

CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING (NOTES omitted)

PRINTING

B41 PRINTING; LINING MACHINES; TYPEWRITERS; STAMPS

B41J TYPEWRITERS; SELECTIVE PRINTING MECHANISMS, {e.g. INK-JET PRINTERS, THERMAL PRINTERS}, i.e. MECHANISMS PRINTING OTHERWISE THAN FROM A FORME; CORRECTION OF TYPOGRAPHICAL ERRORS (composing [B41B](#); printing on special surfaces [B41F](#); laundry marking [B41K](#); erasers, rubbers or erasing devices [B43L 19/00](#); fluid media for correction of typographical errors by coating [C09D 10/00](#); recording the results of measuring [G01](#); recognition or presentation of data, marking record carriers in digital fashion, e.g. by punching, [G06K](#); franking or ticket-printing and issuing apparatus [G07B](#); electric keyboard switches, in general [H01H 13/70](#), [H03K 17/94](#); coding in connection with keyboards or like devices, in general [H03M 11/00](#); receivers or transmitters for transmission of digital information [H04L](#); transmission or reproduction of documents, or the like, e.g. facsimile transmission, [H04N 1/00](#); printing mechanisms specially adapted for apparatus, e.g. cash registers, weighing machines, producing records of their own performance, see the relevant subclasses)

NOTES

1. This subclass covers:
 - manually controlled power-operated apparatus or apparatus of this type with additional control by input of recorded information, e.g. on punched cards or tapes;
 - the "print-out" features of apparatus controlled by record carriers or electric signals in so far as these are of general interest, e.g. impression, inking, line-spacing mechanisms, printing heads.
2. This subclass does not cover:
 - electrical features of apparatus controlled by record carriers or electric signals and of interest apart from the "print-out" features of said apparatus;
 - apparatus controlled by record carriers or electric signals, as a whole.
3. In this subclass, the following term is used with the meaning indicated:
 - "paper" covers also similar flexible copy material;
 - "printing material" covers both paper and temporary record carriers from which records are transferred to a paper, but does not cover printing masters, e.g. formes.

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

Kinds of typewriters or of selective printing mechanisms

- 1/00 Typewriters or selective printing mechanisms characterised by the mounting, arrangement, or disposition of the types or dies (non-selective embossing [B44B 5/00](#))**
- 1/02 . with separate or detached types or dies
 - 1/04 . with types or dies carried upon levers or radial arms, e.g. manually operated ([B41J 1/16](#) takes precedence)
 - 1/06 . . on power-operated levers or arms
 - 1/08 . with types or dies carried on sliding bars or rods
 - 1/10 . . on end surfaces thereof
 - 1/12 . . on side surfaces thereof, e.g. fixed thereto

- 1/14 . . . the types or dies being movable relative to the bars or rods ([mounted on flexible bars or rods \[B41J 1/16\]\(#\)](#))
- 1/16 . with types or dies arranged in stationary or sliding cases or frames or upon flexible strips, plates, bars or rods
- 1/18 . with types or dies strung on wires or rods
- 1/20 . with types or dies mounted on endless bands or the like
- 1/22 . with types or dies mounted on carriers rotatable for selection
- 1/24 . . the plane of the type or die face being perpendicular to the axis of rotation ([B41J 1/60](#) takes precedence)
- 1/243 . . . {Mounting or fixing the carriers}

1/246	. . . {Cartridges for the carriers}				• "ink spray" means a spray of ink transported by a stream of charged particles or air on to the printing material
1/26	. . . Carriers moving for impression (B41J 1/27 takes precedence)				
1/27	. . . Carriers moving during impression				
1/28	. . . Carriers stationary for impression, e.g. with the types or dies not moving relative to the carriers	2/005			• characterised by bringing liquid or particles selectively into contact with a printing material (printing by selective application of impact or pressure on a printing or impression-transfer material B41J 2/22)
1/30	. . . . with the types or dies moving relative to the carriers or mounted on flexible carriers				
1/32	. . the plane of the type or die face being parallel to the axis of rotation, e.g. with type on the periphery of cylindrical carriers (B41J 1/60 takes precedence)	2002/0052			• {Control methods or devices for non ink jet heads}
1/34	. . . Carriers rotating during impression	2002/0055			• {Heating elements adjacent to nozzle orifices of printhead for warming up ink meniscuses, e.g. for lowering the surface tension of the ink meniscuses}
1/36	. . . Carriers sliding for impression, e.g. manually operated				
1/38	. . . . power operated	2/0057			• {where an intermediate transfer member receives the ink before transferring it on the printing material}
1/40	. . . Carriers swinging for impression				
1/42	. . . . about an axis parallel to the axis of rotation of the carrier	2/01			• Ink jet
1/44	. . . Carriers stationary for impression	2002/012			• . . . {with intermediate transfer member}
1/46	. . . . Types or dies fixed on wheel, drum, cylinder, or like carriers	2/015			• . . . characterised by the jet generation process (B41J 2/215 takes precedence)
1/48	. . . . . with a plurality of carriers, one for each character space	2/02			• generating a continuous ink jet
1/50	. . . . . with one or more carriers travelling across copy material in letter-space direction	2002/022			• {Control methods or devices for continuous ink jet}
1/52	. . . . . with copy material moving in the letter-space direction, and the carrier mounting being fixed relative to the machine	2/025			• by vibration
1/54	. . . . . Types or dies movable on wheel, drum, cylinder or like carriers	2/03			• by pressure
1/56	. . . . . Types or dies on shuttles or like loose carriers	2002/031			• {Gas flow deflection}
1/58	. . . . . Types or dies upon arcuate bars	2002/032			• {Deflection by heater around the nozzle}
1/60	. with types or dies on spherical, truncated-spherical, or like surfaces	2002/033			• {Continuous stream with droplets of different sizes}
2/00	Typewriters or selective printing mechanisms characterised by the printing or marking process for which they are designed (mounting, arrangement, or disposition of types or dies B41J 1/00; marking methods B41M 5/00; structure or manufacture of heads, e.g. inductive, for recording by magnetisation or demagnetisation of a record carrier G11B 5/127; heads for reproducing capacitive information G11B 9/07)	2/035			• by electric or magnetic field
		2/04			• generating single droplets or particles on demand
		2002/041			• {Electromagnetic transducer}
		2002/043			• {Electrostatic transducer}
		2/045			• by pressure, e.g. electromechanical transducers
		2/04501			• {Control methods or devices therefor, e.g. driver circuits, control circuits}
		2/04503			• {aiming at compensating carriage speed}
		2/04505			• {aiming at correcting alignment}
		2/04506			• {aiming at correcting manufacturing tolerances}
		2/04508			• {aiming at correcting other parameters}
		2/0451			• {for detecting failure, e.g. clogging, malfunctioning actuator}
		2/04511			• {for electrostatic discharge protection}
		2/04513			• {for increasing lifetime}
		2/04515			• {preventing overheating}
		2/04516			• {preventing formation of satellite drops}
		2/04518			• {reducing costs}
		2/0452			• {reducing demand in current or voltage}
		2/04521			• {reducing number of signal lines needed}
		2/04523			• {reducing size of the apparatus}
		2/04525			• {reducing occurrence of cross talk}
		2/04526			• {controlling trajectory}

NOTES

1. This group covers devices reproducing only a discrete number of tones, whereas group [H04N 1/00](#) covers devices used for the reproduction of documents or the like, which devices are capable of reproducing continuous tone value scales.
2. In this group, the following expressions are used with the meanings indicated:
 - "ink jet" involves the projection of ink on to the printing material, e.g. paper, through a nozzle as a stream of droplets or particles of colouring matter
 - "continuous ink jet" means a jet of ink transformed into a continuous stream of droplets or particles of colouring matter after having left the nozzle

