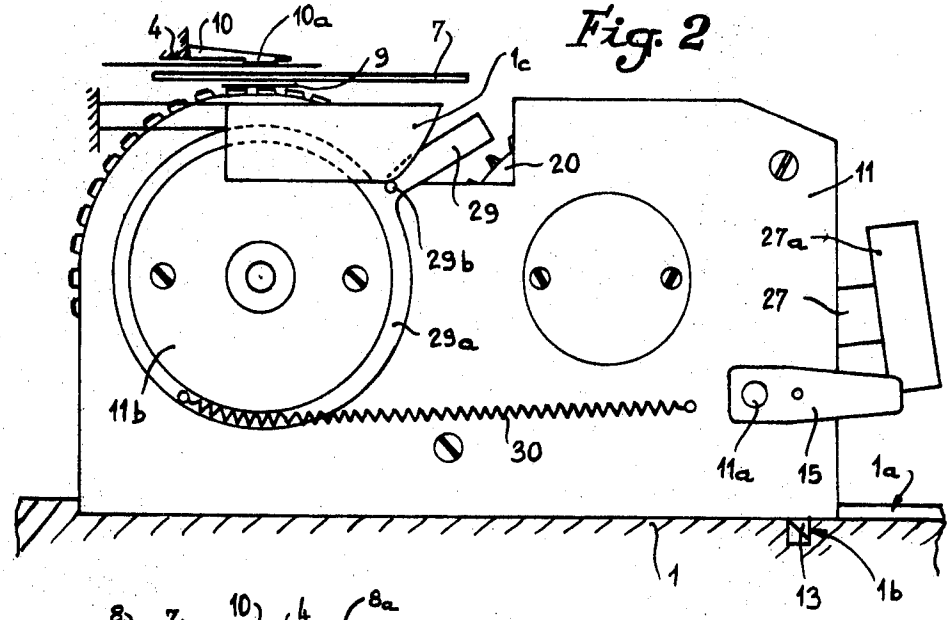
March 23, 1971 R. GRENIER 3,572,239

DRUM SERIES PRINTING WHEELS AND SETTING MEANS THEREFOR

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Fig. 2



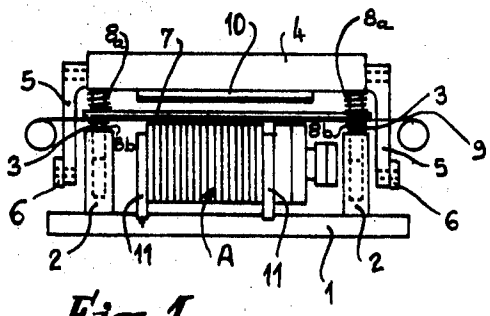


Fig. 1

Fig. 5

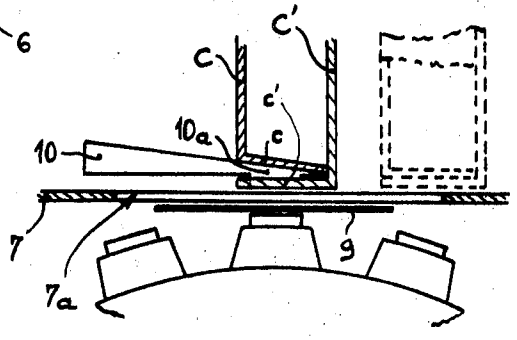


Fig. 4

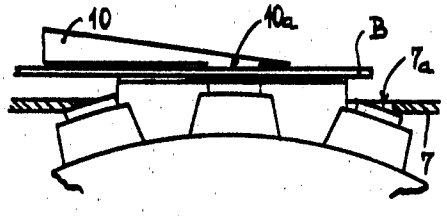
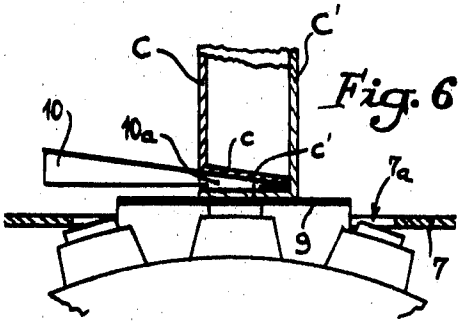


