No. 688,172. Patented Dec. 3, 1901.

J. C. HAWES.

MULTICOLOR PRINTING PRESS.

(Application filed June 2, 1900.)

(No Model.) 6 Sheets—Sheet 1.

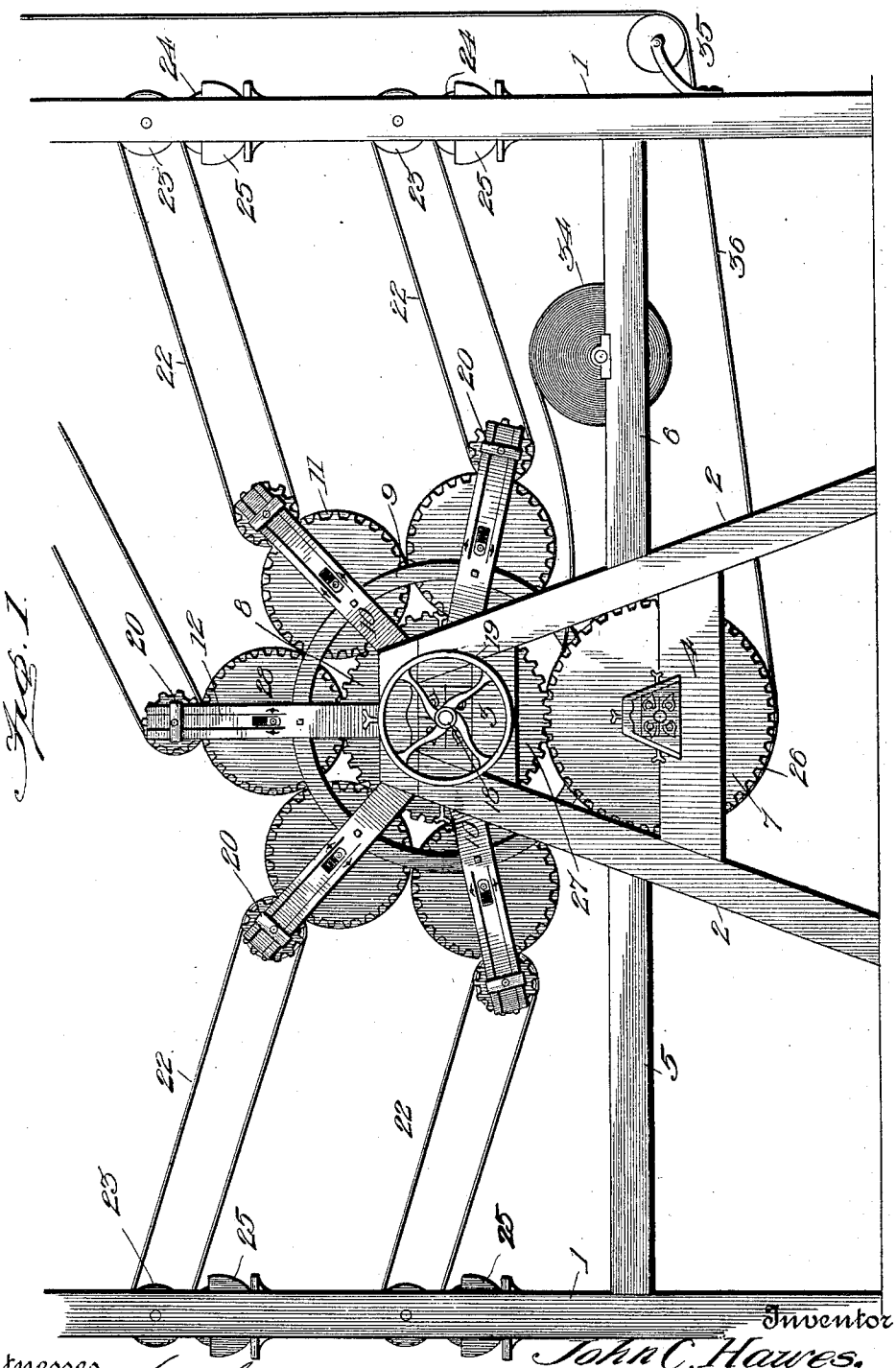


Fig. 1.

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No. 688,172. Patented Dec. 3, 1901.