2/04528	. . . . .	{aiming at warming up the head}	2/04591	. . . . .	{Width of the driving signal being adjusted}
2/0453	. . . . .	{controlling a head having a dummy chamber}	2/04593	. . . . .	{Dot-size modulation by changing the size of the drop}
2/04531	. . . . .	{controlling a head having a heater in the manifold}	2/04595	. . . . .	{Dot-size modulation by changing the number of drops per dot}
2/04533	. . . . .	{controlling a head having several actuators per chamber}	2/04596	. . . . .	{Non-ejecting pulses}
2/04535	. . . . .	{involving calculation of drop size, weight or volume}	2/04598	. . . . .	{Pre-pulse}
2/04536	. . . . .	{using history data}	2/05	. . . . .	produced by the application of heat
2/04538	. . . . .	{involving calculation of heater resistance}	2/055	. . . . .	Devices for absorbing or preventing back-pressure
2/0454	. . . . .	{involving calculation of temperature}	2/06	. . . . .	by electric or magnetic field
2/04541	. . . . .	{Specific driving circuit}	2002/061	. . . . .	{Ejection by electric field of ink or of toner particles contained in ink}
2/04543	. . . . .	{Block driving}	2002/062	. . . . .	{by using a divided counter electrode opposite to ejection openings of an electrostatic printhead, e.g. for controlling the flying direction of ejected toner particles by providing the divided parts of the counter electrode with different potentials}
2/04545	. . . . .	{Dynamic block driving}	2002/063	. . . . .	{Moving solid toner particles in carrier liquid by electrostatic force acting on the toner particles, e.g. for accumulating the toner particles around an ejection electrode of an electrostatic printhead}
2/04546	. . . . .	{Multiplexing}	2/065	. . . . .	involving the preliminary making of ink protuberances
2/04548	. . . . .	{Details of power line section of control circuit}	2/07	. . .	characterised by jet control (B41J 2/205 takes precedence)
2/0455	. . . . .	{Details of switching sections of circuit, e.g. transistors}	2/072	. . . . .	{by thermal compensation}
2/04551	. . . . .	{using several operating modes}	2/075	. . . . .	for many-valued deflection
2/04553	. . . . .	{detecting ambient temperature}	2/08	. . . . .	charge-control type
2/04555	. . . . .	{detecting current}	2/085	. . . . .	Charge means, e.g. electrodes
2/04556	. . . . .	{detecting distance to paper}	2/09	. . . . .	Deflection means
2/04558	. . . . .	{detecting presence or properties of a dot on paper}	2/095	. . . . .	electric field-control type
2/0456	. . . . .	{detecting drop size, volume or weight}	2/10	. . . . .	magnetic field-control type
2/04561	. . . . .	{detecting presence or properties of a drop in flight}	2/105	. . . . .	for binary-valued deflection
2/04563	. . . . .	{detecting head temperature; Ink temperature}	2/11	. . . . .	for ink spray
2/04565	. . . . .	{detecting heater resistance}	2/115	. . . . .	synchronising the droplet separation and charging time
2/04566	. . . . .	{detecting humidity}	2/12	. . . . .	testing or correcting charge or deflection
2/04568	. . . . .	{Control according to number of actuators used simultaneously}	2/125	. . . . .	Sensors, e.g. deflection sensors
2/0457	. . . . .	{Power supply level being detected or varied}	2/13	. . . . .	for inclination of printed pattern
2/04571	. . . . .	{detecting viscosity}	2/135	. . .	Nozzles
2/04573	. . . . .	{Timing; Delays}	2/14	. . . . .	Structure thereof {only for on-demand ink jet heads}
2/04575	. . . . .	{controlling heads of acoustic type}	2/14008	. . . . .	{Structure of acoustic ink jet print heads}
2/04576	. . . . .	{controlling heads of electrostatic type}	2/14016	. . . . .	{Structure of bubble jet print heads}
2/04578	. . . . .	{controlling heads based on electrostatically-actuated membranes}	2/14024	. . . . .	{Assembling head parts}
2/0458	. . . . .	{controlling heads based on heating elements forming bubbles}	2/14032	. . . . .	{Structure of the pressure chamber}
2/04581	. . . . .	{controlling heads based on piezoelectric elements}	2/1404	. . . . .	{Geometrical characteristics}
2/04583	. . . . .	{controlling heads based on discharge by lowering the surface tension of meniscus}	2/14048	. . . . .	{Movable member in the chamber}
2/04585	. . . . .	{controlling heads based on thermal bent actuators}	2/14056	. . . . .	{Plural heating elements per ink chamber}
2/04586	. . . . .	{controlling heads of a type not covered by groups B41J 2/04575 - B41J 2/04585 , or of an undefined type}	2/14064	. . . . .	{Heater chamber separated from ink chamber by a membrane}
2/04588	. . . . .	{using a specific waveform}	2/14072	. . . . .	{Electrical connections, e.g. details on electrodes, connecting the chip to the outside...}
2/0459	. . . . .	{Height of the driving signal being adjusted}	2/1408	. . . . .	{Structure dealing with thermal variations, e.g. cooling device, thermal coefficients of materials}

2/14088	. . . . .	{Structure of heating means}	2002/14419	. . . . .	{Manifold (for bubble jet B41J 2/14145)}
2/14096	. . . . .	{Current flowing through the ink}	2/14427	. . . . .	{Structure of ink jet print heads with thermal bend detached actuators}
2/14104	. . . . .	{Laser or electron beam heating the ink}	2002/14435	. . . . .	{Moving nozzle made of thermal bend detached actuator}
2/14112	. . . . .	{Resistive element}	2002/14443	. . . . .	{Nozzle guard}
2/1412	. . . . .	{Shape}	2/14451	. . . . .	{Structure of ink jet print heads discharging by lowering surface tension of meniscus}
2/14129	. . . . .	{Layer structure}	2002/14459	. . . . .	{Matrix arrangement of the pressure chambers}
2/14137	. . . . .	{Resistor surrounding the nozzle opening}	2002/14467	. . . . .	{Multiple feed channels per ink chamber}
2/14145	. . . . .	{Structure of the manifold}	2002/14475	. . . . .	{characterised by nozzle shapes or number of orifices per chamber}
2/14153	. . . . .	{Structures including a sensor}	2002/14483	. . . . .	{Separated pressure chamber (for bubble jet B41J 2/14064)}
2/14161	. . . . .	{Structure having belt or drum with holes filled with ink}	2002/14491	. . . . .	{Electrical connection (for bubble jet B41J 2/14072)}
2002/14169	. . . . .	{Bubble vented to the ambience}	2/145	. . . . .	Arrangement thereof
2002/14177	. . . . .	{Segmented heater}	2/15	. . . . .	for serial printing
2002/14185	. . . . .	{characterised by the position of the heater and the nozzle}	2/155	. . . . .	for line printing
2002/14193	. . . . .	{movable member in the ink chamber (for bubble jet B41J 2/14048)}	2/16	. . . . .	Production of nozzles
2/14201	. . . . .	{Structure of print heads with piezoelectric elements}	2/1601	. . . . .	{Production of bubble jet print heads (B41J 2/1606 , B41J 2/162 take precedence)}
2/14209	. . . . .	{of finger type, chamber walls consisting integrally of piezoelectric material}	2/1603	. . . . .	{of the front shooter type}
2002/14217	. . . . .	{Multi layer finger type piezoelectric element}	2/1604	. . . . .	{of the edge shooter type}
2002/14225	. . . . .	{Finger type piezoelectric element on only one side of the chamber}	2/1606	. . . . .	{Coating the nozzle area or the ink chamber}
2/14233	. . . . .	{of film type, deformed by bending and disposed on a diaphragm}	2/1607	. . . . .	{Production of print heads with piezoelectric elements (B41J 2/1606 , B41J 2/162 take precedence)}
2002/14241	. . . . .	{having a cover around the piezoelectric thin film element}	2/1609	. . . . .	{of finger type, chamber walls consisting integrally of piezoelectric material}
2002/1425	. . . . .	{Embedded thin film piezoelectric element}	2/161	. . . . .	{of film type, deformed by bending and disposed on a diaphragm}
2002/14258	. . . . .	{Multi layer thin film type piezoelectric element}	2/1612	. . . . .	{of stacked structure type, deformed by compression/extension and disposed on a diaphragm}
2002/14266	. . . . .	{Sheet-like thin film type piezoelectric element}	2/1614	. . . . .	{of cantilever type}
2/14274	. . . . .	{of stacked structure type, deformed by compression/extension and disposed on a diaphragm}	2/1615	. . . . .	{of tubular type}
2/14282	. . . . .	{of cantilever type}	2/1617	. . . . .	{of disc type}
2/1429	. . . . .	{of tubular type}	2/1618	. . . . .	{Fixing the piezoelectric elements}
2/14298	. . . . .	{of disc type}	2/162	. . . . .	{Manufacturing of the nozzle plates}
2002/14306	. . . . .	{Flow passage between manifold and chamber}	2/1621	. . . . .	{manufacturing processes}
2/14314	. . . . .	{Structure of ink jet print heads with electrostatically actuated membrane}	2/1623	. . . . .	{bonding and adhesion}
2002/14322	. . . . .	{Print head without nozzle}	2/1625	. . . . .	{electroforming}
2/1433	. . . . .	{Structure of nozzle plates}	2/1626	. . . . .	{etching}
2002/14338	. . . . .	{Multiple pressure elements per ink chamber (for bubble jet B41J 2/14056)}	2/1628	. . . . .	{dry etching}
2002/14346	. . . . .	{Ejection by pressure produced by thermal deformation of ink chamber, e.g. buckling}	2/1629	. . . . .	{wet etching}
2002/14354	. . . . .	{Sensor in each pressure chamber}	2/1631	. . . . .	{photolithography}
2002/14362	. . . . .	{Assembling elements of heads}	2/1632	. . . . .	{machining}
2002/1437	. . . . .	{Back shooter}	2/1634	. . . . .	{laser machining}
2002/14379	. . . . .	{Edge shooter}	2/1635	. . . . .	{dividing the wafer into individual chips}
2002/14387	. . . . .	{Front shooter}	2/1637	. . . . .	{molding}
2002/14395	. . . . .	{Electrowetting}	2/1639	. . . . .	{sacrificial molding}
2002/14403	. . . . .	{including a filter}	2/164	. . . . .	{thin film formation}
2002/14411	. . . . .	{Groove in the nozzle plate}	2/1642	. . . . .	{thin film formation by CVD [chemical vapor deposition]}
			2/1643	. . . . .	{thin film formation by plating}
			2/1645	. . . . .	{thin film formation by spincoating}

