

March 31, 1936.

D. C. MCGIEHAN

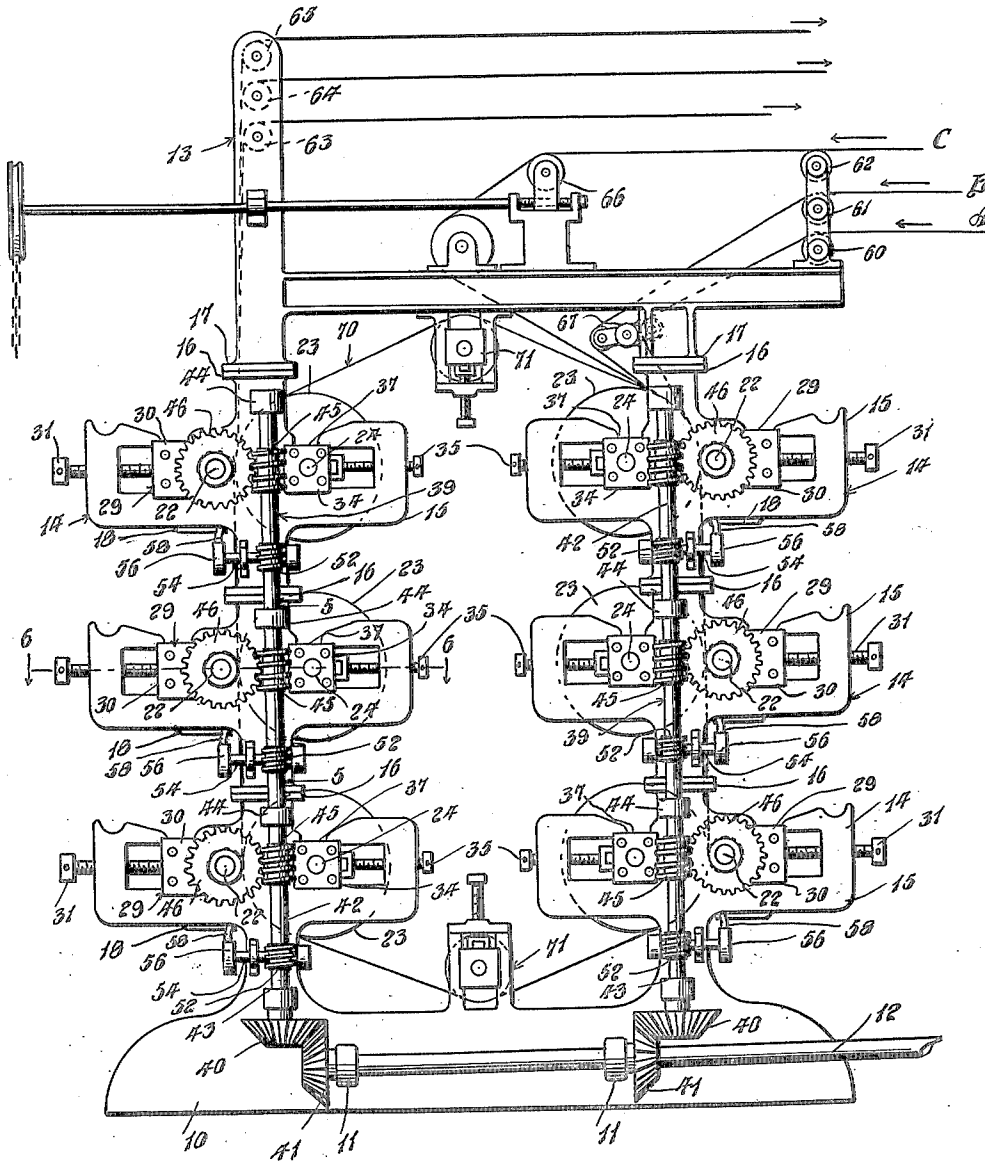
2,036,158

INTAGLIO PRINTING MACHINE

Filed May 17, 1933

5 Sheets-Sheet 1

Fig. 1.