Fig. 6



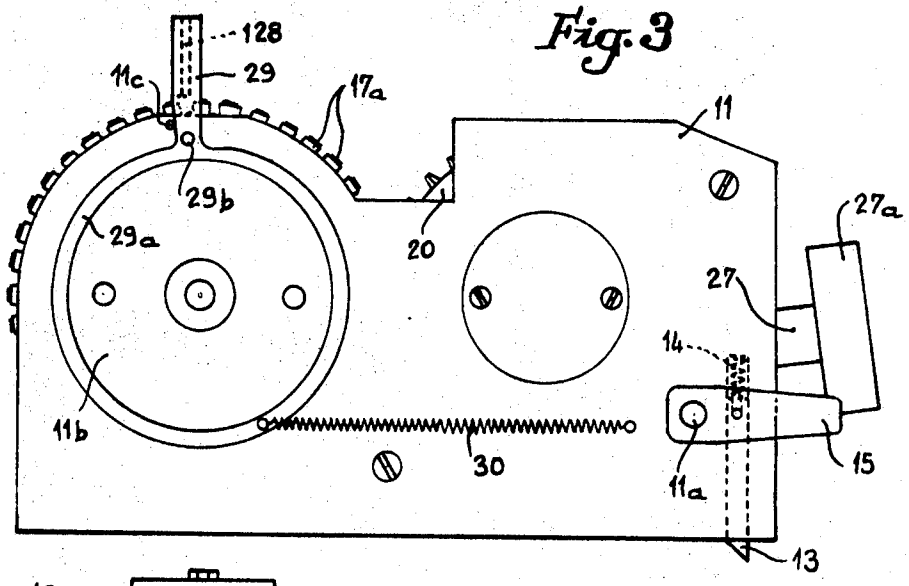
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DRUM SERIES PRINTING WHEELS AND SETTING MEANS THEREFOR

