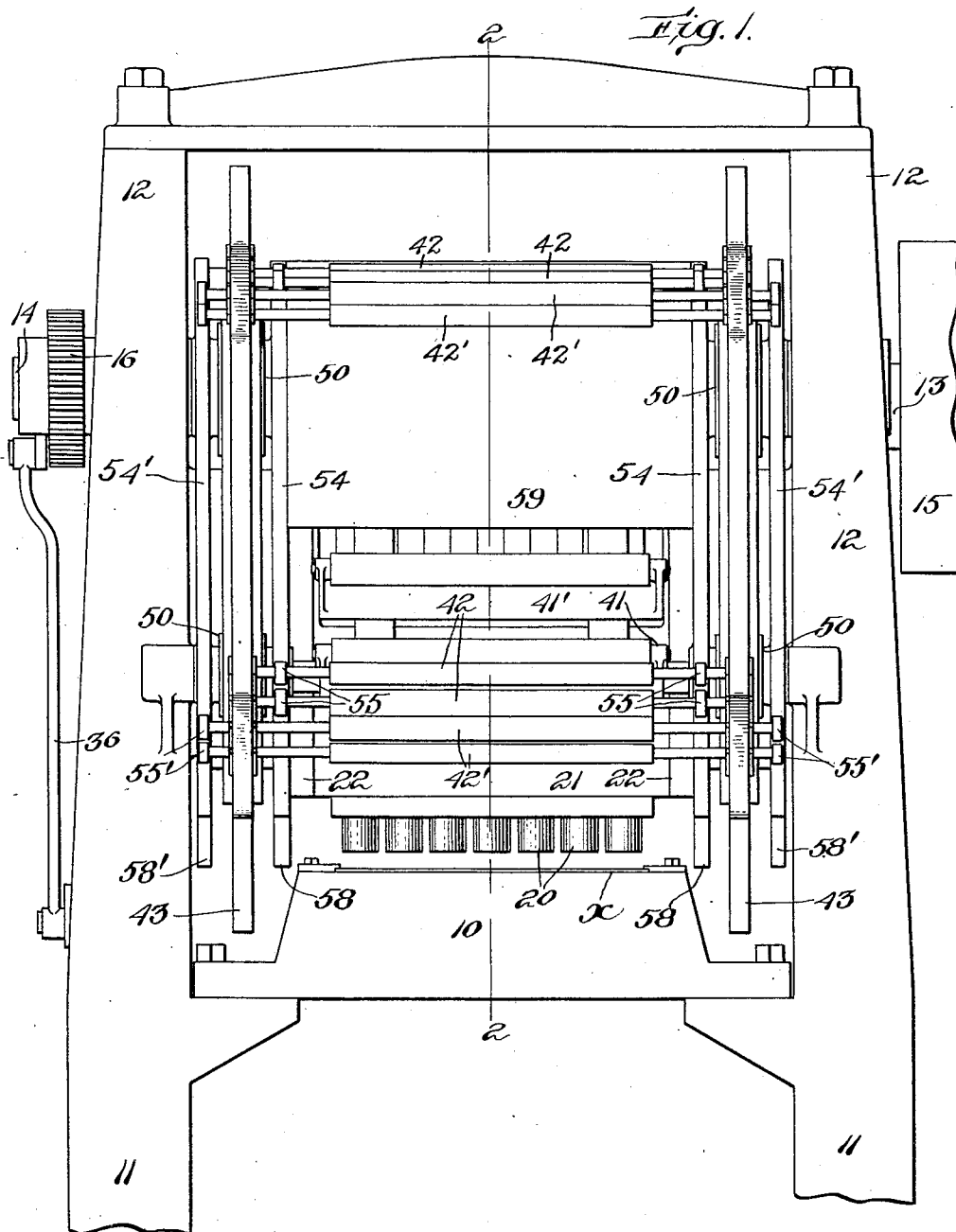


L. G. BUCK.
 PRINTING AND CUTTING MACHINE.
 APPLICATION FILED JULY 19, 1909.

956,476.

Patented Apr. 26, 1910.