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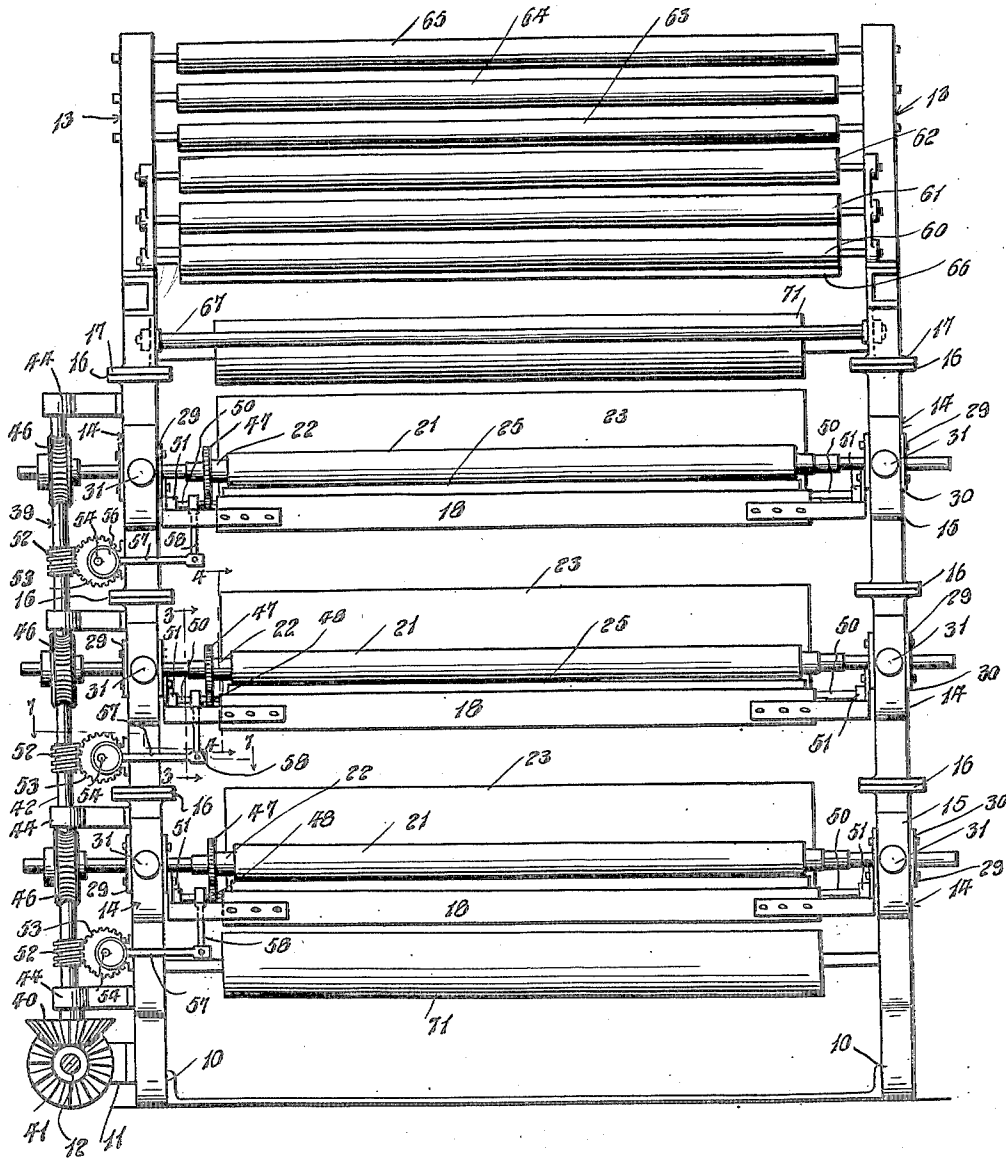
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Fig. 2.