2/1646	. . . . .	{thin film formation by sputtering}	2/16588	. . . . .	{Print heads movable towards the cleaning unit}
2/1648	. . . . .	{Production of print heads with thermal bend detached actuators}	2002/16591	. . . . .	{for line print heads above an endless belt}
2/165	. . . . .	Preventing {or detecting} of nozzle clogging, e.g. cleaning, capping or moistening for nozzles	2002/16594	. . . . .	{Pumps or valves for cleaning}
2002/16502	. . . . .	{Printhead constructions to prevent nozzle clogging or facilitate nozzle cleaning}	2002/16597	. . . . .	{Pumps for idle discharge of liquid through nozzles}
2/16505	. . . . .	{Caps, spittoons or covers for cleaning or preventing drying out}	2/17	. . . . .	characterised by ink handling
2/16508	. . . . .	{connected with the printer frame}	2/1707	. . . . .	{Conditioning of the inside of ink supply circuits, e.g. flushing during start-up or shut-down}
2/16511	. . . . .	{Constructions for cap positioning (B41J 2/16547 takes precedence)}	2/1714	. . . . .	{Conditioning of the outside of ink supply systems, e.g. inkjet collector cleaning, ink mist removal (B41J 2/08, B41J 2/16517, B41J 2/18 take precedence)}
2002/16514	. . . . .	{creating a distance between cap and print head, e.g. for suction or pressurising}	2/1721	. . . . .	{Collecting waste ink; Collectors therefor}
2/16517	. . . . .	{Cleaning of print head nozzles (B41J 2/16505, B41J 2/1707, B41J 2/1714 take precedence)}	2002/1728	. . . . .	{Closed waste ink collector}
2/1652	. . . . .	{by driving a fluid through the nozzles to the outside thereof, e.g. by applying pressure to the inside or vacuum at the outside of the print head}	2002/1735	. . . . .	{Closed waste ink collector with ink supply tank in common container}
2/16523	. . . . .	{Waste ink collection from caps or spittoons, e.g. by suction}	2002/1742	. . . . .	{Open waste ink collector, e.g. ink receiving from a print head above the collector during borderless printing}
2/16526	. . . . .	{by applying pressure only}	2/175	. . . . .	Ink supply systems ; Circuit parts therefor}
2002/16529	. . . . .	{Idle discharge on printing matter}	2/17503	. . . . .	{Ink cartridges}
2/16532	. . . . .	{by applying vacuum only}	2/17506	. . . . .	{Refilling of the cartridge}
2/16535	. . . . .	{using wiping constructions (B41J 2/16552 takes precedence)}	2/17509	. . . . .	{Whilst mounted in the printer}
2/16538	. . . . .	{with brushes or wiper blades perpendicular to the nozzle plate}	2/17513	. . . . .	{Inner structure}
2/16541	. . . . .	{Means to remove deposits from wipers or scrapers}	2002/17516	. . . . .	{comprising a collapsible ink holder, e.g. a flexible bag}
2/16544	. . . . .	{Constructions for the positioning of wipers}	2/1752	. . . . .	{Mounting within the printer}
2/16547	. . . . .	{the wipers and caps or spittoons being on the same movable support}	2/17523	. . . . .	{Ink connection}
2002/1655	. . . . .	{with wiping surface parallel with nozzle plate and mounted on reels, e.g. cleaning ribbon cassettes}	2/17526	. . . . .	{Electrical contacts to the cartridge}
2/16552	. . . . .	{using cleaning fluids}	2/1753	. . . . .	{Details of contacts on the cartridge, e.g. protection of contacts}
2002/16555	. . . . .	{Air or gas for cleaning}	2/17533	. . . . .	{Storage or packaging of ink cartridges}
2002/16558	. . . . .	{Using cleaning liquid for wet wiping}	2/17536	. . . . .	{Protection of cartridges or parts thereof, e.g. tape}
2002/16561	. . . . .	{by an electrical field}	2/1754	. . . . .	{with means attached to the cartridge, e.g. protective cap}
2002/16564	. . . . .	{Heating means therefor, e.g. for hot melt inks}	2/17543	. . . . .	{Cartridge presence detection or type identification}
2002/16567	. . . . .	{using ultrasonic or vibrating means}	2/17546	. . . . .	{electronically}
2002/1657	. . . . .	{Cleaning of only nozzles or print head parts being selected}	2/1755	. . . . .	{mechanically}
2002/16573	. . . . .	{Cleaning process logic, e.g. for determining type or order of cleaning processes}	2/17553	. . . . .	{Outer structure}
2002/16576	. . . . .	{Cleaning means pushed or actuated by print head movement}	2/17556	. . . . .	{Means for regulating the pressure in the cartridge}
2/16579	. . . . .	{Detection means therefor, e.g. for nozzle clogging}	2/17559	. . . . .	{Cartridge manufacturing}
2002/16582	. . . . .	{Maintenance means fixed on the print head or its carriage}	2/17563	. . . . .	{Ink filters}
2/16585	. . . . .	{for paper-width or non-reciprocating print heads}	2/17566	. . . . .	{Ink level or ink residue control}
			2002/17569	. . . . .	{based on the amount printed or to be printed}
			2002/17573	. . . . .	{using optical means for ink level indication}
			2002/17576	. . . . .	{using a floater for ink level indication}
			2002/17579	. . . . .	{Measuring electrical impedance for ink level indication}
			2002/17583	. . . . .	{using vibration or ultra-sons for ink level indication}
			2002/17586	. . . . .	{using ink bag deformation for ink level indication}
			2002/17589	. . . . .	{using ink level as input for printer mode selection or for prediction of remaining printing capacity}

2/17593	. . . . . {Supplying ink in a solid state}	2/25	. . . . . Print wires
2/17596	. . . . . {Ink pumps, ink valves}	2/255	. . . . . Arrangement of the print ends of the wires
2/18	. . . . . Ink recirculation systems	2/26	. . . . . Connection of print wire and actuator
2/185	. . . . . Ink-collectors; Ink-catchers	2/265	. . . . . Guides for print wires
2002/1853	. . . . . {ink collectors for continuous Inkjet printers, e.g. gutters, mist suction means}	2/27	. . . . . Actuators for print wires
2002/1856	. . . . . {waste ink containers}	2/275	. . . . . of clapper type (B41J 2/28 takes precedence)
2/19	. . . . . for removing air bubbles	2/28	. . . . . of spring charge type, i.e. with mechanical power under electro-magnetic control
2/195	. . . . . for monitoring ink quality	2/285	. . . . . of plunger type
2/20	. . . . . for preventing or detecting contamination of compounds	2/29	. . . . . of moving-coil type
2/205	. . . . . for printing a discrete number of tones (B41J 2/21 takes precedence)	2/295	. . . . . using piezo-electric elements
2/2052	. . . . . {by dot superpositioning, e.g. multipass doubling}	2/30	. . . . . Control circuits for actuators
2/2054	. . . . . {by the variation of dot disposition or characteristics, e.g. dot number density, dot shape}	2/305	. . . . . Ink supply apparatus (ink ribbons, ink-ribbon mechanisms B41J 31/00 - B41J 35/00)
2/2056	. . . . . {by ink density change}	2/31	. . . . . using a print element with projections on its surface impacted or impressed by hammers
2002/2058	. . . . . {selecting different ink densities from one colour}	2/315	. . . . . characterised by selective application of heat to a heat sensitive printing or impression-transfer material (B41J 2/385, B41J 2/435 take precedence)
2/21	. . . . . for multi-colour printing	2/32	. . . . . using thermal heads
2/2103	. . . . . {Features not dealing with the colouring process <i>per se</i> , e.g. construction of printers or heads, driving circuit adaptations}	2/325	. . . . . by selective transfer of ink from ink carrier, e.g. from ink ribbon or sheet
2/2107	. . . . . {characterised by the ink properties}	2/33	. . . . . from ink roller
2/211	. . . . . {Mixing of inks, solvent or air prior to paper contact}	2/335	. . . . . Structure of thermal heads
2/2114	. . . . . {Ejecting transparent or white coloured liquids, e.g. processing liquids (B41J 2/211 takes precedence)}	2/33505	. . . . . {Constructional details}
2/2117	. . . . . {Ejecting white liquids}	2/3351	. . . . . {Electrode layers}
2/2121	. . . . . {characterised by dot size, e.g. combinations of printed dots of different diameter}	2/33515	. . . . . {Heater layers}
2/2125	. . . . . {by means of nozzle diameter selection}	2/3352	. . . . . {Integrated circuits}
2/2128	. . . . . {by means of energy modulation}	2/33525	. . . . . {Passivation layers}
2/2132	. . . . . {Print quality control characterised by dot disposition, e.g. for reducing white stripes or banding (methods for local corrections by dot omission, image edge enhancement, or multi-pass mask selection G06K 15/102; colour conversion H04N 1/40)}	2/3353	. . . . . {Protective layers}
2/2135	. . . . . {Alignment of dots (adjustments by bodily moving print heads or carriages B41J 25/001)}	2/33535	. . . . . {Substrates}
2/2139	. . . . . {Compensation for malfunctioning nozzles creating dot place or dot size errors}	2/3354	. . . . . {characterised by geometry}
2/2142	. . . . . {Detection of malfunctioning nozzles (for cleaning purposes B41J 2/16579; jet deflection sensors B41J 2/125)}	2/33545	. . . . . {characterised by dimensions}
2/2146	. . . . . {for line print heads}	2/3355	. . . . . {characterised by materials}
2/215	. . . . . by passing a medium, e.g. consisting of an air or particle stream, through an ink mist	2/33555	. . . . . {characterised by type}
2/22	. . . . . characterised by selective application of impact or pressure on a printing material or impression-transfer material	2/3356	. . . . . {Corner type resistors}
2/225	. . . . . ballistic, e.g. using solid balls or pellets	2/33565	. . . . . {Edge type resistors}
2/23	. . . . . using print wires	2/3357	. . . . . {Surface type resistors}
2/235	. . . . . Print head assemblies	2/33575	. . . . . {Processes for assembling process heads}
2/24	. . . . . serial printer type (B41J 2/25, B41J 2/265 take precedence)	2/3358	. . . . . {Cooling arrangements}
2/245	. . . . . line printer type (B41J 2/25, B41J 2/265 take precedence)	2/33585	. . . . . {Hollow parts under the heater}
		2/3359	. . . . . {Manufacturing processes}
		2/33595	. . . . . {Conductors through the layered structure}
		2/34	. . . . . comprising semiconductors
		2/345	. . . . . characterised by the arrangement of resistors or conductors
		2/35	. . . . . providing current or voltage to the thermal head
		2/355	. . . . . Control circuits for heating-element selection
		2/3551	. . . . . {Block driving}
		2/3553	. . . . . {Heater resistance determination}
		2/3555	. . . . . {Historical control}
		2/3556	. . . . . {Preheating pulses}
		2/3558	. . . . . {Voltage control or determination}
		2/36	. . . . . Print density control
		2/362	. . . . . {Correcting density variation}
		2/365	. . . . . by compensation for variation in temperature
		2/37	. . . . . by compensation for variation in current
		2/375	. . . . . Protection arrangements against overheating
		2/38	. . . . . Preheating, i.e. heating to a temperature insufficient to cause printing