4 SHEETS—SHEET 1.



Witnesses:

P. H. Pezzetti

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Louis G. Buck

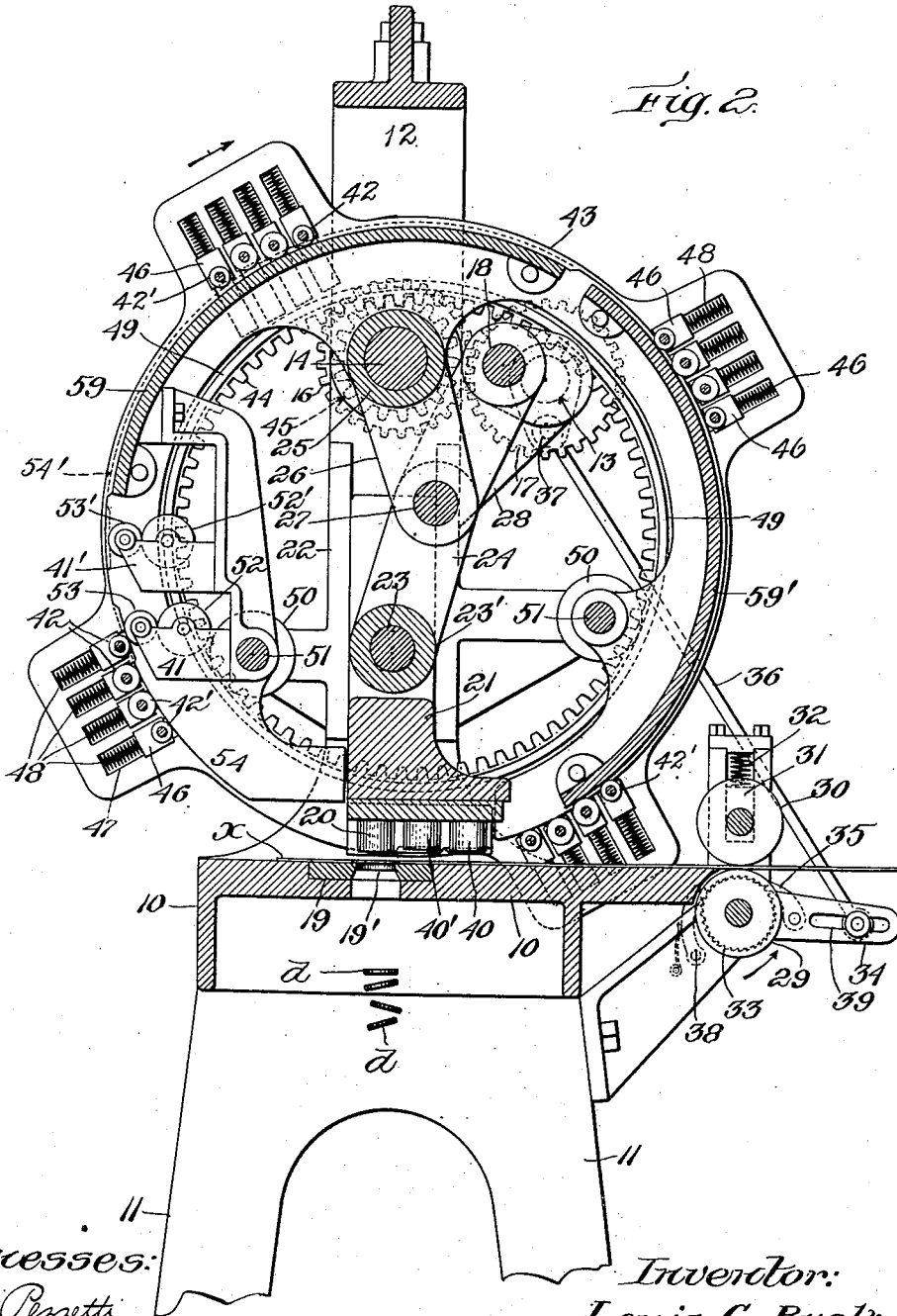