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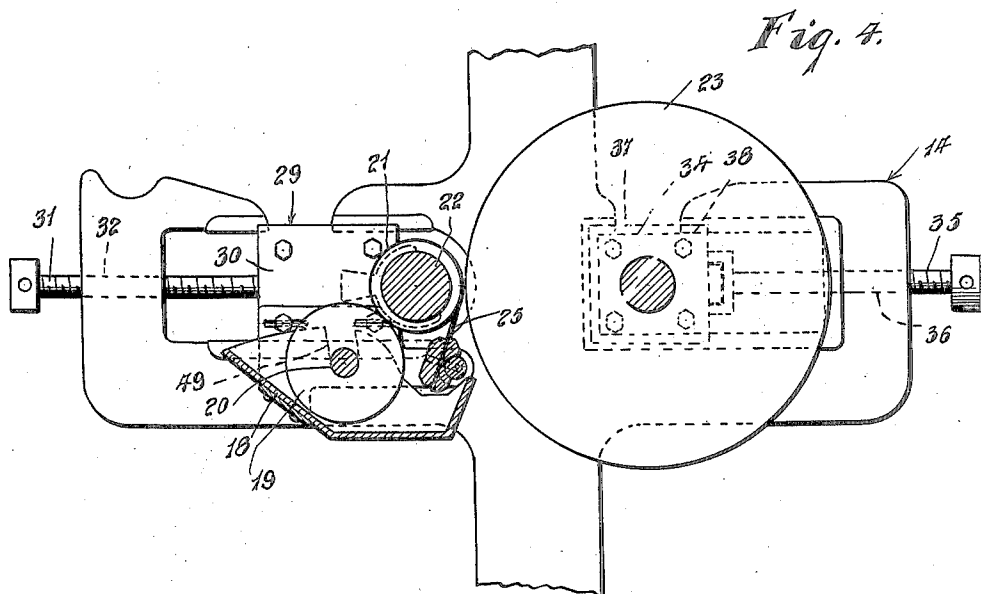
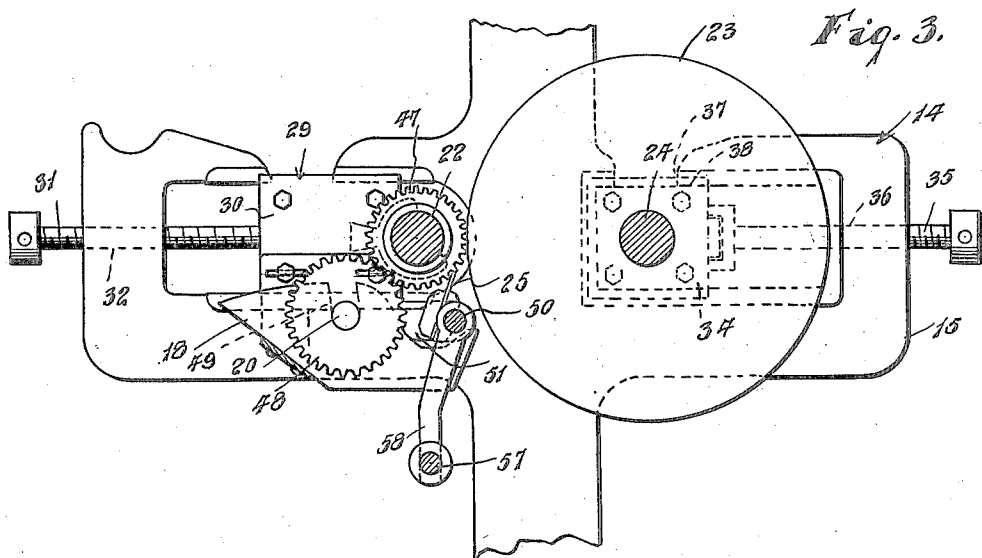
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5 Sheets-Sheet 4

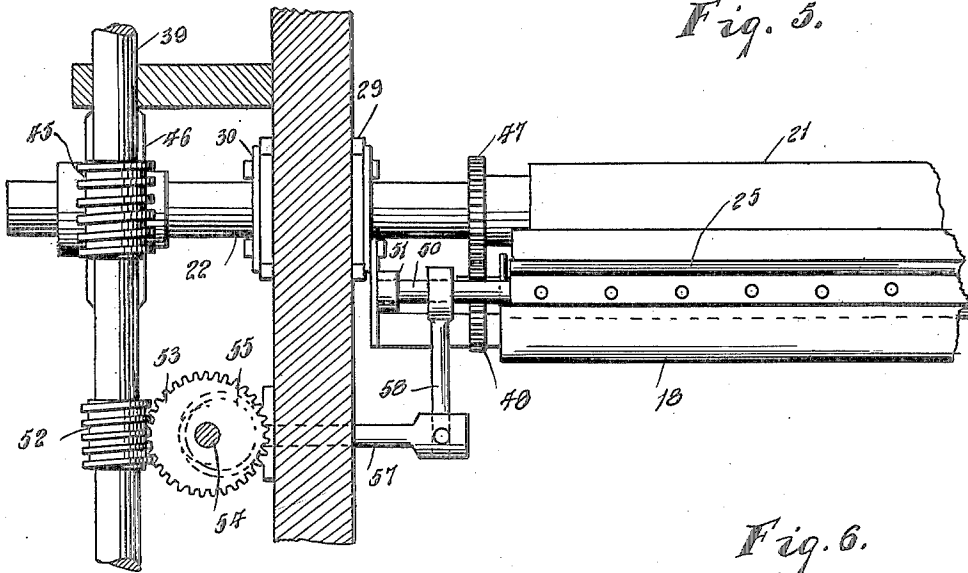


Fig. 5.