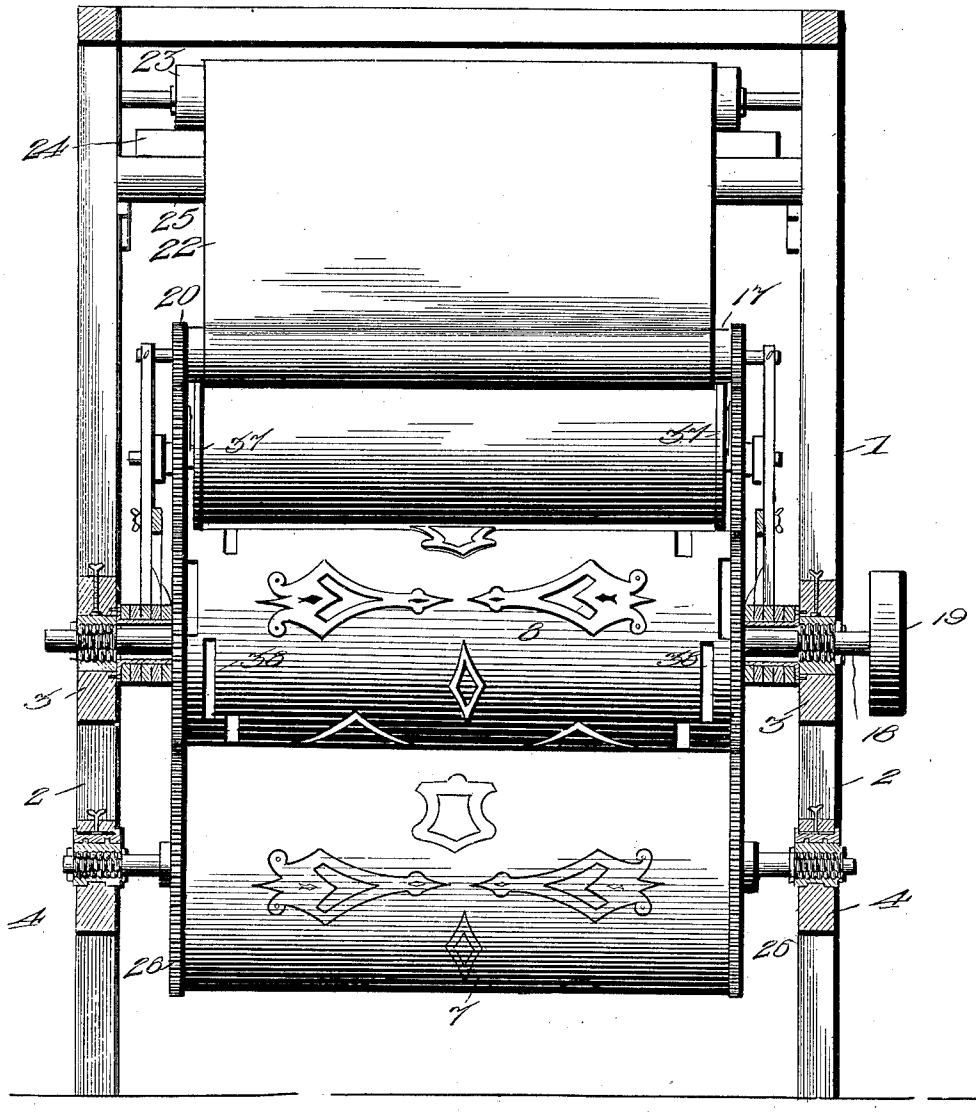
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(No Model.) 6 Sheets—Sheet 2.

Fig. 2.



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(No Model.) 6 Sheets—Sheet 3.