- 2/385 . characterised by selective supply of electric current or selective application of magnetism to a printing or impression-transfer material ([B41J 2/005 takes precedence](#); [electrography](#), [magnetography G03G](#))
- 2/3855 . . {[Electrographic print heads using processes not otherwise provided for](#), e.g. [electrolysis](#)}
- 2/39 . . using multi-stylus heads
- 2/395 . . . Structure of multi-stylus heads
- 2/40 . . . providing current or voltage to the multi-stylus head
- 2/405 Selection of the stylus or auxiliary electrode to be supplied ([electronic switching circuits in general H03K 17/00](#))
- 2/41 . . for electrostatic printing ([B41J 2/39 takes precedence](#))
- 2/415 . . . by passing charged particles through a hole or a slit
- 2/4155 {[for direct electrostatic printing \[DEP\]](#)}
- 2/42 . . for heating selectively
- 2/425 . . for removing surface layer selectively from electro-sensitive material, e.g. metal coated paper
- 2/43 . . for magnetic printing
- 2/435 . characterised by selective application of radiation to a printing material or impression-transfer material ([optical elements, systems, or apparatus G02B](#); [modulation or deflection of light G02F](#); [electrophotography G03G](#))
- 2/44 . . using single radiation source {[per colour](#)}, e.g. lighting beams or shutter arrangements ({[B41J 2/465](#), [B41J 2/47](#)}, [B41J 2/475 take precedence](#))
- 2/442 . . . {[using lasers \(ablative marking methods and sheet materials for use therein B41M 5/24; working material by laser beam in general B23K 26/00\)](#)}
- 2/445 . . . using liquid crystals
- 2/447 . . using arrays of radiation sources ([B41J 2/475 takes precedence](#))
- 2/4473 . . . {[using liquid crystal \[LC\] arrays](#)}
- 2/4476 . . . {[using cathode ray or electron beam tubes](#)}
- 2/45 . . . using light-emitting diode {[[LED](#)] or laser} arrays
- 2/451 {[Special optical means therefor](#), e.g. [lenses](#), [mirrors](#), [focusing means](#)}
- 2002/453 {[self-scanning](#)}
- 2/455 . . . using laser arrays {, [the laser array being smaller than the medium to be recorded](#)}
- 2/46 . . . characterised by using glass fibres
- 2/465 . . using masks, e.g. light-switching masks ([photographic composing B41B](#))
- 2/4655 . . . {[using character templates](#)}
- 2/47 . . using the combination of scanning and modulation of light
- 2/471 . . . {[using dot sequential main scanning by means of a light deflector](#), e.g. [a rotating polygonal mirror](#)}
- 2/473 {[using multiple light beams](#), [wavelengths](#) or [colours](#)}
- 2/475 . . for heating selectively {[by radiation or ultrasonic waves](#)}
- 2/4753 . . . {[using thermosensitive substrates](#), e.g. [paper](#)}
- 2002/4756 {[Erasing by radiation](#)}
- 2/48 . . . melting ink on a film or melting ink granules
- 2/485 . characterised by the process of building-up characters {or [image elements](#)} applicable to two or more kinds of printing or marking processes
- 2/49 . . by writing
- 2/495 . . by selective printing from a rotating helical member
- 2/50 . . by the selective combination of two or more non-identical printing elements
- 2/505 . . from an assembly of identical printing elements {([printers with two or more sets of printing elements B41J 3/54](#); [arrangements for producing a permanent visual presentation of the digital output data using matrix printers](#), e.g. [individual print element control for printing letters G06K 15/10](#))}
- 2/5052 . . . {[with special adaptations characterised by the ink properties \(B41J 2/2107 takes precedence\)](#)}
- 2/5054 . . . {[with special adaptations characterised by dot size \(B41J 2/2121 takes precedence\)](#)}
- 2/5056 . . . {[using dot arrays providing selective dot disposition modes](#), e.g. [different dot densities for high speed and high quality printing](#), [array line selections for multi-pass printing](#), or [dot shifts for character inclination \(B41J 2/2132 takes precedence\)](#); [providing dot disposition modes by bodily changing the angle of a print head B41J 25/003](#))}
- 2/5058 {[locally](#), i.e. for single dots or for small areas of a character ([methods for insertion or deletion of dots](#), or for character edge smoothing [G06K 15/102](#))}
- 2/51 . . . serial printer type
- 2/512 {[Adjustment of the dot disposition by adjustment of the arrangement of the dot printing elements of a print head](#), e.g. [nozzles](#), [needles](#)}
- WARNING**
This group is no longer used for the classification of new documents as from January 1, 2010. The backlog of this group is being continuously reclassified to [B41J 25/001](#) and subgroups
- 2/515 . . . line printer type
- 2/52 . Arrangement for printing a discrete number of tones, not covered by group [B41J 2/205](#), e.g. applicable to two or more kinds of printing or marking process ([B41J 2/525 takes precedence](#); for [photomechanical production G03F 5/00](#))
- 2/525 . Arrangement for multi-colour printing, not covered by group [B41J 2/21](#), e.g. applicable to two or more kinds of printing or marking process (for [photomechanical production G03F 3/00](#))
- 3/00** **Typewriters or selective printing or marking mechanisms, {e.g. [ink-jet printers](#), [thermal printers](#)} characterised by the purpose for which they are constructed ([cryptographic typewriters G09C 3/00](#))**
- 3/01 . for special character, e.g. for Chinese characters or barcodes
- 3/24 . for perforating or stencil cutting using special types or dies
- 3/26 . for stenographic writing

- 3/28 . . for printing downwardly on flat surfaces, e.g. of books, drawings, boxes {, envelopes, e.g. flat-bed ink-jet printers (B41J 3/36, B41J 3/407, B41J 3/4071, B41J 3/4073, B41J 3/4075, B41J 3/4076, B41J 3/4078 take precedence; flat page-size platens B41J 11/06; conveyor belts B41J 13/12; drawing instruments B43L 13/00, automatic draughting machines B43L 13/022)}
- 3/283 . . {on bank books or the like}
- 3/286 . . {on boxes}
- 3/30 . . for printing with large type, e.g. on bulletins, tickets
- 3/32 . . for printing in Braille or with keyboards specially adapted for use by blind or disabled persons
- 3/34 . . for printing musical scores
- 3/36 . . for portability {, i.e. hand-held printers or laptop printers (B41J 3/4075 takes precedence; printers with reduced dimensions B41J 29/023; stackable printers B41J 29/026)}
- 3/365 . . {Toy typewriters (toy imitations of typewriters A63H 33/3077)}
- 3/37 . . Foldable typewriters
- 3/38 . . for embossing, e.g. for making matrices for stereotypes {(surface shaping, e.g. embossing B29C 59/00; mechanical deformation of paper or cardboard without removing material B31F 1/00; machines or apparatus for embossing decorations or marks B44B 5/00)}
- 3/382 . . {of tapes, e.g. tape cartridges}
- 3/385 . . {of plates, e.g. metal plates, plastic cards}
- 3/387 . . . {with automatic plate transport systems, e.g. for credit cards}
- 3/39 . . hand-held (manually-controlled or manually-operable label dispensers having printing equipment B65C 11/02)
- 3/407 . . for marking on special material (printing on special surfaces B41F 7/00; {apparatus or processes for manufacturing printed circuits by printing or dispensing a conductive paste or ink H05K 3/1241})
- 3/4071 . . {Printing on disk-shaped media, e.g. CDs}
- 3/4073 . . {Printing on three-dimensional objects not being in sheet or web form, e.g. spherical or cubic objects (B41J 3/283, B41J 3/286 take precedence; building up a 3D object using individual droplets from jetting heads B29C 64/112)}
- 3/4075 . . {Tape printers; Label printers (tape cartridges B41J 15/044)}
- 3/4076 . . {printing on rewritable, bistable "electronic paper" by a focused electric or magnetic field (displays in which the positions of movable elements are controlled by the application of an electric field G09F 9/372, of a magnetic field G09F 9/375)}
- 3/4078 . . {Printing on textile (ink-jet dying or printing processes for textile D06P 5/30; conversion of colour signals for textile printing H04N 1/54)}
- 3/413 . . for metal
- 3/42 . . Two or more complete typewriters coupled for simultaneous operation
- 3/44 . . Typewriters or selective printing mechanisms having dual functions or combined with, or coupled to, apparatus performing other functions (printing mechanisms coupled to typographical composing machines B41B 27/41)
- 3/445 . . {Printers integrated in other types of apparatus, e.g. printers integrated in cameras}

- 3/46 . . . Printing mechanisms combined with apparatus providing a visual indication
- 3/50 . . . Mechanisms producing characters by printing and also producing a record by other means {, e.g. printer combined with RFID writer} (punching mechanisms G06K)
- 3/51 . . . the printed and recorded information being identical; using type elements with code-generating means (G06K 1/12 takes precedence)
- 3/54 . . with two or more sets of type or printing elements (B41J 3/60 takes precedence)
- 3/543 . . {with multiple inkjet print heads (B41J 2/17503, B41J 2/2103 take precedence)}
- 3/546 . . {Combination of different types, e.g. using a thermal transfer head and an inkjet print head}
- 3/60 . . for printing on both faces of the printing material
- 3/62 . . for printing on two or more separate sheets or strips of printing material {being conveyed simultaneously to or through the printing zone} (B41J 3/54 takes precedence {; B41J 15/18, B41J 15/20, B41J 15/22 and B41J 15/24 take precedence})

Common details or accessories

- 5/00 **Devices or arrangements for controlling character selection** ({interpreting G06K 3/00; } methods or arrangements for sensing record carriers G06K 7/00)
- 5/02 . . Character or syllable selected by setting an index
- 5/04 . . . Single-character selection
- 5/06 . . . Multiple-character selection
- 5/08 . . Character or syllable selected by means of keys or keyboards of the typewriter type
- WARNING**
Groups B41J 5/08 - B41J 5/28 are no longer used for the classification of new documents. See G06F 3/00
- 5/10 . . . Arrangements of keyboards {, e.g. key button disposition}
- 5/102 . . . {Keyboard overlays (for computer use G06F 3/023)}
- 5/105 . . . {Constructional details of keyboard frames, e.g. adjusting or fixation means}
- 5/107 . . . {for special purposes, e.g. Braille, Chinese, multi-language options}
- 5/12 . . Construction of key buttons
- 5/14 . . Construction of key levers
- 5/16 . . Mounting or connecting key buttons on or to key levers
- 5/18 . . Locks
- 5/20 . . . for subsidiary keys, e.g. for shift keys
- 5/22 . . . Interlocks between keys, e.g. without detent arrangements
- 5/24 with detent arrangements
- 5/26 . . Regulating touch, key dip or stroke, or the like
- 5/28 . . Multiple-action keys, e.g. keys depressed by two or more amounts or movable in two or more directions to effect different functions or selections
- 5/30 . . Character or syllable selection controlled by recorded information
- 5/31 . . characterised by form of recorded information