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Fig. 3



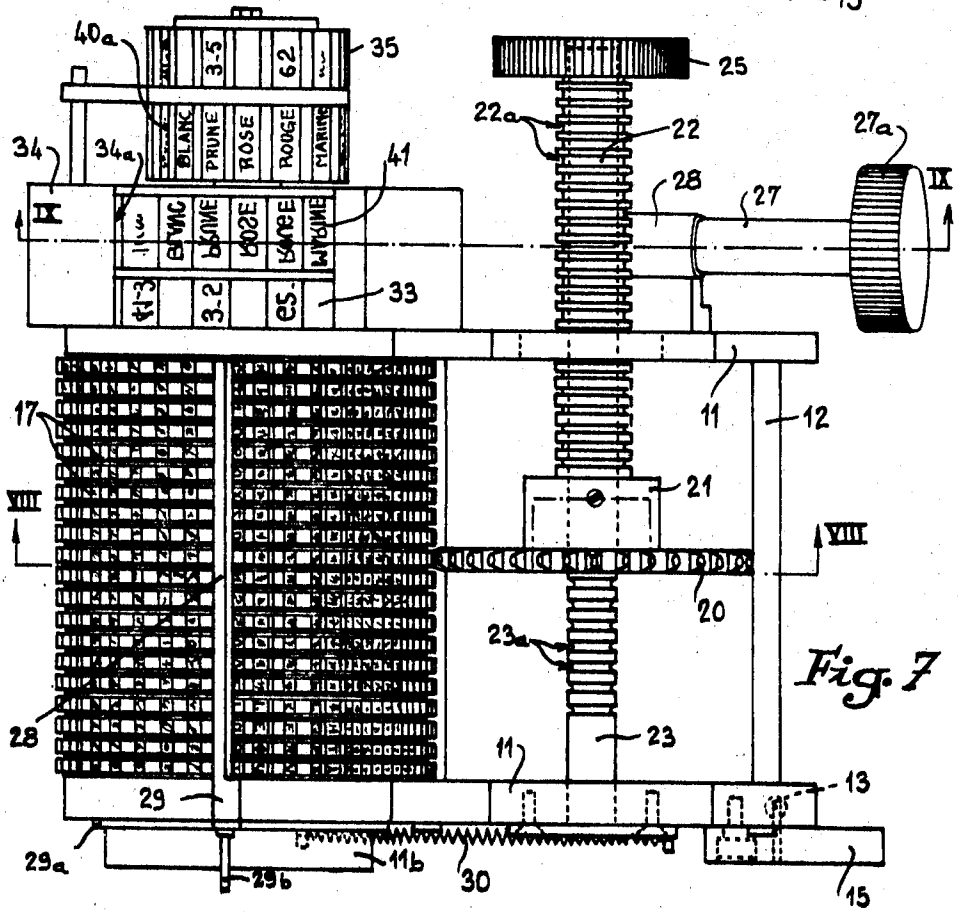


Fig. 7

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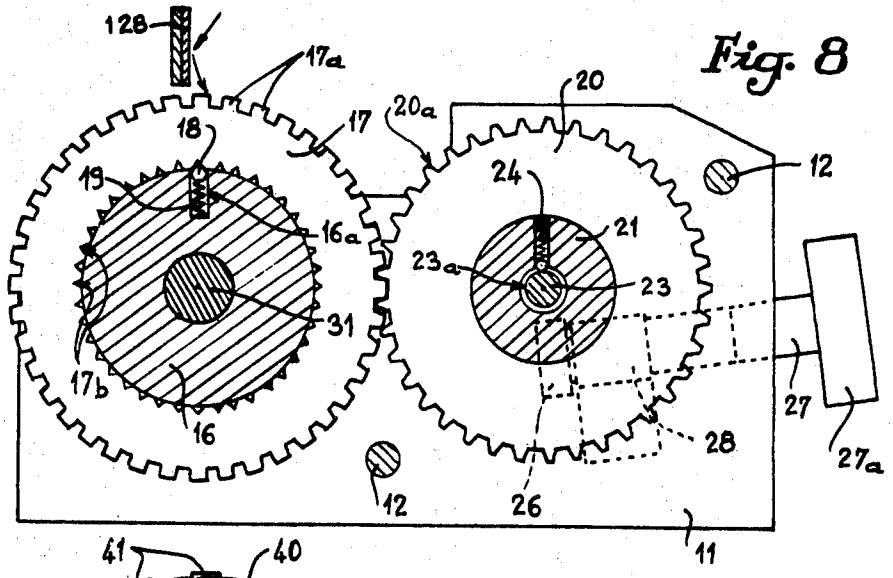