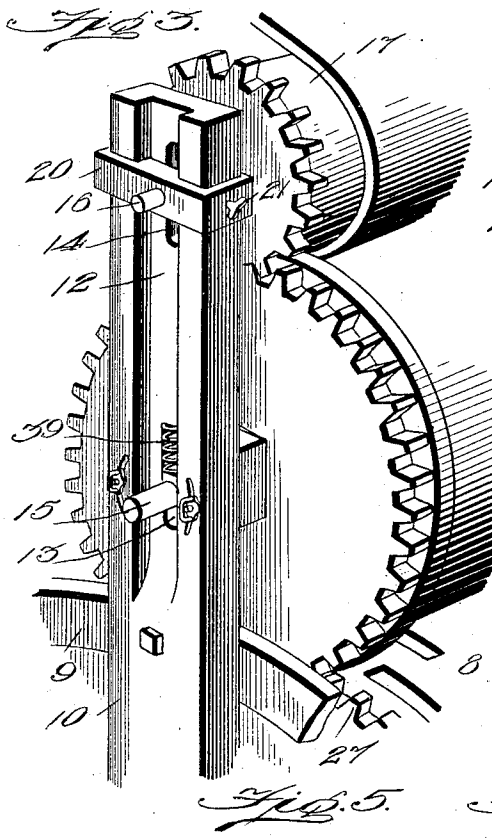


Fig. 5.

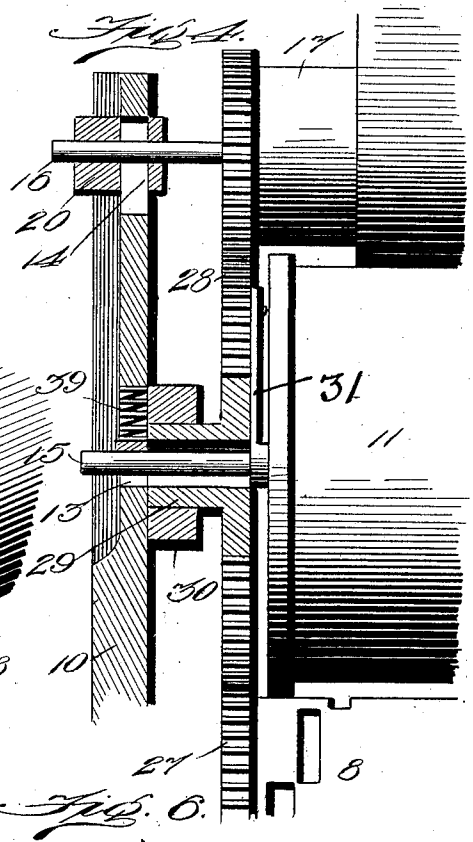
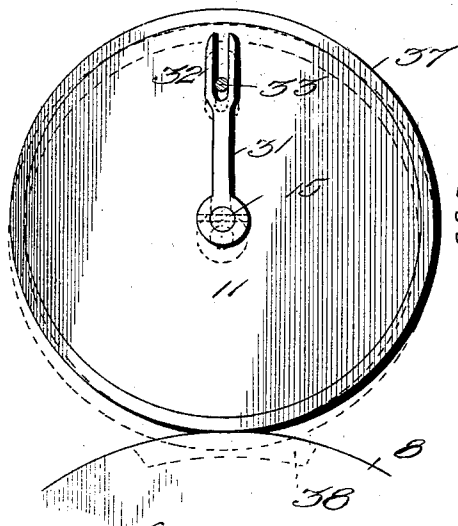
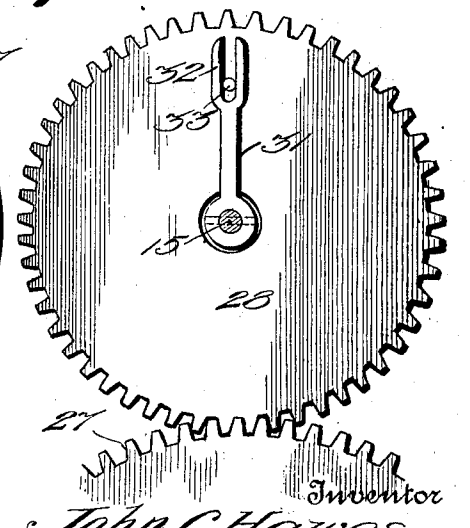


Fig. 6.





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(Application filed June 2, 1900.)

(No Model.) 6 Sheets—Sheet 4.