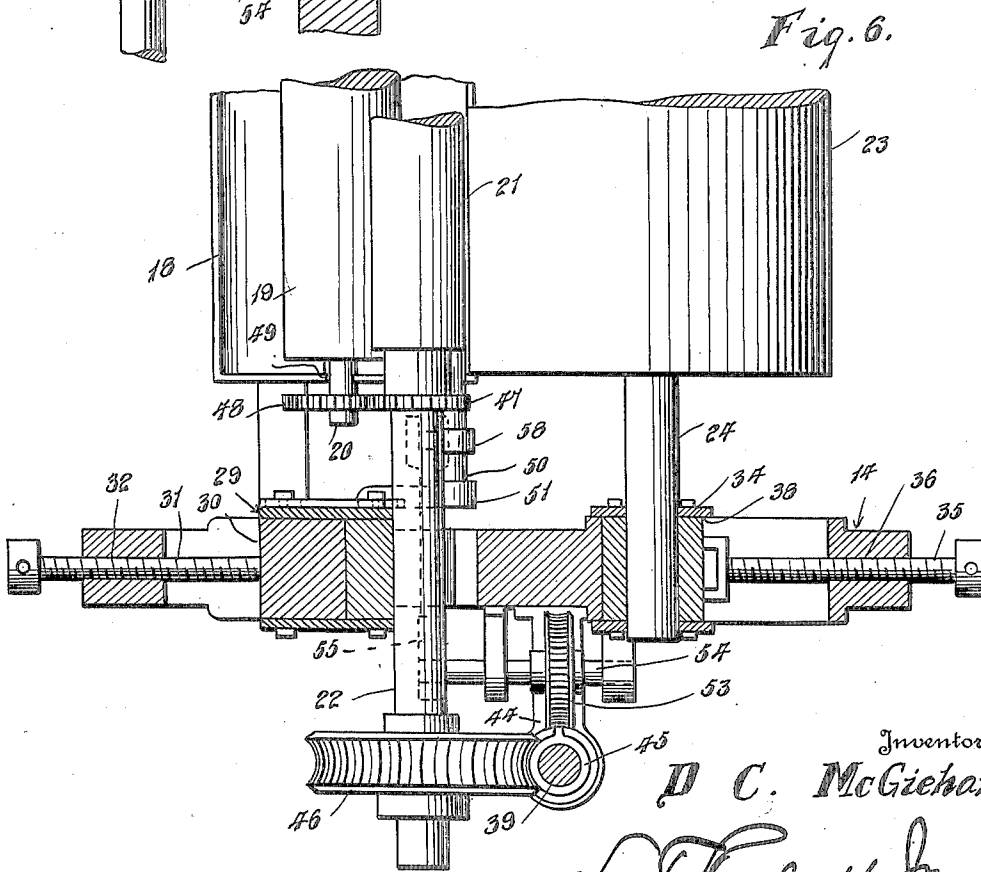


Fig. 6.