- 5/32 . . . by printed, embossed, or photographic records, e.g. cards, sheets
- 5/34 by strips or tapes
- 5/36 . . . by punched records, e.g. cards, sheets
- 5/38 by strips or tapes
- 5/40 . . . by magnetic or electrostatic records, e.g. cards, sheets
- 5/42 by strips or tapes
- 5/44 . . characterised by storage of recorded information
- 5/46 . . . on internal storages
- 5/48 . . . on external storages
- 5/50 on a single storage
- 5/51 on more than one separate storage, e.g. on additional correction strips or tapes
- 5/52 . . characterised by the provision of additional devices for producing a punched or like record, e.g. simultaneously
- 7/00 Type-selecting or type-actuating mechanisms**
(index setting [B41J 5/02](#))
- 7/005 . {Type-selecting actions or mechanisms by unusual means, e.g. for use by physically disabled persons (control means for physically disabled persons in general [A61F 4/00](#))}
- 7/02 . Type-lever actuating mechanisms
- 7/04 . . Levers mounted on fixed pivots
- 7/06 . . . and connected to transmission members, e.g. toothed gearing
- 7/08 with pin-and-slot or like loose connections; Cam-slot members
- 7/10 Chain, belt, flexible cable, or like members
- 7/12 . . . U-shaped type-lever on two pivots
- 7/14 . . . Single key-and-type lever
- 7/16 . . . Type-head pivoted to or rotating on lever
- 7/18 . . Levers having moving or variable fulcra to alter the mechanical advantage during the stroke
- 7/20 . . Levers having moving pivots fixed relative to the lever; Type- bars each pivoted on two links
- 7/22 . . Type-baskets; Bearings or hangers for type levers
- 7/24 . . Construction of type-levers ([U-shaped levers B41J 7/12](#))
- 7/26 . . Special means, e.g. repulsers, for ensuring return of type- levers
- 7/28 . . Key lever and type member returned independently to rest position
- 7/30 . . Preventing rebound or clash of levers or type members
- 7/32 . Type-face selected by operation of sliding members
- 7/34 . Type-face selected by operation of rotary members
- 7/36 . Selecting arrangements applied to type-carriers rotating during impression
- 7/38 . . Type movable on carrier for selection
- 7/40 . . Type movable on carrier for impression
- 7/42 . . Timed impression, e.g. without impact
- 7/44 . . . with impact
- 7/46 . . Rolling contact during impression
- 7/48 . Type carrier arrested in selected position by electromagnetic means
- 7/50 . Type-face selected by combinations of two movements of type carrier
- 7/52 . . by combined rotary and sliding movement
- 7/54 . Selecting arrangements including combinations, permutation, summation, or aggregation means
- 7/56 . . Summation devices for mechanical movements
- 7/58 . . . Wedges
- 7/60 . . . Levers
- 7/62 . . . Gearing
- 7/64 . . . Pulley and strand mechanism
- 7/66 . . Movable members, e.g. pins, displaceable according to a code
- 7/68 . . with means for selectively closing an electric circuit for type presentation
- 7/90 . Syllable, line, or like type selection
- 7/92 . Impact adjustment; Means to give uniformity of impression ([B41J 9/46](#), [B41J 9/48](#) take precedence)
- 7/94 . . Character-by-character adjustment
- 7/96 . Means checking correctness of setting
- 9/00 Hammer-impression mechanisms**
- 9/02 . Hammers; Arrangements thereof
- 9/04 . . of single hammers, e.g. travelling along printing line
- 9/06 . . . of stationary hammers, e.g. engaging a single type-carrier
- 9/08 engaging more than one type-carrier
- 9/10 . . of more than one hammer, e.g. one for each character position
- 9/12 . . . each operating in more than one character position
- 9/127 . . Mounting of hammers
- 9/133 . . Construction of hammer body or tip
- 9/14 . Means for selecting or suppressing individual hammers
- 9/16 . Means for cocking or resetting hammers
- 9/18 . . Cams
- 9/20 . . Springs
- 9/22 . . Fluid-pressure means
- 9/24 . . Electromagnetic means
- 9/26 . Means for operating hammers to effect impression
- 9/28 . . Cams
- 9/30 . . Springs
- 9/32 . . arranged to be clutched to snatch roll
- 9/34 . . Fluid-pressure means
- 9/36 . . in which mechanical power is applied under electromagnetic control
- 9/38 . . Electromagnetic means
- 9/40 . . including an electro-adhesive clutch
- 9/42 . with anti-rebound arrangements
- 9/44 . Control for hammer-impression mechanisms
- 9/46 . . for deciding or adjusting hammer-firing time
- 9/48 . . for deciding or adjusting hammer-drive energy
- 9/50 . . for compensating for the variations of printer drive conditions, e.g. for compensating for the variation of temperature or current supply
- 9/52 . . for checking the operation of print hammers
- 9/54 . . . for checking the breakage of print hammers

- 11/00** **Devices or arrangements {of selective printing mechanisms, e.g. ink-jet printers, thermal printers,} for supporting or handling copy material in sheet or web form** ({printing on both faces [B41J 3/60](#); } specially adapted for supporting or handling copy material in short lengths [B41J 13/00](#); in continuous form [B41J 15/00](#); holders for text to be copied [B41J 29/00](#) {; handling sheets or webs in general [B65H](#); apparatus for electrographic processes using a charge pattern, e.g. copying machines, [G03G 15/00](#)})
- 11/0005 . {Curl smoothing, i.e. smoothing down corrugated printing material, e.g. by pressing means acting on wrinkled printing material (means for tensioning webs in general [B41J 15/16](#); tensioning webs by using redirecting rollers or redirecting nonrevolving guides [B41J 15/165](#); smoothers in general [B65H 5/36](#) or [B65H 29/52](#); taking out curl from webs [B65H 23/34](#); decurling sheets [G03G 15/6576](#))}
- 11/001 . {Handling wide copy materials, (wide cut sheets [B41J 13/0072](#))}
- 11/0015 . {for treating before, during or after printing or for uniform coating or laminating the copy material before or after printing (selective coating [B41J 2/2114](#); application of ink fixing material by inkjet printers [B41M 5/0011](#); after-treatment of prints relating to the nature of material [B41M 7/00](#); after-treatment of prints using protective coatings or layers [B41M 7/0027](#))}
- 11/002 . . {Heating or irradiating, e.g. by UV or IR, or drying of copy material}
- 11/0025 . {Handling copy materials differing in width}
- 11/003 . . {Paper-size detection, i.e. automatic detection of the length and/or width of copy material}
- 11/0035 . {Handling copy materials differing in thickness ([B41J 11/20](#) and [B41J 25/308](#) take precedence)}
- 11/004 . {Platenless printing, i.e. conveying the printing material freely, without support on its back, through the printing zone opposite to the print head}
- 11/0045 . {Guides for printing material (curl smoothing [B41J 11/0005](#); platens [B41J 11/02](#), [B41J 11/06](#); guiding webs [B41J 15/046](#))}
- 11/005 . . {Guides in the printing zone, e.g. guides for preventing contact of conveyed sheets with printhead (guides in the printing section for copy material in short lengths [B41J 13/14](#))}
- 11/0055 . . {Lateral guides, e.g. guides for preventing skewed conveyance of printing material}
- 11/006 . {Means for preventing paper jams or for facilitating their removal}
- 11/0065 . {Means for printing without leaving a margin on at least one edge of the copy material, e.g. edge-to-edge printing}
- 11/007 . {Conveyor belts or like feeding devices (conveyor belts specially adapted for handling sheets [B41J 13/08](#); conveyor belts specially adapted for handling copy material in continuous form [B41J 15/048](#); conveyor belts in general [B65G 15/00](#); separating articles from piles using belts [B65H 3/04](#); feeding articles by belts [B65H 5/02](#))}
- 11/0075 . {Low-paper indication, i.e. indicating the state when copy material has been used up nearly or completely}
- 11/008 . {Controlling printhead for accurately positioning print image on printing material, e.g. with the intention to control the width of margins}
- 11/0085 . {Using suction for maintaining printing material flat (on rotatable drums [B41J 13/226](#))}
- 11/009 . {Detecting type of paper, e.g. by automatic reading of a code that is printed on a paper package or on a paper roll or by sensing the grade of translucency of the paper (selecting type of paper [B41J 11/485](#); investigating or analysing materials by the use of optical means [G01N 21/00](#); investigating moving sheets [G01N 21/86](#))}
- 11/0095 . {Detecting means for copy material, e.g. for detecting or sensing presence of copy material or its leading or trailing end}
- 11/02 . Platens
- 11/04 . . Roller platens
- 11/053 . . . with sound-deadening devices (structure of surface [B41J 11/057](#))
- 11/057 . . . Structure of the surface
- 11/06 . . Flat page-size platens {or smaller flat platens having a greater size than line-size platens ([B41J 11/0085](#) takes precedence; flat-bed ink-jet printers [B41J 3/28](#))}
- 11/08 . . Bar or like line-size platens
- 11/10 . . Anvil or like character-size platens
- 11/13 . . Backings or blankets (for roller platens [B41J 11/057](#))
- 11/14 . . Platen-shift mechanisms; Driving gear therefor {([B41J 11/20](#) takes precedence)}
- 11/16 . . with balancing means
- 11/18 . Platen-impression arrangements
- 11/20 . Platen adjustments for varying the strength of impression, for a varying number of papers, for wear or for alignment {, or for print gap adjustment (adjustments by moving the print head [B41J 25/308](#), [B41J 25/312](#))}
- 11/22 . Paper carriage guides or races {(printhead carriage guides [B41J 19/00](#))}
- 11/24 . Detents, brakes, or couplings for feed rollers or platens
- 11/26 . Pin feeds
- 11/27 . . on or within the platen-rollers
- 11/28 . . Pin wheels
- 11/30 . . Pin traction elements other than wheels, e.g. pins on endless bands
- 11/32 . . Adjustment of pin wheels or traction elements, e.g. laterally
- 11/34 . . Guides coating with pin feeds
- 11/36 . Blanking or long feeds; Feeding to a particular line, e.g. by rotation of platen or feed roller
- 11/38 . . Manually-operated feeding devices
- 11/40 . . specially adapted for printing musical scores
- 11/42 . . Controlling {printing material conveyance for accurate alignment of the printing material with the printhead; Print registering (controlling printhead [B41J 11/008](#); control of the transport of cut sheets [B41J 13/0009](#))}
- 11/425 . . . {for a variable printing material feed amount}
- 11/44 . . . by devices, e.g. programme tape or contact wheel, moved in correspondence with movement of paper-feeding devices, e.g. platen rotation
- 11/46 . . . by marks or formations on the paper being fed