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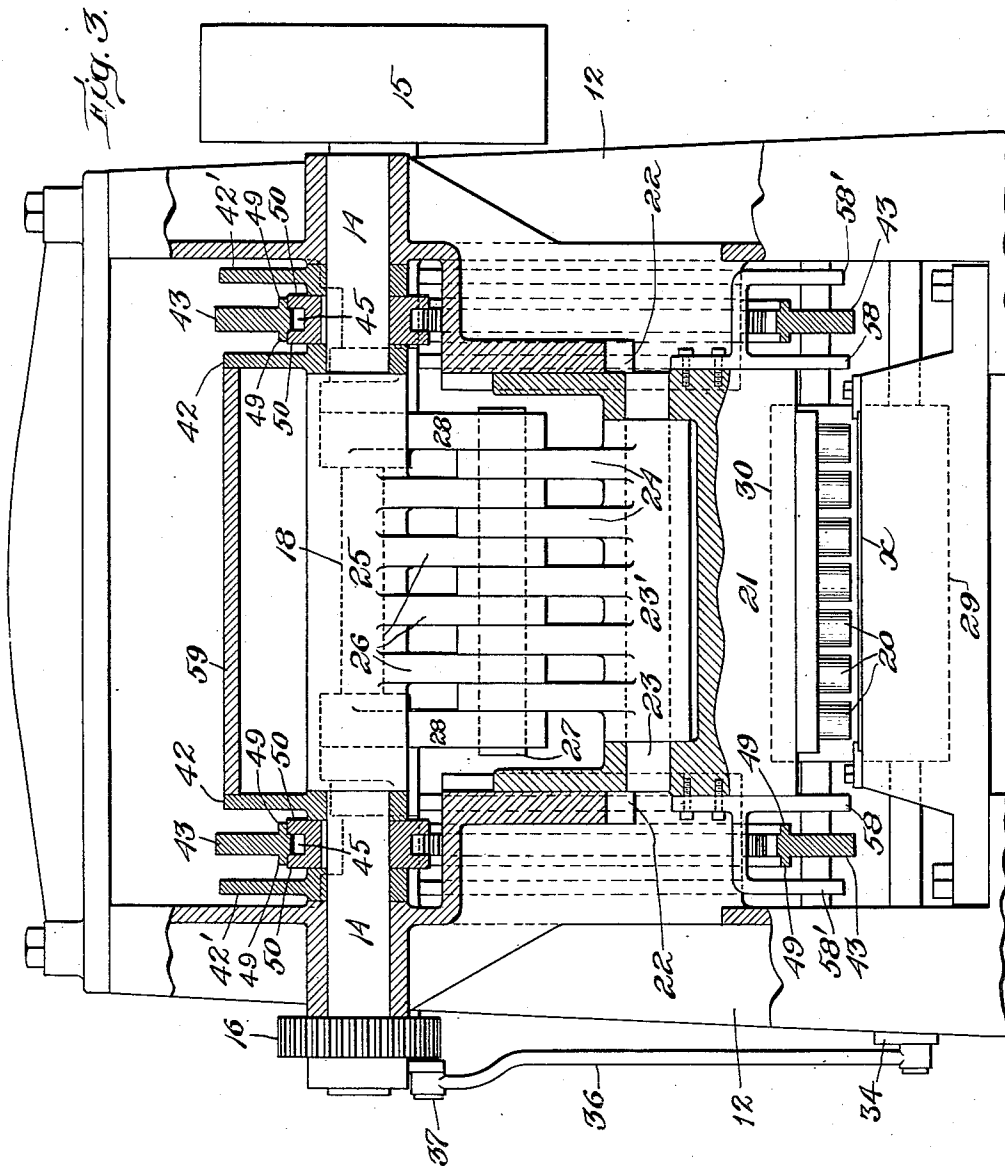
by *Wm. B. Smith & Co.*
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4 SHEETS—SHEET 3.