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INTAGLIO PRINTING MACHINE

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5 Sheets-Sheet 5

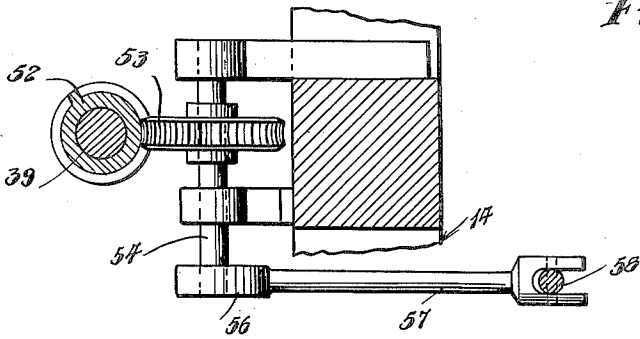
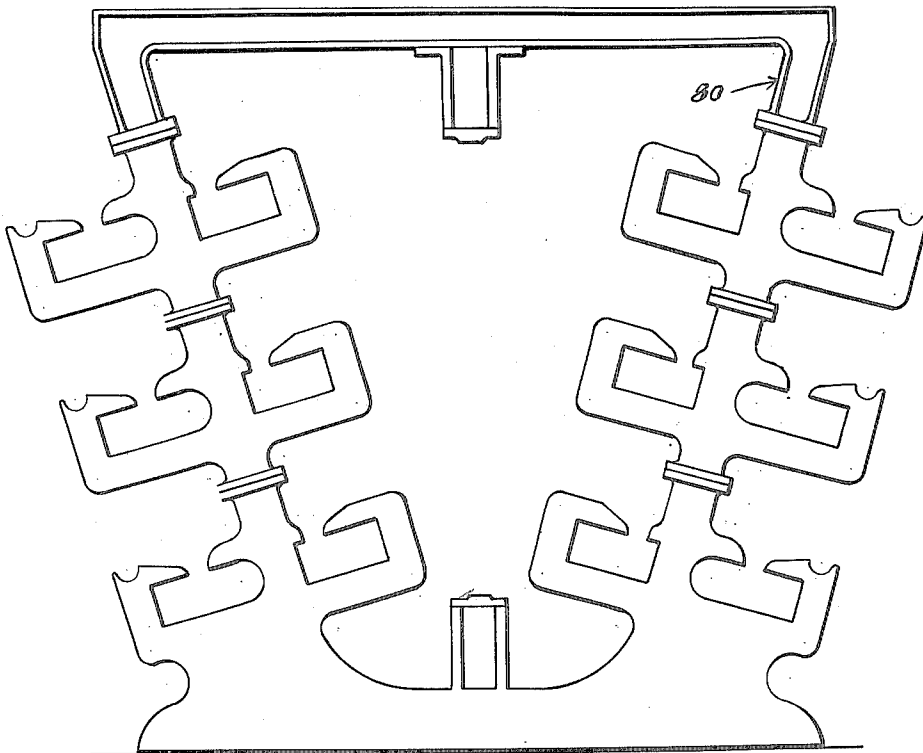


Fig. 7.

Fig. 8.



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UNITED STATES PATENT OFFICE

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INTAGLIO PRINTING MACHINE

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Application May 17, 1933, Serial No. 671,574

9 Claims. (Cl. 101—152)

This invention relates to an intaglio printing machine adapted to print on textile fabric, paper or the like, in the form of a continuous web from a roll.

5 One particular object is to provide a novel construction which will permit adjustment of the platen cylinder means so as to accommodate any diameter of print roll means without changing the position of the mandrel or mandrels holding
10 the print roll means or the fitting gear or gearing associated with the end of such mandrel or mandrels, in order to avoid the use of various sizes of gears since it is possible to always keep the single gear or set of gears in mesh with the driving shaft or driving means.

15 It is also an aim to provide a machine complete to print in two colors only and added to for printing in more than two colors, and to so arrange the units that the web follows a rectilinear, U-shaped,
20 V-shaped or equivalent path.

A further object is to provide a novel construction having a driving arrangement which will eliminate the necessity of using the large, heavy central cylinder and large intermediate or star
25 gear necessary in the present or rotary type of intaglio printing machine. The elimination of such cylinder and gear or equivalent gearing enables a machine to be built which is less bulky, less complicated, more practical, and less expensive
30 to build.

A still further object is to provide a machine of the present character which is built up in units, enabling the use of a unit corresponding to each different color used in printing with only
35 the necessary power and not requiring the use of all of the power required for the maximum number of colors as in the operation of existing machines.

40 One more object is to provide a construction which permits the use of a short or endless blanket about the several platen cylinders, preferably with associated tensioning means, to afford extra padding in order to eliminate mark-offs when printing fine patterns. This construction permits piece goods to be held out to width.

45 I further aim to provide a machine wherein a worm drive is possible in order that the machine will operate quietly and smoothly, eliminating to a great extent backlash, which is so detrimental
50 to the fit of patterns.

Still another object is to provide a novel construction of doctor motion utilizing a combination worm and cam or eccentric means.

55 The more specific objects and advantages will become apparent from a consideration of the de-

scription following taken in connection with accompanying drawings illustrating an operative embodiment.