- 11/48 . Apparatus for condensed record, tally strip, or like work using two or more papers, or sets of papers {, e.g. devices for switching over from handling of copy material in sheet form to handling of copy material in continuous form and vice versa or point-of-sale printers comprising means for printing on continuous copy material, e.g. journal for tills, and on single sheets, e.g. cheques or receipts ([B41J 15/042](#) takes precedence; simultaneous conveyance of sheets or strips [B41J 3/62](#))}
- 11/485 . . {Means for selecting a type of copy material amongst different types of copy material in the printing apparatus (detecting type of paper [B41J 11/009](#))}
- 11/50 . . in which two or more papers or sets are separately fed in the same direction towards the printing position {([B41J 15/18](#), [B41J 15/20](#), [B41J 15/22](#) and [B41J 15/24](#) take precedence)}
- 11/51 . . . with different feed rates {([B41J 15/18](#), [B41J 15/20](#), [B41J 15/22](#) and [B41J 15/24](#) take precedence)}
- 11/52 . . in which one paper or set is moved transversely relative to another
- 11/53 . . . Devices for holding in place one paper or set during replacement of one or more of the auxiliary papers or sets
- 11/54 . . in which one paper or set is fed towards printing position from the front of the apparatus
- 11/55 . . . with means for adjusting a paper or set
- 11/56 . specially constructed to facilitate storage or transport of typewriter {([B41J 3/36](#) takes precedence)}
- 11/58 . Supply holders for sheets or fan-folded webs, e.g. shelves, tables, scrolls, pile holders {([B41J 13/10](#), [B41J 13/103](#) and [B41J 13/106](#) take precedence)}
- 11/60 . Erasing or correcting tables
- 11/62 . Shields or masks
- 11/64 . Applications of scales or indicators
- 11/66 . Applications of cutting devices {(cutting in general [B26D](#))}
- 11/663 . . {Controlling cutting, cutting resulting in special shapes of the cutting line, e.g. controlling cutting positions, e.g. for cutting in the immediate vicinity of a printed image}
- 11/666 . . {Cutting partly, e.g. cutting only the uppermost layer of a multiple-layer printing material}
- 11/68 . . cutting parallel to the direction of paper feed
- 11/70 . . cutting perpendicular to the direction of paper feed
- 11/703 . . . {Cutting of tape}
- 11/706 . . . {using a cutting tool mounted on a reciprocating carrier}
- 13/00** **Devices or arrangements {of selective printing mechanisms, e.g. ink-jet printers, thermal printers,} specially adapted for supporting or handling copy material in short lengths, e.g. sheets {(handling sheets or webs in general [B65H](#); apparatus for electrographic processes using a charge pattern, e.g. copying machines, [G03G 15/00](#))}**
- 13/0009 . {control of the transport of the copy material}
- 13/0018 . . {in the sheet input section of automatic paper handling systems (guides therefor [B41J 13/103](#))}
- 13/0027 . . {in the printing section of automatic paper handling systems (rollers [B41J 13/02](#), guides therefor [B41J 13/14](#))}
- 13/0036 . . {in the output section of automatic paper handling systems (rollers [B41J 13/02](#), guides [B41J 13/106](#))}
- 13/0045 . . {concerning sheet refeed sections of automatic paper handling systems, e.g. intermediate stackers, reversing units (printing on both faces [B41J 3/60](#))}
- 13/0054 . {Handling sheets of differing lengths}
- 13/0063 . {Handling thick cut sheets larger than credit cards, e.g. greeting cards, postcards, e.g. using means for enabling or facilitating the conveyance of thick sheets ([B41J 11/20](#), [B41J 13/12](#) and [B41J 25/308](#) take precedence)}
- 13/0072 . {Handling wide cut sheets, e.g. using means for enabling or facilitating the conveyance of wide sheets}
- 13/0081 . {Sheet-storing packages, e.g. for protecting the sheets against ambient influences, e.g. light, humidity, changes in temperature}
- 13/009 . {Diverting sheets at a section where at least two sheet conveying paths converge, e.g. by a movable switching guide that blocks access to one conveying path and guides the sheet to another path, e.g. when a sheet conveying direction is reversed after printing on the front of the sheet has been finished and the sheet is guided to a sheet turning path for printing on the back}
- 13/02 . Rollers (roller platens [B41J 11/04](#) {; rollers for conveying in general [B65G 39/00](#); separating articles from piles using friction rollers [B65H 3/06](#); feeding articles by rollers [B65H 5/06](#))}
- 13/025 . . {Special roller holding or lifting means, e.g. for temporarily raising one roller of a pair of nipping rollers for inserting printing material}
- 13/03 . . driven, e.g. feed rollers separate from platen
- 13/036 . . co-operating with a roller platen
- 13/042 . . . Front and rear rollers or sets of front or rear rollers each mounted on a separate carrier
- 13/048 . . . Front and rear rollers both mounted on a common carrier
- 13/054 on the paper apron concentric with the roller platen
- 13/076 . . Construction of rollers; Bearings therefor
- 13/08 . {Conveyor} bands or like feeding devices {([B41J 11/007](#) takes precedence)}
- 13/10 . Sheet holders, retainers {, movable guides}, or stationary guides
- 13/103 . . {for the sheet feeding section}
- 13/106 . . {for the sheet output section}
- 13/12 . . specially adapted for {small} cards, envelopes, or the like {, e.g. credit cards, cut visiting cards (handling thick cut sheets larger than credit cards [B41J 13/0063](#))}
- 13/14 . . Aprons or guides {for the printing section}
- 13/16 . . . movable for insertion or release of sheets
- 13/18 . . . concentric with roller platen
- 13/20 . . Bails
- 13/22 . . Clamps or grippers
- 13/223 . . . {on rotatable drums}
- 13/226 {using suction}
- 13/24 . . Strips for supporting or holding papers

- 13/26 . Registering devices [{\(registering in general B65H 9/00\)}](#)
- 13/28 . . Front lays, stops, or gauges
- 13/30 . . Side lays or gauges
- 13/32 . . Means for positioning sheets in two directions under one control, e.g. for format control or orthogonal sheet positioning
- 15/00 Devices or arrangements {of selective printing mechanisms, e.g. ink-jet printers, thermal printers,} specially adapted for supporting or handling copy material in continuous form, e.g. webs {(handlling sheets or webs in general B65H)}**
- 15/005 . {Forming loops or sags in webs, e.g. for slackening a web or for compensating variations of the amount of conveyed web material (by arranging a "dancing roller" in a sag of the web material)}
- 15/02 . Web rolls or spindles; Attaching webs to cores or spindles
- 15/04 . Supporting, feeding, or guiding devices; Mountings for web rolls or spindles
- 15/042 . . {for loading rolled-up continuous copy material into printers, e.g. for replacing a used-up paper roll; Point-of-sale printers with openable casings allowing access to the rolled-up continuous copy material}
- 15/044 . . {Cassettes or cartridges containing continuous copy material, tape, for setting into printing devices}
- 15/046 . . {for the guidance of continuous copy material, e.g. for preventing skewed conveyance of the continuous copy material}
- 15/048 . . {Conveyor belts or like feeding devices [\(B41J 11/007 takes precedence\)](#)}
- 15/06 . . characterised by being applied to printers having stationary carriages
- 15/08 . . characterised by being applied to printers having transversely- moving carriages
- 15/10 . . . and mounted on the carriage
- 15/12 . . . and coupled to the carriage
- 15/14 . . . and detached from the carriage
- 15/16 . Means for tensioning or winding the web
- 15/165 . . {for tensioning continuous copy material by use of redirecting rollers or redirecting nonrevolving guides}
- 15/18 . Multiple web-feeding apparatus
- 15/20 . . for webs superimposed during printing [\(machines for separating superposed webs B65H 41/00\)](#)
- 15/22 . . for feeding webs in separate paths during printing
- 15/24 . . with means for registering the webs with each other
- 17/00 Mechanisms for manipulating page-width impression-transfer material, e.g. carbon paper (in manifolding devices B41L)**
- 17/02 . Feeding mechanisms
- 17/04 . . Feed dependent on the record-paper feed, e.g. both moved at the same time
- 17/06 . . . "Creep" feed, i.e. impression-transfer material fed slower than the record paper
- 17/07 . . . electromagnetically controlled
- 17/08 . . Feed independent of the record-paper feed
- 17/10 . . . electromagnetically controlled
- 17/12 . . Special adaptations for ensuring maximum life
- 17/14 . . Automatic arrangements for reversing the feed direction
- 17/16 . Holders in the machine for sheets of impression transfer material
- 17/18 . . pivotable to and from the platen
- 17/20 . . slidable to and from the platen
- 17/22 . Supply arrangements for webs of impression-transfer material
- 17/24 . . Webs supplied from reels or spools attached to the machine
- 17/26 . . Webs supplied from trays or like supports attached to the machines
- 17/28 . Arrangements of guides for the impression-transfer material
- 17/30 . Constructions of guides for the impression-transfer material
- 17/32 . Detachable carriers or holders for impression-transfer material mechanism
- 17/34 . Backings for impression-transfer material, e.g. sheets for reducing friction, shields for preventing imprint
- 17/36 . Alarms, indicators, or feed-disabling devices responsible to material breakage or exhaustion
- 17/38 . for dealing with the impression-transfer material after use
- 17/40 . . for retracting sheets for re-use
- 17/42 . . for webs
- 19/00 Character- or line-spacing mechanisms ({paper carriage guides [B41J 11/22](#); superimposed movements for serial printing [B41J 25/005](#);) key actions [B41J 25/02](#)}**
- 19/005 . {Cable or belt constructions for driving print, type or paper-carriages, e.g. attachment, tensioning means}
- 19/02 . with retarding devices, e.g. brakes
- 19/04 . Sound-deadening or shock-absorbing devices or measures therein [\(B41J 19/38 takes precedence\)](#)
- 19/06 . . Resilient mounting of mechanism
- 19/08 . . Buffers, springs or like carriage stops
- 19/10 . . Dash-pots
- 19/12 . . Gearing made of special material or specially constructed to reduce sound or shock
- 19/14 . with means for effecting line or character spacing in either direction
- 19/142 . . {with a reciprocating print head printing in both directions across the paper width}
- 19/145 . . . {Dot misalignment correction}
- 19/147 . . . {Colour shift prevention}
- 19/16 . Special spacing mechanisms for circular, spiral, or diagonal-printing apparatus
- 19/18 . Character-spacing or back-spacing mechanisms; Carriage return or release devices therefor
- 19/20 . . Positive-feed character-spacing mechanisms [\(controlled by escapements B41J 19/52\)](#)
- 19/202 . . . {Drive control means for carriage movement}
- 19/205 {Position or speed detectors therefor}
- 19/207 {Encoding along a bar}
- 19/22 . . . acting by friction or gripping effect
- 19/24 . . . Pawl and ratchet
- 19/26 moving a paper or like carriage
- 19/28 moving a paper or like web or strip, e.g. over a stationary support
- 19/30 . . . Electromagnetically-operated mechanisms