Witnesses:
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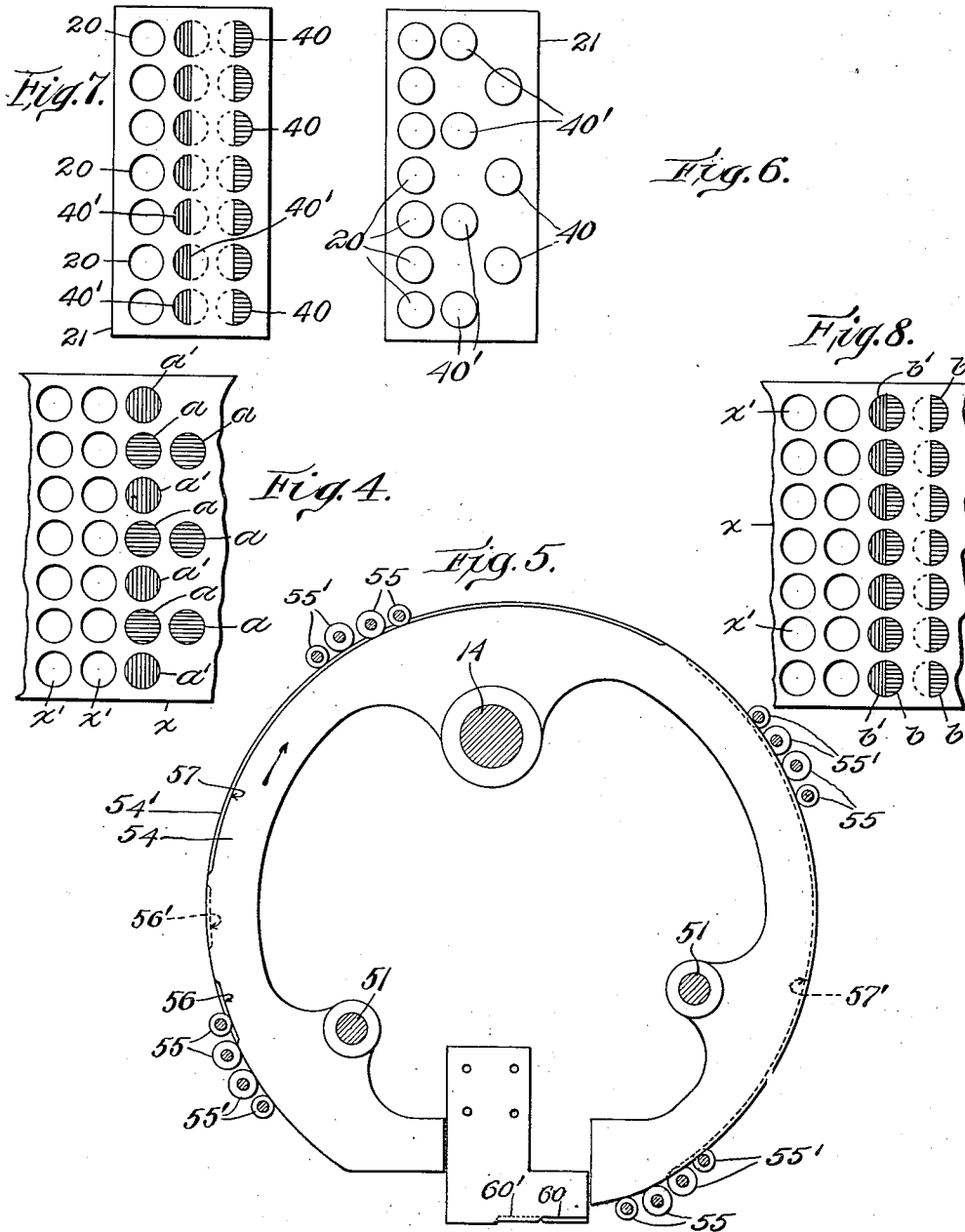
Inventor:
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4 SHEETS—SHEET 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