Fig. 8

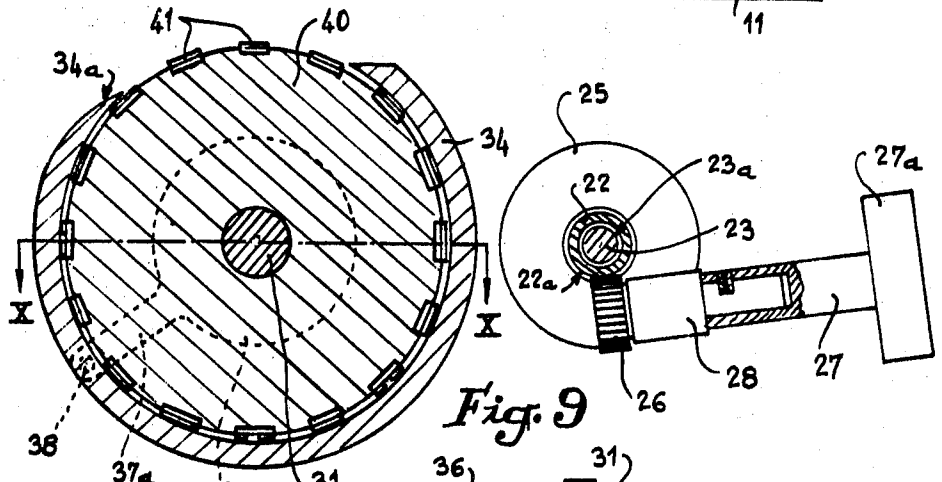


Fig. 9

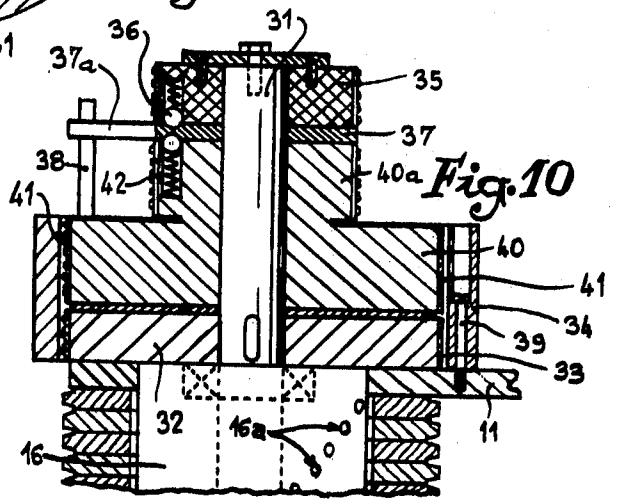


Fig. 10

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3,572,239

DRUM SERIES PRINTING WHEELS AND SETTING MEANS THEREFOR

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Int. Cl. B41j 1/24, 1/26
U.S. Cl. 101—99 6 Claims

ABSTRACT OF THE DISCLOSURE

The printing cylinder comprises a number of co-axial successive discs provided with peripheral teeth, each carrying a type. The setting of the discs is effected by means of a single toothed wheel slidably and rotatably mounted on a shaft parallel to the common axis of the discs so as to be brought into meshing engagement with any of them. The printing cylinder also comprises drums bearing removable printing blocks retained in depressions of the drums by a stationary outer casing having an aperture along the printing line of the cylinder. The cylinder is carried by a frame movable on the base of the pressing means of the apparatus between a printing position under the said pressing means, and a fully exposed composing position.

The present invention relates to a printing apparatus of the kind used for printing references or like marks on flat articles such as labels, tickets, packings or documents.

These apparatus generally comprise a type-carrying cylinder and pressing means for applying the article to be printed against the cylinder, or more accurately, against a longitudinal line or generatrix of the periphery of the said cylinder. The cylinder is generally formed of a number of co-axial elements and by individually rotating these elements it is possible to bring to the printing position on the cylinder any one of the types carried by the elements.

It is an object of the present invention to provide a printing apparatus of the kind in question wherein this angular adjustment of the elements is particularly simple and easy.

In accordance with the present invention the elements of the type-carrying cylinder are in the form of discs having flat peripheral teeth each carrying a printing type, while there is provided a disc-driving wheel axially displaceable along an axis parallel to the axis of the cylinder and having peripheral teeth adapted to mesh with the teeth of any one of the said discs so as to bring any desired type of this disc to the printing position on the cylinder.

In the accompanying drawings:

FIG. 1 is a general diagrammatical view of an apparatus according to the invention.

FIG. 2 is a side view of the movable printing device of this apparatus, the said device being at the printing or effective position on the base of the said apparatus.

FIG. 3 is a side view of the printing device at its ineffective or composing position.

FIG. 4 is a diagrammatical view illustrating the operation of the pressing means of the apparatus on a flat article such as a sheet, a ticket, a label, etc.

FIGS. 5 and 6 are views similar to FIG. 4, but illustrating the operative steps of the pressing means of the apparatus on the cover of a cardboard box.

FIG. 7 is a general plan view of the printing device.

FIGS. 8 and 9 are sectional views corresponding to lines VIII—VIII and IX—IX of FIG. 7.

FIG. 10 is a fragmental horizontal section taken along line X—X of FIG. 9.