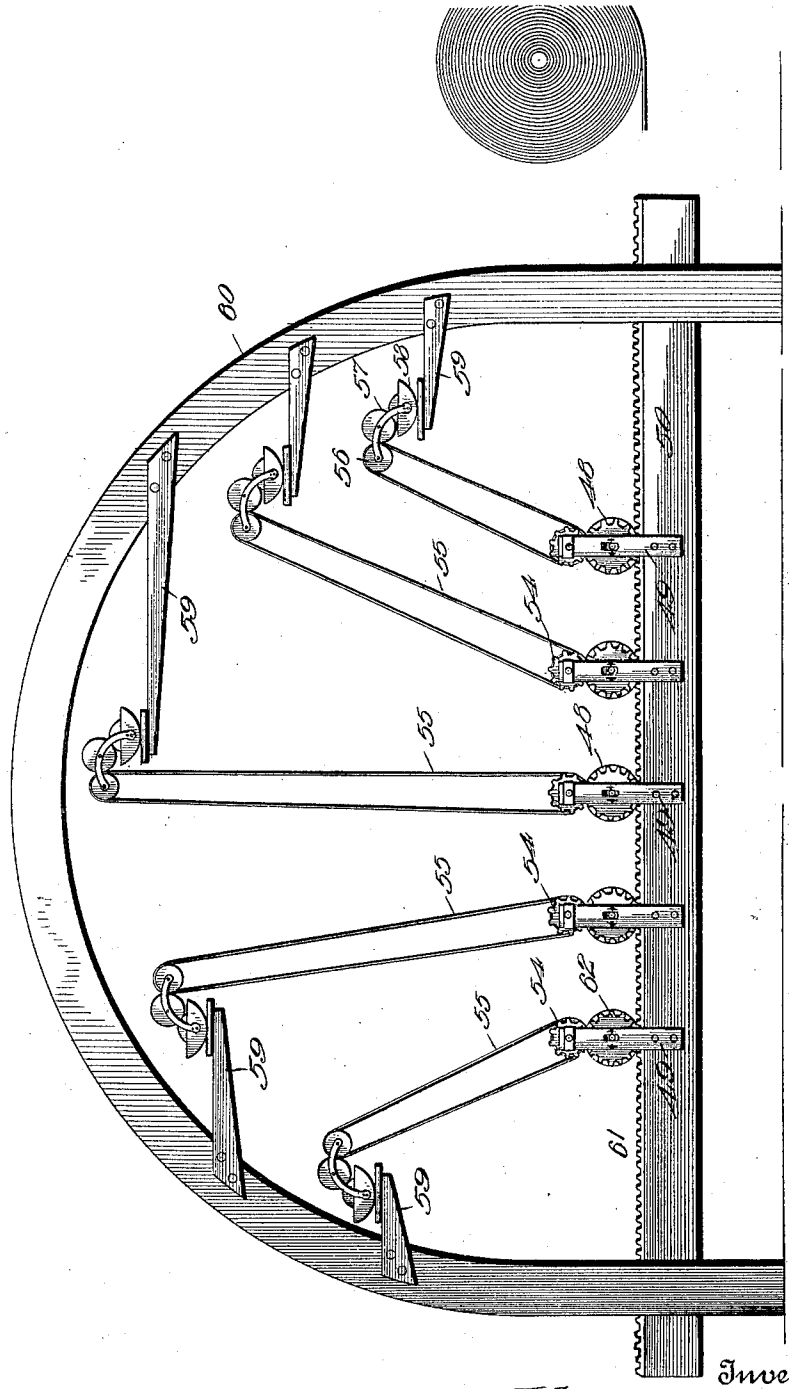


Fig. 7.