LOUIS G. BUCK, OF ANDOVER, MASSACHUSETTS, ASSIGNOR TO JOSEPH W. ROBINSON, OF NORTH ANDOVER, MASSACHUSETTS.

PRINTING AND CUTTING MACHINE.

956,476.

Specification of Letters Patent. Patented Apr. 26, 1910.

Application filed July 19, 1909. Serial No. 508,316.

To all whom it may concern:

Be it known that I, LOUIS G. BUCK, of Andover, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Printing and Cutting Machines, of which the following is a specification.

This invention relates to machines for cutting and printing by one and the same operation. The printing and cutting are performed upon a strip fed step by step in one direction upon which the printed characters are repeated and from which the printed portions may be severed by the cutting members.

The invention is especially adapted for printing and cutting circular disks such as those employed as caps for milk jars.

The accompanying drawings illustrate the invention as embodied in a machine for printing and cutting caps for milk jars and includes a plurality of printing types and sources of ink together with ink-feeding devices whereby the printed characters may be printed in a plurality of colors.

A novel feature of the invention is the inking mechanism which includes a rotary carrier driven continuously in one direction and provided with successive ink rolls for applying the ink to the types. The advantage of a carrier constructed and operated in this manner is that the machine is thereby adapted to be operated rapidly without liability to vibration inasmuch as the carrier moves constantly in one direction and is equally balanced with regard to the distribution of weight.

Of the accompanying drawings which illustrate one form in which the invention may be embodied, Figure 1 represents a front elevation of a printing and cutting machine adapted to print in a plurality of colors and to cut the printed work in the form of circular disks. Fig. 2 is a perpendicular section on line 2-2 of Fig. 1. Fig. 3 is a transverse perpendicular section of the operative parts of the machine. Fig. 4 represents a diagram of a strip in plan view from which the disks are cut. Fig. 5 represents a perpendicular section including the ink rolls and their guides. Fig. 6 is an inverted plan view of the types and dies. Fig. 7 shows another arrangement of types.

Fig. 8 is a plan view of a strip printed in accordance with the arrangement of Fig. 7.

The same reference characters indicate the same parts wherever they occur.

On the drawings, 10 represents a bed or frame which may be mounted upon legs indicated at 11. Upon the supporting legs are provided upwardly extending end supports 12, in which are bearings for a power shaft 13 and a countershaft 14. The power shaft may be provided with a pulley 15 for driving purposes and may be connected with the shaft 14 by gears 16 and 17. The power shaft is formed with a crank 18 by which reciprocatory motion is supplied for operating the printing types and cutting member hereinafter described, while the shaft 14 is employed for imparting continuous rotary motion in one direction to the carrier for the ink rolls. The bed 10 constitutes a printing platen and is provided with a countersunk hardened steel plate 19 in which are formed a plurality of internal cutting dies 19' arranged in a transverse line. The upper surface of the plate 19 lies in the same plane as the upper surface of the platen. A plurality of external cutting dies 20, arranged to coincide with the dies 19', is mounted upon a head 21 arranged in guides 22 formed upon the upper supports 12. The head is adapted to be reciprocated toward and from the platen and is provided with a relatively stout pivot stud shaft 23 upon which is arranged a toggle link 23' having a plurality of branches 24. 25 represents a similar toggle link loosely mounted upon the countershaft 14 and provided with a plurality of branches 26 which are pivotally connected to the branches 24 by a pivot stud 27. The stud 27 is connected to the crank 18 by a pair of links 28 one at either side of the toggle links. By means of these connections the head 21 is reciprocated continuously and the coöperative dies are adapted to simultaneously sever a plurality of disks from a strip fed between them.

Feeding mechanism is provided for feeding a broad paper strip *x* between the upper and lower dies. The feeding mechanism includes a feed roll 29, mounted in fixed bearings below the plane of the platen, and an idle roll 30 adapted to coöperate therewith and arranged in yielding bearings 31 above

the plane of the platen. Springs 32 are provided for forcing the bearing pieces 31 toward the driving roll. One end of the driving roll is provided with a ratchet 33 and with a loose arm upon which is pivoted a pawl 35 adapted to cooperate with the ratchet. The free end of the arm 34 is pivotally connected with one end of a connecting rod 36, of which the other end is connected to a crank 37 on the shaft 13. By means of this mechanism, the feed roll may be rotated intermittently in the direction of the arrow in Fig. 2, thereby feeding the strip x step by step toward the cutting dies. A retaining pawl 38 may be provided for preventing retrograde motion of the feed roll. The arm 34 may be formed with a radial slot 39 in which the connecting pivot of the rod 36 may be positioned so as to impart more or less movement to the arm.

That portion of the machine to which the foregoing description relates is a well known type of punch press, and embodies no new features, but when combined with the printing mechanism hereinafter described, it forms a part of the present invention.