The apparatus generally illustrated in FIG. 1 comprises a base 1 provided with two tubular columns 2 each forming a guide for a spring-loaded rod 3. These rods 3 support a cross beam 4 to the ends of which are secured laterally depending arms 5 having their lower ends pivotally connected with eccentrics or connecting rods 6 which impart to the said arms and to the beam 4 a vertically reciprocating motion. Beam 4 cooperates with a table 7 slidably mounted on rods 3, springs 8*a* and 8*b* being disposed between this table and, respectively, beam 4 and columns 2. An inking ribbon 9 is transversely movable between the lower side of table 7 and a type-carrying cylinder A. The document or like flat article to be printed is disposed between this table 7 and a pressure member 10 removably secured to the beam 4.

The pressure member 10 (FIGS. 2, 4, 5 and 6) is in the form of a plate having a wedge-shaped cross-section and whose horizontal underside, parallel to the table 7, is provided with a flat downwardly protruding portion 10*a* adapted to engage the article B to be printed. As illustrated in FIG. 4, this plate 10 permits of printing flat articles such as sheets, tickets, labels, etc., the downward motion of the beam 4 together with the pressure plate 10 first causing application of the said article onto table 7, and then lowering the latter. Owing to the provision of an aperture 7*a* in the said table, the article B is thus pressed against the inking ribbon 9 which is itself applied against the uppermost types of the type-carrying cylinder A. Moreover, and as more clearly shown in FIGS. 5 and 6, the acute edge of plate 10 may be engaged between the lateral wall *c* of a cardboard box C and the facing wall *c'* of the cover C' thereof. It will be noted that plate 10 may be formed of a single member co-extensive with cylinder A, or of a series of separate elements, each corresponding to a character to be printed.

The table 7, the pressure plate 10, the cross-beam 4 together with rods 3 and columns 2, form the pressing means of the apparatus.

The base 1 of the apparatus further supports a movable printing device comprising a frame formed of two lateral cheeks 11 (FIGS. 1, 2, 3 and 7) connected with each other by stays 12. The lower edge of each cheek 11 is slidably engaged in a groove 1*a* provided in the upper side of the base 1, and one of these cheeks carries a vertically movable bolt 13 urged downwardly by a spring 14 (FIG. 3) but which may be raised against the action of the said spring by a lever 15 pivoted to the cheek at 11*a* and connected with the bolt itself by a conventional pin-and-slot connection. The bottom of the corresponding groove 1*a* of base 1 has two depressions 1*b* adapted to receive bolt 13 at each end of the stroke of the printing device on base 1, as explained below.

The lateral cheeks 11 carry a massive tubular shaft 16 (FIG. 8) on which are rotatably mounted discs 17. The periphery of each disc 17 is formed with a number of rectangular teeth or projections 17*a* the outer side of which carries a printing type (letter, figure, sign). Each disc 17 is retained in angular position by means of a ball 18 radially movable in a perforation 16*a* of shaft 16 and urged outwardly by a spring 19 disposed in the said perforation so as yieldingly to engage ball 18 into one of a number of notches 17*b* provided in the inner edge of the disc 17 under consideration. It will be understood that each notch 17*b* corresponds to a tooth 17*a* in such manner that the disc 17 may be so retained angularly that any tooth 17*a* may be brought to the uppermost printing position. As shown in FIG. 10 perforations 16*a* are helically disposed on shaft 16 in order not to create a weak line on the latter in spite of the close disposition of discs 17 on the said shaft.

The type-carrying discs 17 are rotated by means of a

wheel **20** (FIGS. 7 and 8) provided with pointed teeth **20***a* which mesh with the teeth **17***a* of the discs or, more exactly speaking, which engage the depressions between the successive teeth **17***a*. This wheel **20** has a hub **21** solid with an elongated tubular extension **22** (FIG. 7). Hub **21** and extension **22** are slidably mounted on a fixed shaft **23** having one of its ends secured to one of cheeks **11**, the other cheek being provided with a perforation of a diameter somewhat larger than the outer diameter of the said extension **22**. The periphery of the latter is formed with a series of equidistant circular grooves **23***a* which cooperate with a ball-and-spring device **24** (see FIG. 8) provided in a radial perforation of hub **21** in order to retain wheel **20** at a number of successive positions for each of which the said wheel meshes with one of discs **17**.