19/305	. . . . {Linear drive mechanisms for carriage movement}	21/14	. characterised by denominational arrangements
19/32	. . . Differential or variable-spacing arrangements	21/16	. controlled by the sensing of marks or formations on the paper being typed, an undersheet, or the platen
19/34	. . Escapement-feed character-spacing mechanisms	21/17	. controlled by stored information
19/36	. . . Driving mechanisms, e.g. springs stressed during carriage return	21/18	. characterised by applications of scales or indicators
19/38	. . . . adapted for silent return	23/00	Power drives for actions or mechanisms (B41J 9/00, {B41J 19/305}, take precedence)
19/40	. . . Escapements having a single pawl or like detent	23/02	. Mechanical power drives
19/42	. . . Escapements having two pawls or like detents	23/025	. . {using a single or common power source for two or more functions}
19/44	. . . . coacting with two toothed members, e.g. racks or wheels	23/04	. . with driven mechanism arranged to be clutched to continuously- operating power source
19/46	. . . . and mounted on a single rocker	23/06	. . . by snatch rolls
19/48	. . . . and mounted on a single slider	23/08	. . . by one-revolution or part-revolution clutches
19/50	. . . Electromagnetically-controlled escapements	23/10	. . . and arrested in selected position
19/52	. . . Escapements controlling positive-feed mechanism	23/12	. . Mechanism driven by cams engaging rotating roller
19/54	. . . Construction of universal bars	23/14	. . Mechanism driven by through an oscillating or reciprocating member
19/56	. . . Escapements controlling web or strip feed	23/16	. . Mechanisms driven by a spring tensioned by power means
19/58	. . . Differential or variable-spacing arrangements	23/18	. . Continuously-cycling drives
19/60	. . Auxiliary feed or adjustment devices	23/20	. Fluid-pressure power drives
19/62	. . . for back spacing	23/22	. . for key or like type selection
19/64	. . . for justifying	23/24	. . for impression mechanisms
19/66	. . Carriage-release mechanisms	23/26	. . for platen or carriage movements, e.g. for line spacing, letter spacing, or carriage return
19/68	. . Carriage-return mechanisms, e.g. manually actuated	23/28	. . for type-carriage movements
19/70	. . . power driven	23/30	. . for case shift
19/72	. . . . with power stored during character spacing	23/32	. Electromagnetic power drives, e.g. applied to key levers
19/74	. . with special means to maintain character-spacing or back- spacing elements in engagement during case-shift or like movement	23/34	. . applied to elements other than key levers
19/76	. Line-spacing mechanisms (special line-feeds, e.g. long feeds B41J 11/36)	23/36	. . . and acting on type members
19/78	. . Positive-feed mechanisms	23/38	. . . and acting on aligning or case-shift mechanisms
19/80	. . . Pawl-and-ratchet mechanisms	25/00	Actions or mechanisms not otherwise provided for
19/82	. . . . moving a paper or like carriage	25/001	. {Mechanisms for bodily moving print heads or carriages parallel to the paper surface (character- or line-spacing mechanisms B41J 19/00)}
19/84	. . . . . in the form of a roller rotated for line spacing	25/003	. . {for changing the angle between a print element array axis and the printing line, e.g. for dot density changes (dot arrays providing selective dot disposition modes B41J 2/5056)}
19/86	. . . . . the pawl being normally in engagement with the ratchet	25/005	. . {for serial printing movements superimposed to character- or line-spacing movements}
19/88	. . . . moving a type carriage	25/006	. . {for oscillating, e.g. page-width print heads provided with counter-balancing means or shock absorbers}
19/90	. . . . moving a paper or like web or strip, e.g. over a stationary support, automatically in response to movements other than carriage return	2025/008	. {comprising a plurality of print heads placed around a drum}
19/92	. . . Electromagnetically-operated mechanisms	25/02	. Key actions for specified purposes
19/94	. . . automatically operated in response to carriage return	25/04	. . Back spacing
19/96	. . . Variable-spacing arrangements	25/06	. . Carriage return
19/98	. . Escapement-feed mechanisms	25/08	. . Case shift
21/00	Column, tabular, or like printing arrangements; Means for centralising short lines (carrier-release mechanisms B41J 19/66; key actions B41J 25/18)	25/10	. . Ink-ribbon adjustment
21/02	. Stops or stop-racks	25/12	. . Character spacing
21/04	. Mechanisms for setting or restoring tabulation stops	25/14	. . Line spacing
21/06	. with means for preventing rebound from stops	25/16	. . Line spacing and carriage return by a single key
21/08	. Mechanisms for initiating, effecting, skipping, or stopping tabulation movement; Means for centralising short lines	25/18	. . Tabulating
21/10	. with central, counter, or equivalent stop projected into path of tabulation stops		
21/12	. characterised by arrangements of electrical contacts		

- 25/20 . Auxiliary type mechanisms for printing distinguishing marks, e.g. for accenting, using dead or half-dead key arrangements, for printing marks in telegraph printers to indicate that machine is receiving
- 25/22 . for aligning characters for impression ([in machines using index setting B41J 5/02](#))
- 25/24 . Case-shift mechanisms ([B41J 11/14 takes precedence](#); [key actions B41J 25/08](#)); Fount-change arrangements
- 25/304 . Bodily-movable mechanisms for print heads or carriages movable towards or from paper surface ([type carriers {rotatable for selection and} sliding for impression B41J 1/36](#); [type carriers {rotatable for selection and} swinging for impression B41J 1/40](#) {; [line print heads movable towards a cleaning unit B41J 2/16588](#)})
- 25/308 . . with print gap adjustment mechanisms {[\(by platen movement B41J 11/20\)](#)}
- 25/3082 . . . {[with print gap adjustment means on the print head carriage, e.g. for rotation around a guide bar or using a rotatable eccentric bearing](#)}
- 25/3084 {[by means of a spacer contacting the matter to be printed](#)}
- 25/3086 . . . {[with print gap adjustment means between the print head and its carriage](#)}
- 25/3088 . . . {[with print gap adjustment means on the printer frame, e.g. for rotation of an eccentric carriage guide shaft](#)}
- 25/312 . . with print pressure adjustment mechanisms, e.g. pressure-on-the paper mechanisms
- 25/316 . . with tilting motion mechanisms relative to paper surface
- 25/32 . Impression mechanisms in which a roller co-operates with stationary type-faces
- 25/34 . Bodily-changeable print heads or carriages ([B41J 1/20](#), [B41J 1/22](#), [B41J 1/60 take precedence](#))
- 27/00 Inking apparatus**
- 27/02 . with ink applied by pads or rotary discs
- 27/04 . . Pads or discs; Ink supply arrangements therefor
- 27/06 . . Arrangements to ensure maximum life of pads or discs
- 27/08 . . Arrangements for multicolour work
- 27/10 . with ink applied by rollers; Ink supply arrangements therefor
- 27/12 . . Rollers
- 27/14 . . Arrangements for multicolour work
- 27/16 . with ink deposited electrostatically or electromagnetically, e.g. powdered ink
- 27/18 . . with liquid ink deposited
- 27/20 . with ink supplied by capillary action, e.g. through porous type members, through porous platens
- 27/22 . with inking discs or sectors
- 29/00 Details of, or accessories for, typewriters or selective printing mechanisms not otherwise provided for**
- 29/02 . Framework
- 29/023 . . {[with reduced dimensions \(for portability B41J 3/36\)](#)}
- 29/026 . . {[Stackable](#)}
- 29/04 . Means for attaching machines to baseboards
- 29/06 . Special supports, platforms or trolleys for supporting machines on tables
- 29/08 . Sound-deadening, or shock-absorbing stands, supports, cases or pads separate from machines
- 29/10 . Sound-deadening devices embodied in machines ([B41J 19/04 takes precedence](#))
- 29/12 . Guards, shields or dust excluders
- 29/13 . . Cases or covers
- 29/14 . Attachments operated by the leg, e.g. the foot, the knee
- 29/15 . Script supports connected to the typewriter or printer ([tables, desks, office furniture in general A47B](#))
- 29/16 . Auxiliary receptacles for articles, e.g. erasers, pencils
- 29/17 . Cleaning arrangements
- 29/18 . Mechanisms for rendering the print visible to the operator ([ink-ribbon shifts B41J 35/20](#))
- 29/19 . . with reflectors or illuminating devices
- 29/20 . Arrangements of counting devices
- 29/22 . . Line counters
- 29/24 . . Word counters
- 29/26 . Devices, non-fluid media or methods for cancelling, correcting errors, underscoring or ruling
- 29/28 . . Writing or like instruments in holders or guides
- 29/30 . . Wheels
- 29/32 . . Type members
- 29/34 . . . repeatedly actuated
- 29/36 . . for cancelling or correcting errors by overprinting ([B41J 31/00 takes precedence](#))
- 29/367 . . . sheet media carrying a pigmented transferable correction layer
- 29/373 . . . sheet media bearing an adhesive layer effective to lift off wrongly typed characters
- 29/377 . Cooling or ventilating arrangements
- 29/38 . Drives, motors, controls or automatic cut-off devices for the entire printing mechanism
- 29/387 . . Automatic cut-off devices
- 29/393 . . Devices for controlling or analysing the entire machine {; [Controlling or analysing mechanical parameters involving printing of test patterns](#)}
- 2029/3932 . . . {[Battery or power source mounted on the carriage](#)}
- 2029/3935 . . . {[by means of printed test patterns](#)}
- 2029/3937 . . . {[Wireless communication between the printer and the cartridge, carriage or printhead](#)}
- 29/40 . Means for printing fixed, i.e. unchanging, matter in addition to selectable matter
- 29/42 . Scales and indicators, e.g. for determining side margins
- 29/44 . . for determining top and bottom margins or indicating exhaust of paper
- 29/46 . Applications of alarms, e.g. responsive to approach of end of line ([responsive to transfer-material breakage or exhaustion B41J 17/36](#), [B41J 35/36](#))
- 29/48 . . responsive to breakage or exhaustion of paper or approach of bottom of paper
- 29/50 . Side-stop mechanisms
- 29/52 . Top-and-bottom stop mechanisms
- 29/54 . Locking devices applied to printing mechanisms
- 29/56 . . and manually actuated
- 29/58 . . and automatically actuated
- 29/60 . . . in response to failure of power supply
- 29/62 . . . by the absence of paper to lock hammer mechanism