40 and 40' represent printing types mounted upon the head 21 and adapted to cooperate with the platen 10 for printing characters upon the strip prior to the cutting operation. According to the present arrangement of types those indicated at 40 are in a transverse line, and those indicated at 40' are likewise in a transverse line between the types 40 and the dies 20. Each type 40 and each type 40' may be in longitudinal alinement with a die 20. As a result of this arrangement a given portion of the strip x may be caused to register first with a type 40, then with a type 40' and finally with a die 19', whereby a disk may be printed with different colors and finally severed from the strip.

Although there are but two gangs of printing types illustrated upon the drawings, it is to be understood that the head 21 may be provided with any desired number of printing types arranged in a longitudinal series, whereby a greater number of colors may be applied.

41 and 41' represent ink reservoirs which may be supplied with different colored inks. The ink is transferred from the reservoir 41 to the types 40 by ink rolls 42, and that from the reservoir 41' is transferred to the types 40' by ink rolls 42'. The ink rolls are mounted upon a rotary carrier comprising a pair of annular rings 43 provided with internal gears 44 intermeshing with spur pinions 45 affixed upon the shaft 14. The arrangement of the ink rolls includes a plurality of gangs or groups each comprising one or more rolls 42 and one or more rolls 42'. According to the arrangement illus-

trated each group comprises a pair of each class of rolls. There are illustrated four of such groups equally spaced about the periphery of the carrier, and therefore adapted to follow in the same path and to engage the printing types successively. The ends of the rolls are mounted in sliding boxes 46 arranged in guides 47 formed upon the carrier 43. The boxes are engaged by springs 48 by which they are pressed inwardly toward the axis of the carrier. The rings 43 are formed with annular flanges 49 which roll upon the peripheries of guide rolls 50. As shown by Figs. 2 and 3, two pairs of guide rolls 50 are mounted upon the shaft 14 and as shown by Fig. 2, the other guide rolls are mounted upon studs or tie rods 51. The rolls maintain the rings upon a fixed axis about which they rotate when driven by the pinions 45.

The direction of rotation of the carrier is indicated by arrows in Figs. 2 and 5, and the ink rolls are therefore caused to pass the ink reservoirs 41, 41', the types 40, 40', and the dies 20 in the order named.

The ink reservoir 41 is provided with feed rolls 52 and 53, and the reservoir 41' is provided with feed rolls 52' and 53'. The rolls 53 and 53' are arranged to receive ink from the rolls 52 and 52' and to feed the ink to the ink rolls upon the rotary carrier.

Segmental rings 54 and 54' are provided for guiding the ink rolls 42 and 42' so as to cause the rolls to cooperate with their respective ink feeders and types. For this purpose there are provided two rings 54 and two rings 54' arranged in pairs adapted to cooperate with the ends of the ink rolls. The rings are constructed and arranged so that their outer edges are adapted to be engaged by trundle rolls 55 and 55' arranged respectively upon the ink rolls 42 and 42'. The peripheries of the rings 54 are cut away as indicated at 56 and 57 and the rings 54' are cut away as indicated at 56' and 57'. The gaps between the ends of the rings 54 and 54' coincide with the path of the reciprocatory head 21, and these gaps are alternately opened and closed by ring sections 58 and 58' mounted upon the head. The sections 58 and 58' are so arranged upon the head as to register with the rings 54 and 54' when the head is at the upper end of its movement, and at this point the rings and removable sections combine to form continuous tracks upon which the trundle rolls 55, 55' may run. The purpose of forming the gaps in the rings is to enable the head 21 to move up and down across the path of the ink rolls, and the purpose of providing the movable sections 58 and 58' is to bridge the gaps to enable the ink rolls to pass across the path of the head. The motions of the head are so timed

with relation to the rotation of the carrier that a group of ink rolls passes between the head and the platen when the head is raised and the head is moved toward and from the platen after the passage of one group of ink rolls and before the arrival of the succeeding group.

The cut out portion 56 in the ring 54 permits the ink rolls 42 to cooperate with the ink feeder 53, and the portion of the rings 54 between the cut out portions 56 and 57 retract the said rolls so that the rolls are unable to engage the ink feeder 53'. The rolls 42 after passing the feeder 53' are permitted by the cut out portion 57 to engage and roll upon a segmental plate 59 by which the ink on said rolls is evenly distributed about their peripheries. 59' indicates a similar segmental plate arranged at an equal distance from the axis of the rotary carrier beyond the extremity of the cut out portion 57. The rolls 42 upon reaching the rear extremities of the cut out portions 57 are retracted beyond the arc of the plate 59' and are guided in retracted position to the types 40.