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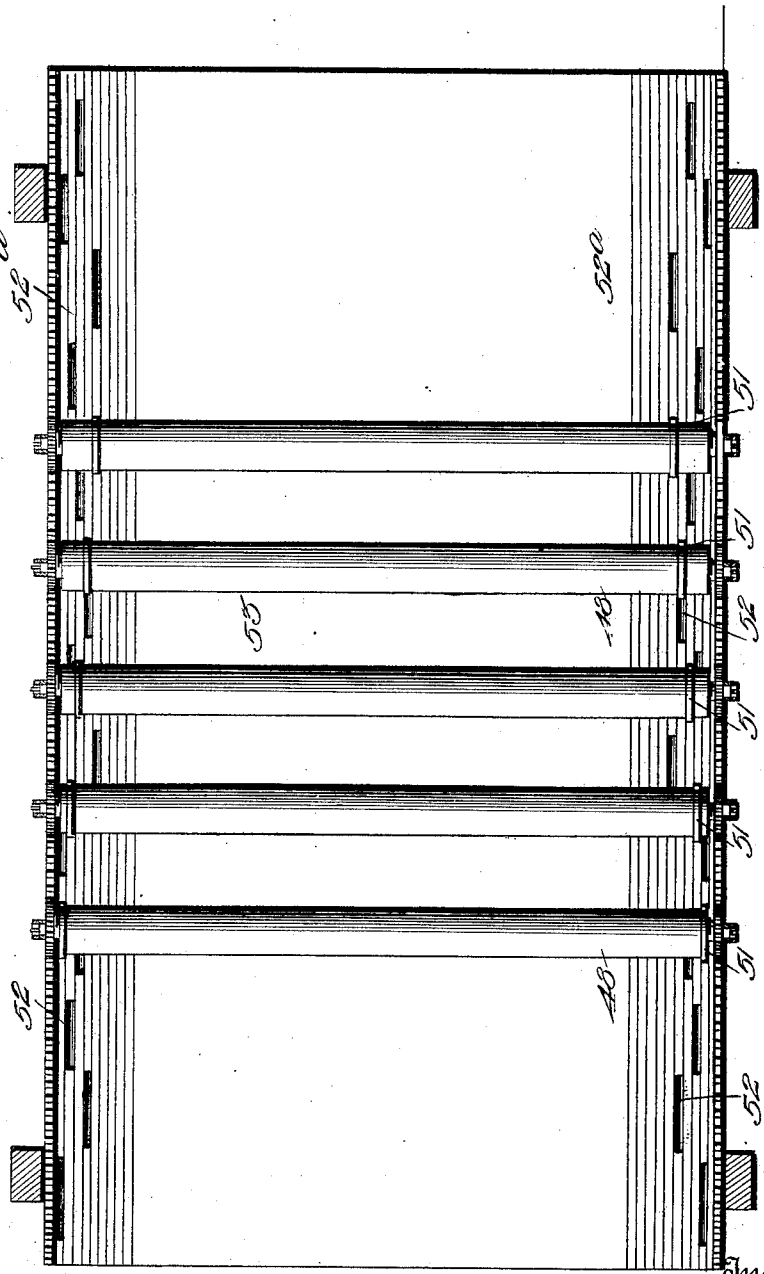
J. C. HAWES.

MULTICOLOR PRINTING PRESS.

(Application filed June 2, 1900.)

(No Model.) 6 Sheets—Sheet 5.

Fig. 8.



Witnesses
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No. 688,172. Patented Dec. 3, 1901.

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MULTICOLOR PRINTING PRESS.

(Application filed June 2, 1900.)

(No Model.) 6 Sheets—Sheet 6.

Fig. 9.

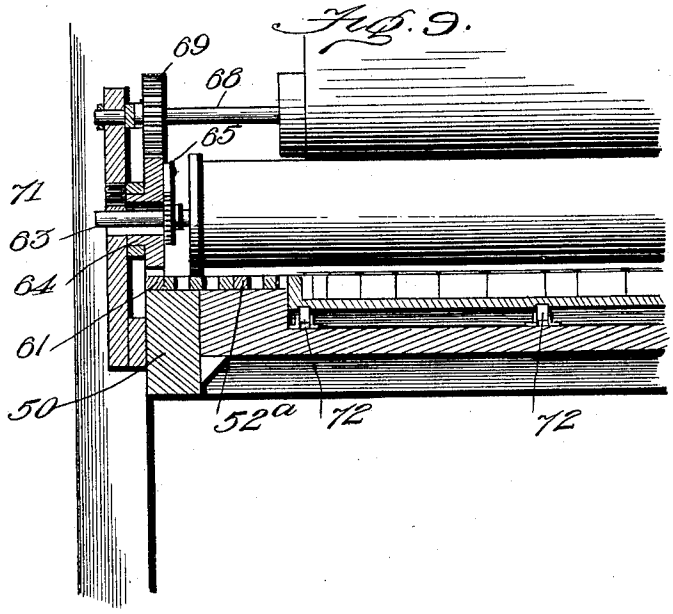


Fig. 10.