- 29/64 . . . by a function of the printer to lock the keyboard
- 29/66 Locking devices actuated when platen reaches the end of a line
- 29/68 . . . by completion of a page or predetermined number of lines or exhaustion of paper to lock the keyboard
- 29/70 . . . Interlocks between any two-carriage-moving mechanisms, e.g. character-space, back space, tabulation, carriage return or carriage- release mechanisms

Ink ribbons; Ink-ribbon mechanisms

- 31/00 Ink ribbons (spools for ink ribbons [B65H 75/00](#); coated or treated non-woven strips or sheets used as ink ribbons [D21H](#)); Testing or renovating ink ribbons**
- 31/02 . Ink ribbons characterised by the material from which they are woven
- 31/04 . . woven from synthetic material
- 31/05 . Ink ribbons having coatings other than impression-material coatings
- 31/06 . . the coatings being directly on the base material, i.e. below impression transfer material; Ink ribbons having base material impregnated with material other than impression material
- 31/08 . . the coatings being superimposed on impression-transfer material
- 31/09 . Ink ribbons characterised by areas carrying media for obliteration or removal of typing errors
- 31/10 . Ink ribbons having arrangements to facilitate threading through a machine
- 31/12 . Ink ribbons having arrangements to prevent undesired contact between the impression-transfer material and machine parts or other articles
- 31/14 . Renovating or testing ink ribbons
- 31/16 . . while fitted in the machine using the ink ribbons
- 32/00 Ink-ribbon cartridges**
- 32/02 . for endless ribbons
- 33/00 Apparatus or arrangements for feeding ink ribbons or like character-size impression-transfer material**
- 33/003 . {[Ribbon spools \(spools in general \[B65H 75/00\]\(#\)\)](#)}
- 33/006 . . {[Arrangements to attach the ribbon to the spool](#)}
- 33/02 . Ribbon arrangements
- 33/04 . . mounted on moving carriages
- 33/06 . . Ribbons associated, but not moving, with typewriter platens, e.g. extending transversely to the length of the platen
- 33/08 . . . and extending parallel to the length of the platen
- 33/10 . . Arrangements of endless ribbons
- 33/12 . . Ribbons carried by coaxially-mounted spools
- 33/14 . Ribbon-feed devices or mechanisms
- 33/16 . . with drive applied to spool or spool spindle
- 33/18 . . . by ratchet mechanism ([B41J 33/30 takes precedence](#))
- 33/20 . . . by friction
- 33/22 . . . by gears or pulleys
- 33/24 . . with drive applied directly to ribbon
- 33/26 . . . by rollers engaging the ribbon
- 33/28 . . . by mechanism pulling or gripping the ribbon
- 33/30 . . Escapement mechanisms

- 33/32 . . Electromagnetic devices
- 33/34 . . driven by motors independently of the machine as a whole
- 33/36 . . with means for adjusting feeding rate
- 33/38 . . Slow, e.g. "creep", feed mechanisms
- 33/382 . . . the ribbon being fed only during carriage return
- 33/384 and attached to the carriage during writing
- 33/386 . . . the ribbon being fed only by operation of the line spacing mechanism
- 33/388 . . . the ribbon being fed only when type impression takes place
- 33/40 . . with arrangements for reversing the feed direction
- 33/42 . . . manually
- 33/44 . . . automatically
- 33/46 and characterised by its application to mechanism in which two spools are driven by pawl-and-ratchet mechanism
- 33/48 comprising two pawls and ratchets, one for each spool
- 33/50 comprising a single pawl or integral double-tooth pawl selectively engageable with two ratchets, one for each spool
- 33/51 and characterised by the use of particular reversing control means
- 33/512 using a pivoted reversing-feeler engaging the external periphery of the wound ribbon
- 33/514 using a pivoted reversing-feeler engaging the interior of the wound ribbon
- 33/516 using a reversing-feeler responsive to the tension of the ribbon
- 33/518 the reversing-feeler engaging buttons or the like secured to the ribbon near its ends
- 33/52 . . Braking devices therefor
- 33/54 . . for ensuring maximum life of the ribbon ([B41J 33/38 takes precedence](#); by adjustment of vibrator mechanisms [B41J 35/14](#))
- 33/56 . . . Ribbon adjusted transversely
- 33/58 . . . Ribbon fed angularly
- 33/60 . . responsive to telegraph code or other extraneous signals
- 35/00 Other apparatus or arrangements associated with, or incorporated in, ink-ribbon mechanisms**
- 35/02 . Frames or holders for unwound short lengths of ink ribbons
- 35/03 . . the holder being movable to inoperative position, e.g. by swinging upwardly
- 35/04 . Ink-ribbon guides
- 35/06 . . stationary
- 35/08 . . with tensioning arrangements
- 35/10 . . Vibrator mechanisms; Driving gear therefor
- 35/12 . . . adjustable, e.g. for case shift ([key actions \[B41J 25/02\]\(#\)](#))
- 35/14 for multicolour work; for ensuring maximum life of ink ribbon; for rendering ink-ribbon inoperative
- 35/16 . Multicolour arrangements ([B41J 35/10 takes precedence](#))
- 35/18 . . Colour change effected automatically
- 35/20 . Ink-ribbon shifts, e.g. for exposing print, for case-shift adjustment, for rendering ink ribbon inoperative
- 35/22 . Mechanisms permitting the selective use of a plurality of ink ribbons

- 35/23 . . with two or more ribbon guides
- 35/24 . Mechanisms specially adapted for feeding impression-transfer materials of foil form
- 35/26 . Ink-ribbon shields or backings
- 35/28 . Detachable carriers or holders for ink-ribbon mechanisms
- 35/30 . Manifolding or like arrangements
- 35/32 . . for producing a plurality of copies along the printing line by a single ink ribbon
- 35/34 . . using a plurality of separate ink ribbons, e.g. including one hectographic ink ribbon
- 35/35 . . using unwound short lengths of ink ribbons
- 35/36 . Alarms, indicators, or feed disabling devices responsive to ink ribbon breakage or exhaustion
- 35/38 . Feeding the ink ribbon to waste after use

2202/00 Embodiments of or processes related to ink-jet or thermal heads

- 2202/01 . Embodiments of or processes related to ink-jet heads
- 2202/02 . . Air-assisted ejection
- 2202/03 . . Specific materials used
- 2202/04 . . Heads using conductive ink
- 2202/05 . . Heads having a valve
- 2202/06 . . Heads merging droplets coming from the same nozzle
- 2202/07 . . dealing with air bubbles
- 2202/08 . . dealing with thermal variations, e.g. cooling
- 2202/09 . . Ink jet technology used for manufacturing optical filters
- 2202/10 . . Finger type piezoelectric elements
- 2202/11 . . characterised by specific geometrical characteristics
- 2202/12 . . with ink circulating through the whole print head
- 2202/13 . . Heads having an integrated circuit
- 2202/14 . . Mounting head into the printer
- 2202/15 . . Moving nozzle or nozzle plate ([for moving nozzle or nozzle plate made of thermal bend actuator B41J 2002/14435](#))
- 2202/16 . . Nozzle heaters
- 2202/17 . . Readable information on the head
- 2202/18 . . Electrical connection established using vias
- 2202/19 . . Assembling head units
- 2202/20 . . Modules
- 2202/21 . . Line printing
- 2202/22 . . Manufacturing print heads
- 2202/30 . Embodiments of or processes related to thermal heads
- 2202/31 . . Thermal printer with head or platen movable
- 2202/32 . . Thermal head for perforating stencil
- 2202/33 . . Thermal printer with pre-coating or post-coating ribbon system
- 2202/34 . . Thermal printer with pre-coating or post-processing
- 2202/35 . . Thermal printing on id card
- 2202/36 . . Thermal printing on disk-shaped medium
- 2202/37 . . Writing and erasing thermal head
- 2202/38 . . Test pattern thermal printing
- 2202/50 . Embodiments of processes related to optical heads