The tubular extension **22** of the hub **21** of wheel **20** is also formed with a series of equidistant outer circular grooves **22***a* so as to act as a cylindrical rack in cooperation with a pinion **26** (FIG. 9) carried by a transverse actuating shaft **27** rotatably supported by a lateral bearing **28** secured to the outer side of the cheek **11** through which extension **23** is freely slidable. This shaft **27** has an actuating knob **27***a* by means of which wheel **20** may thus be axially displaced on shaft **23** so as to be brought into meshing engagement with any disc **17**, while another knob **25** secured to the outer end of extension **22** permits of rotating the disc in order to bring the desired type to the uppermost printing position in front of the aperture **7***a* of table **7**.

In order to facilitate the setting of the discs **17**, the apparatus is preferably equipped with a blade-like mirror **128** extending along the whole length of the successive discs **17** and carried by a lateral arm **29** in one with an annular member **29***a*. The latter is rotatably supported by an outer circular boss **11***b* carried by one of cheeks **11** substantially co-axially to the shaft **16** on which the discs **17** are mounted. A spring **30** (FIGS. 2 and 3) attached to member **29***a* and to the cheek maintains arm **29** against an abutment **11***c* carried by cheek **11**, mirror **128** then being at such a position that it permits direct reading of the uppermost line of characters or types on discs **17**, as clearly shown in FIG. 8. When the operator pushes the printing device in order to bring the same to its printing position under the apertured table **7** (position of FIG. 2) a fixed member **1***c* carried by base **1** acts on a lateral pin **29***b* secured to arm **29** so as to displace the latter clockwise in FIG. 2, whereby mirror **128** is brought to such a position that it cannot interfere with table **7** or with ribbon **9**.

The axial bore of the massive tubular shaft **16** receives a shaft **31** extending beyond the cheek **11** which supports the above-mentioned bearing **28**. A solid drum **32** having the same diameter as discs **17** is keyed on this etxension of shaft **31**. The periphery of this drum is formed with a series of equidistant depressions in which are removably disposed printing blocks **33**, each comprising a number of characters. Drum **32** is surrounded by a stationary cylindrical casing **34** which retains blocks **33** in the corresponding depressions. This casing has an upper opening **34***a* through which the successive blocks **33** may be exposed below ribbon **9** and table **7** (see FIG. 1) in order to cooperate with them. Drum **32** may be rotated by means of a knob **35** (FIG. 10) provided at the end of shaft **31**. In order to retain the said drum at any proper angular position there is provided a ball-and-spring device **36** carried by knob **35** and which cooperates with depressions formed on the facing side of a flat ring **37** loosely mounted on shaft **31**. This ring **37** has a radial arm **37***a* which is maintained at a fixed angular position by a finger **38** carried by casing **34**. The latter is itself secured to the adjacent cheek **11** by means of screws such as **39**.

The above-mentioned shaft **31** loosely carries another solid drum **40** having the same diameter as discs **17** and

drum **32**, and the periphery of this drum **40** is also formed with depressions in which are removably disposed printing blocks **41** also retained in position by casing **34**, but exposed through aperture **34***a* (see FIG. 9). This drum **40** is in one with an actuating knob **40***a* provided with a ball-and-spring positioning device **42** which co-acts with depressions formed in the facing side of the above-described ring **37**.

As clearly shown in FIG. 7 the periphery of knobs **35** and **40***a* carries indications which reproduce the characters (numbers, words or signs) of the corresponding blocks **33** and **41**.

It is understood that discs **17** together with drum **32** and **40** form the type-carrying cylinder A of FIG. 1.