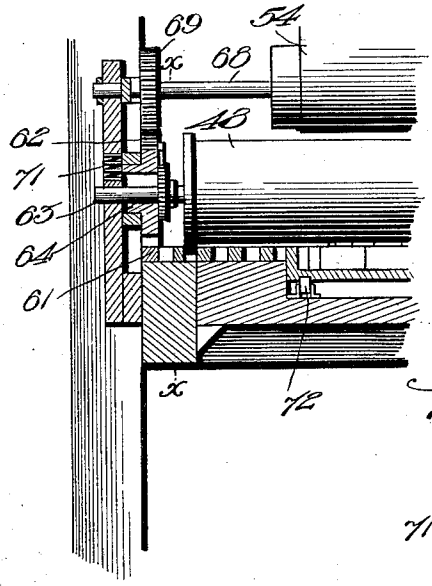


Fig. 11.

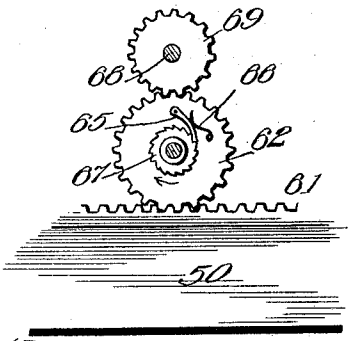
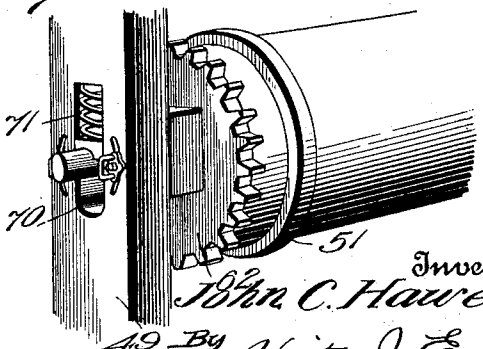


Fig. 12.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN C. HAWES, OF LANSING, MICHIGAN.

MULTICOLOR-PRINTING PRESS.

SPECIFICATION forming part of Letters Patent No. 688,172, dated December 3, 1901.

Application filed June 2, 1900. Serial No. 18,915. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. HAWES, a citizen of the United States, residing at Lansing, in the county of Ingham and State of Michigan, have invented certain new and useful Improvements in Multicolor-Printing Presses, of which the following is a specification.

My invention relates to multicolor-printing presses, the primary object being to provide simple and effective mechanism for printing in a plurality of colors at a single impression.

The main characteristic feature of the invention is the provision of novel means for inking different portions of the form or types by independent inking-rolls, so that one part of the form may be inked in one color and another portion or section in another color, the variety or number of colors employed being dependent upon the requirements of the work to be done.

A further object of the invention is to render the operation of the mechanism (aside from the required motive power) entirely automatic, so that no adjustment or manipulation of the printing cylinder or forms will be required, the construction and arrangement of the inking-rolls and gearing being such as to insure the proper registry of the inking-rolls and the form or types and the application of a plurality of colors to the form, whereby a single impression will suffice to complete the work in any desired number of colors.

The invention is susceptible of embodiment in different forms and is equally applicable to cylinder-presses or to those employing a flat printing-surface or horizontal bed-plate.

In addition to the broad features above outlined the invention consists in the improved details of construction hereinafter fully described, and defined in the appended claims, in connection with the accompanying drawings, which constitute a part of this specification, and in which—

Figure 1 is a side elevation of a part of a cylinder printing-press with my improvements applied thereto. Fig. 2 is a front elevation of the same, partly in section. Fig. 3 is a detail perspective of a portion of the gearing for driving one of the inking-rolls. Fig. 4 is a view, partly in vertical section and partly in elevation, of the mechanism shown in Fig. 3. Fig. 5 is an end elevation of one of the inking-rolls, its movement with relation to the printing-cylinder being indicated by broken lines. Fig. 6 is an elevation of the inner side of one of the gear-wheels mounted on the shafts of the inking-rolls. Fig. 7 is a side elevation of the invention as applied to a bed-plate press. Fig. 8 is a top plan of Fig. 7 with the ink-belts and parts of the frame removed. Fig. 9 is a vertical section on one side of the press shown in Fig. 7. Fig. 10 is a similar view with the parts in a different position. Fig. 11 is a section on the line $x\ x$ of Fig. 10. Fig. 12 is a perspective view of one end of one of the inking-rolls.