The ink rolls 42' meanwhile, in passing the ink feeder 53, are held in retracted position by their guide rings 54', but they are permitted to engage the ink feeder 53' by reason of the cut out portions 56'. The ink rolls 42', after leaving the feeder 53', are retracted by their guides and are guided in retracted position over the segmental plate 59. Upon reaching the rear end of the plate 59 and immediately after the ink rolls 42 are retracted, the rolls 42' enter the cut out portions 57' and engage and roll upon the plate 59'. It is therefore apparent that each set of ink rolls of each group is guided so as to engage but one ink feeder and but one distributing plate, and that different colored inks may thus be fed to and distributed upon the two sets of rolls without liability of becoming mixed.

The sections 58 on the head 21 are cut away as indicated at 60 to permit the ink rolls 42 to engage the types 40. The sections 58', however, are not so cut away but are formed to hold the ink rolls 42' in retracted position so that said rolls may not engage the types 40. The sections 58' are, however, cut away as indicated at 60' for the purpose of permitting the rolls 42' to engage the types 40'. The sections 58 and 58' are formed to cause the ink rolls 42, 42' after engaging their respective types 40 and 40', to clear the cutting dies 20 and to pass therefrom to their respective rings 54 and 54'. No difficulty is encountered by reason of bridging the gaps in the guide rings with reciprocating sections because the ink rolls move continuously at a relatively rapid rate, whereas at the time when the rolls are in

engagement with the reciprocating track sections, the head 21 is at one extreme of its movement and is moving very slowly for a substantial period of time.

It is obvious that a machine of this character is capable of a great variety of work and that the work may be fed in other ways. Not only may the number of types and colors be increased, but the arrangement of the types may be varied to produce different results. For instance, the arrangement shown by Fig. 6 includes an equal number of types and dies, but the types are arranged in a plurality of transverse and longitudinal lines. The work pauses at each transverse line and the result is that each disk has printed characters of a single color, but the characters of one disk may be of another color than those of another disk.

The result of the arrangement shown by Fig. 7 is that the characters of each disk include a plurality of colors. This is obtained by providing a plurality of types in longitudinal alinement and applying ink of different colors to successive types.

In Fig. 4, the portions *a* of the strip *x* represent the areas adapted to receive impressions of one color from the types 40. The portions *a'* represent the areas adapted to receive impressions of another color from the types 40', and *x'* represents the apertures formed by severing the areas *a* and *a'*. The severed disks are indicated at *d* in Fig. 1.

In Fig. 8, the portions indicated at *b* and *b'* represent the combined impressions from the types 40 and 40' according to the arrangement shown by Fig. 7.

Having thus explained the nature of my said invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is:—

1. In a printing machine, a continuously revolving carrier, a series of groups of successive ink rolls movably mounted on the carrier, a series of ink feeders, a platen, a plurality of types reciprocated in unison across the path of the rolls, and guides cooperating with the rolls for causing the rolls to cooperate selectively with the feeders and types.

2. In a printing and cutting machine, a type, a cutting member, a movable carriage for said type and cutting member, ink rolls movable in a path intersecting the path of the type and cutting member, and guides for causing the rolls to engage the type and to avoid the cutting member.

3. In a printing and cutting machine, a cutting member and type movable in unison, a carrier, ink rolls movably mounted on the

carrier and adapted to cross the paths of the cutting member and type, and guides movable with said member and type for causing the rolls to engage the type and avoid the
5 cutting member.

4. In a printing and cutting machine, a printing couple including successive types for simultaneously printing with a plurality of colors, means for feeding a strip step
10 by step to successive types, and means for severing the printed portions from the strip,

said printing couple and feeding means being adapted to produce similar printed portions each including a plurality of colors, or printed portions of a plurality of colors
15 each portion bearing but one color.

In testimony whereof I have affixed my signature, in presence of two witnesses.

LOUIS G. BUCK.

Witnesses:

JAMES B. ROBINSON,
HARRY R. DOW.