With the apparatus described the operator may easily pull the printing device on base **1** so as to disengage it from ribbon **9** and table **7** and to bring it to the fully exposed composing position (position of FIG. 3). With the aid of mirror **128** he may set discs **17** to the respective positions required for the successive characters to be printed by first rotating knob **27***a* until wheel **20** meshes with the disc to be rotated and then by rotating knob **25** until the desired character or type appears in the mirror. Owing to the reflective effect the character appears as it will be printed and not as it is to be seen on the periphery of the disc. Additional indications or characters may be printed by drums **32** and **40** which may be set to the proper angular positions through knobs **35** and **40***a*. Owing to the removable character of the printing blocks **33** and **41**, these may be easily changed when desired.

Once the printing device has been properly adjusted (composition of the matter to be printed), the printing device is pushed under beam **4**, i.e. to its printing position of FIG. 2, and the flat articles such as B or *c'* (FIGS. 4 to 6) may be printed by merely lowering beam **4**.

I claim:

1. In a printing apparatus of the kind comprising an angularly adjustable type-carrying cylinder formed of a number of individually rotatable co-axial elements and pressing means to apply a flat article to be printed against a longitudinal printing line of types of said cylinder, said elements being in the form of a plurality of discs rotatable about a common first axis, each having flat peripheral teeth each to carry a type, and said apparatus further comprising a disc-driving wheel having peripheral teeth capable of meshing with the peripheral teeth of any of said discs, guiding means to permit of displacing said wheel along a second axis parallel to said first axis and situated at such a distance therefrom that said wheel may thus be selectively brought into engagement with any of said discs, and means to rotate said wheel, said type-carrying cylinder further comprising at least one block-carrying drum co-axial to said discs and having substantially the same diameter as said discs, said drum being formed with a series of peripheral depressions, and printing blocks removably disposed in said depressions; and said apparatus further including a stationary casing disposed around said block-carrying drum to retain said printing blocks in said depressions, said casing having an upper aperture to expose said printing blocks along the longitudinal printing line of said type-carrying cylinder.

2. In an apparatus as claimed in claim **1** said type-carrying cylinder comprising a first and a second block-carrying drum with said first drum adjacent to said discs and said second drum adjacent to said first drum; a disc-supporting shaft on which said discs are loosely mounted, said disc-supporting shaft having an axial bore; a drum-supporting shaft rotatably mounted in said bore, said first block-carrying drum being keyed on said drum-supporting shaft while said second block-carrying drum is rotatable thereon; a first knob on said drum-supporting shaft to effect rotation of said first block-supporting drum;

and a second knob laterally secured to said second block-carrying drum and disposed between same and said first knob, said second knob being loose on said drum-supporting shaft to effect rotation of said second block-carrying drum.

3. In an apparatus as claimed in claim 2, a ring loosely mounted on said drum-supporting shaft between said first and second knobs; means to maintain said ring angularly fixed; and resilient positioning means carried by said ring and by each of said first and second knobs to yieldingly retain each of said block-carrying drums at a number of positions for each of which a printing block of said each of said drums is disposed on the longitudinal printing line of said type-carrying cylinder.

4. In an apparatus as claimed in claim 1 a flat base to support said pressing means; a movable frame to support said type-carrying cylinder, said frame resting on said base and being slidably guided thereon between a printing position at which said cylinder may cooperate with said pressing means to print a flat article, and a composing position at which said cylinder is fully exposed; and means to maintain said movable frame at said printing position.

5. In an apparatus as claimed in claim 4, an elongated mirror effective to reflect the longitudinal printing line of said type-carrying cylinder when said movable frame is at its composing position; a lateral arm pivoted to said frame to support said mirror; means to resiliently retain

said mirror at its effective position with respect to said cylinder; and means to deviate said mirror-supporting arm when said movable frame is brought to its printing position, so as to bring said mirror to an ineffective position at which it does not interfere with proper operation of said pressing means.

6. In an apparatus as claimed in claim 1, said pressing means including a wedge-shaped protruding pressure plate to apply a flat article to be printed against the longitudinal printing line of said type-carrying cylinder.

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WILLIAM B. PENN, Primary Examiner

U.S. Cl. X.R.

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