Each side of the frame of the press, as shown in Figs. 1 and 6 of the drawings, comprises vertical bars 1 and converging supports 2, the latter connected by horizontal bars 3 and 4 and braced to the bars 1 by horizontal braces 5 and 6. Upon the bars 3 and 4 are supported the bearings for the bed-roller 7 and printing-cylinder 8. As the construction of these bearings is a novel feature of the invention, they will be described more specifically hereinafter.

To the inner side of each of the frames formed by the converging bars 2 is secured a circular support 9, to which are firmly bolted a plurality of radially-disposed arms 10, the number of said arms depending upon the number of inking-rolls employed. In the machine shown in Fig. 1 five of these arms are employed at each side of the machine, serving to support five inking-rolls, (designated by the numeral 11.) Each of the arms 10 is centrally recessed on its outer surface, as shown at 12, and formed with two elongated slots 13 and 14 for the passage and adjustment of the shafts 15 and 16 of the inking-rolls 11 and the belt-rolls 17.

18 designates the shaft of the printing-cylinder 8, said shaft projecting beyond the frame-bars 2 and having a belt-pulley 19 mounted thereon for the application of power to operate the entire mechanism.

The ends of the shafts 16 of the belt-rolls are supported in yokes 20, adjustably secured upon the outer ends of the arms 10 by means of set-screws 21.

The endless ink-belts 22 pass around the rolls 17 and rolls 23, the latter being mounted

in the frame of the machine above inking-rollers 24, supported to revolve in troughs or vats 25. There is a separate vat or trough for each belt, whereby a different-colored ink may be supplied to each belt.

The ends of the bed-roller 7 are formed with gear-teeth 26, which mesh with the teeth of gear-wheels 27, fixed to the ends of the printing-cylinder 8, concentric therewith.

Upon the ends of the shafts 15 of the inking-rolls are loosely mounted gear-wheels 28, formed with sleeves 29, through which the shafts 15 extend, said sleeves being supported in bearings 30 on the inner sides of the arms 10. As shown in Figs. 4, 5, and 6, the internal diameter of the axial supporting-sleeves of the gear-wheels 28 is greater than that of the shafts 15, permitting the latter to move within the sleeves; but to insure the revolution of the inking-rolls with the gear-wheels 28 an arm 31 is fixed to each end of the shafts 15, the free ends 32 of said arms being forked or bifurcated to straddle pins 33, projecting from the inner faces of the wheels 28. This connection of the inking-rolls and gear-wheels permits a limited lateral or radial movement of the rolls 8, but causes them to revolve when their gear-wheels are revolved by the gear-wheels 27 of the printing-cylinder.

34 designates the paper-feed roll, and 35 a guide-roller around which the printed product 36 passes, as illustrated in Fig. 1.

Each of the inking-rolls 11 is provided adjacent to each of its ends with an annular flange or collar 37, the collars on one of said rolls being out of vertical alinement with those on the other rolls. The printing-cylinder is formed near its ends with a series of peripheral slots 38, said slots varying in length and being in different vertical planes. By means of these slots and the collars on the inking-rolls the inking-rolls are permitted to contact with the types or form on the printing-cylinder at predetermined intervals. The collars on the inking-rolls bear against the surface of the printing-cylinder, so that the inked surfaces of said rolls do not contact with the printing-cylinder, except when the collars are brought into alinement with the slots in the printing-cylinder. When the collars reach the particular slots adapted to receive them, the inking-rolls drop into contact with the printing-cylinder to ink that part of the form lying between the slots. The shaft 15 of each of the rolls is under the tension of coil-springs 39, supported in the slots 13 of the arms 10, and said springs assist gravity to project the collars into their slots. As soon as each inking-roll inks its portion of the form the continued revolution of the printing-cylinder rides the collars out of the slots, thus lifting the roll away from the surface of the printing-cylinder.

It will be obvious from the illustration in Fig. 1 that inks of different color are supplied to the respective ink-rolls by means of the belts 22, which receive their supply of ink from the feed-rollers 24, mounted in the vats or troughs 25, the revolution of the belts being effected by the rolls 17, which are geared to the gear-wheels 28 of the inking-rolls.

Referring now to Figs. 7 to 12, inclusive, I will describe the invention as applied to a bed-plate press. The numeral 48 designates the inking-rolls, supported in bearings formed in vertical arms 49, secured to the frame 50 of the machine and provided with collars 51, adapted to enter slots 52, formed in the bed-plate 53 of the press. 54 designates belt-rollers, also mounted in bearings in the arms 49 and supporting ink-belts 55, said belts also passing around rollers 56, supported by arms 57, projecting from ink troughs or vats 58, arranged upon arms 59, projecting from the arch 60 of the frame. The bed-plate 53 is provided at each side with racks 61, meshing with gear-wheels 62, loosely mounted upon the ends of the shafts 63 of the inking-rollers. As shown in Figs. 9 and 10, these gear-wheels are each formed with a sleeve 64, through which the shafts 63 extend, and to the inner surface of each of the gear-wheels is pivotally secured a pawl 65, provided with a spring 66. These pawls engage ratchet-wheels 67, fixed upon the shafts 63. By this construction and connection of the inking-rolls and wheels 62 the inking-rolls are permitted to drop into inking contact with the bed-plate, when the collars on said rolls enter the slots in the bed-plate. Instead of forming the slots 52 in the bed-plate I preferably employ a series of strips 52^a at each side of the bed-plate and divide or slot the strips at the proper points to accommodate the collars 51 of the inking-rolls. The shafts 68 of the belt-rollers 54 are provided at their ends with fixed gear-wheels 69, which mesh with the gear-wheels 62. The arms 49 are formed with elongated slots 70 to receive the shafts 63, coil-springs 71 being located within said slots, the tendency of said springs being to force the shafts downward. The numeral 72 designates antifriction-rollers upon which the bed-plate reciprocates. The operation of the bed-plate press as thus described, so far as the inking of the form is concerned, is substantially similar to that above set forth in connection with the cylinder-press.

I would have it understood that the machine is susceptible of many modifications in its details of construction and that I am not restricted to all of the details shown and described. I therefore reserve the right to make all such changes and modifications as may fall within the spirit and scope of the invention as defined in the following claims.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a multicolor-printing press, the combination with a movable printing-surface, of a plurality of slotted arms supported by the frame of the press, a plurality of inking-rolls supported adjustably in said arms, and means for moving said rolls toward and from the

printing-surface without interrupting their rotary movement, comprising a gear-wheel having a projecting sleeve to receive the shaft of the inking-roll, and a sliding connection between said shaft and gear-wheel.

2. In a multicolor-printing press, the combination with a printing-cylinder, of a plurality of inking-rolls geared to the cylinder, and means for effecting a radial movement of the rolls with relation to the cylinder without interrupting their rotation, comprising a gear-wheel having a projecting sleeve to receive the shaft of the inking-roll, and a sliding connection between said shaft and gear-wheel.

3. In a multicolor-printing press, the combination with a rotary printing-cylinder, of a plurality of radially-disposed slotted arms, inking-rolls supported by said arms and revolved by the cylinder, and means for permitting the rolls to move into and out of inking contact with the cylinder without interrupting the rotation of said rolls, comprising a gear-wheel having a projecting sleeve to receive the shaft of the inking-roll, and a sliding connection between said shaft and gear-wheel.

4. In a multicolor-printing press, the combination with a rotary printing-cylinder, and a bed-roller geared to the cylinder, of a plurality of inking-rolls also geared to the cylinder, and means for moving the rolls into, and out of inking contact with the cylinder without interrupting their rotation, comprising a gear-wheel having a projecting sleeve to receive the shaft of the inking-roll, and a sliding connection between said shaft and gear-wheel.

5. In a multicolor-printing press, the combination with a rotary printing-cylinder, and a bed-roller geared thereto, of a plurality of slotted and recessed arms disposed radially with relation to the cylinder, a plurality of inking-rolls supported by said arms and geared to said cylinder, means for moving the inking-rollers into and out of inking contact with the cylinder without interrupting their rotary movement, comprising a gear-wheel having a projecting sleeve to receive the shaft of the inking-roll, and a sliding connection between said shaft and gear-wheel, and a plurality of belt-rollers adjustably supported by said arms.

6. In a multicolor-printing press, the combination with a revoluble printing-cylinder formed with peripheral elongated slots; of a plurality of inking-rollers each formed with peripheral collars; gear-wheels on the shafts of said inking-rolls each formed with a bearing-sleeve through which the shaft of the inking-roller extends; and a bifurcated arm fixed to said shaft, and straddling a pin projecting from the gear-wheel.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN C. HAWES.

Witnesses:
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WM. A. FRASER.