In said drawings:—

Figure 1 is a view in side elevation of the im- 5 proved intaglio printing machine,

Figure 2 is an end view of said machine looking from the right of Figure 1,

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 2, 10

Figure 4 is a cross sectional view taken on the line 4—4 of Figure 2,

Figure 5 is a cross sectional view taken on the line 5—5 of Figure 1,

Figure 6 is a cross sectional view taken on the line 6—6 of Figure 1, 15

Figure 7 is a cross sectional view taken on the line 7—7 of Figure 2, and

Figure 8 is a side elevation of the framework of a modified form of printing machine constructed in accordance with the invention. 20

Referring specifically to the drawings, wherein like reference characters designate like or similar parts and first to the form of Figures 1 to 7, the machine embodies a base 10 adapted to be suitably supported, in bearings 11 of which a drive shaft 12 is journaled, such shaft being driven from any suitable source of power, usually by an electric motor (not shown) which may be disposed below the floor or support for said base 30 10. A cap section for the frame is shown at 13 and between said base 10 and cap section 13, a series of color unit sections or nips 14 are provided, a section or nip 14 being used for each different color of ink used in the printing operation, 35 the nips always being used in horizontally opposite pairs, and it being possible to use just one pair of the nips or sections 14, two pairs, three pairs as shown, or any desired number of pairs. Such nips or sections 14 are identical in construction and interchangeable so that, for two color work, merely one pair of nips is sufficient. Hence, a machine may be purchased with a single pair of nips and as work or expense justifies, an additional pair or pairs may be purchased and 45 connected into the machine. It will be noted that the nips or sections 14 have frame parts 15 whose upper and lower terminals are provided with flanges 16. Such flanges 16 may contact 50 with each other and those of the uppermost nips engage similar flanges 17 on the cap section 13. In the case of the lower sections or nips 14 the frame parts which are designated 15' are preferably integral with the base 10. The various 55

flanges 16 and 17 in the relation shown, are bolted or otherwise detachably connected together.

Each nip or color unit section carries a color pan 18 for the ink or pigment in liquid condition, in which rotates a furnishing roll 19 carried by a rotatable shaft at 20. By means of the rolls 19, the ink is transferred to print rolls 21, for instance of copper, having the design engraved thereon and carried by rotatable mandrels 22. Rolls 21 are associated with platen rolls 23 carried by rotatable shafts 24. Horizontally reciprocable doctor blades 25 wipe the periphery of the print rolls 21 so that the surplus ink will be removed and returned to the pan 18.

Particular attention is called to the fact that the present machine will accommodate a print roll 21 of any diameter without changing the position of the mandrel, which holds the same, it being understood that the print roll is removable from the mandrel in any desired manner. The mandrels 22 may be removed from the nips through the open spaces at the top as at 29. The mandrels 22 removably bear against slide blocks 30, through the medium of open bronze bearings completing the journaling thereof. Such slide blocks 30 in the operating position of Figure 4 close the spaces 29 and are held in operative position by contact of adjustable screws 31 against the same, such screws being screw-threaded as at 32 in the frame portions 15. The upper and lower edges of the blocks 30 are grooved as at 33 so that they receive adjacent portions of the frame parts 15 and are held and guided in the operation of the machine.

On the other hand, the platen rolls 23 are adapted to be adjusted relatively to the print rolls 21 according to the diameter of the latter. To this end, the shafts 24 are journaled in slide blocks 34 which are pressed into operative position and maintained in such position by the abutment of screws 35 thereagainst which are screw-threaded as at 36 in the frame parts 15. Shafts 24 may be removed through the open spaces 37 of the frame parts 15. Slide blocks 34, are grooved as at 38 in their upper and lower surfaces to receive, for guidance, adjacent portions of the frame parts 15.

A vertical drive or counter shaft 39 is associated with each side of the machine, each shaft 39 having a bevel gear at 40 enmeshed with a bevel gear 41 on the drive shaft 12, in order to continuously rotate the shaft 39. Said shafts 39 are made up of sections 42, the lowermost sections 42 corresponding to the base section 10 and the other sections corresponding to the units or nip sections 14, the sections 42 being journaled on the sections 10 and 14, respectively, as at 43, and being detachably bolted or coupled together as at 44 to correspond with the unit feature described.

On each section 42 a worm 45 is keyed which is in mesh with a worm wheel 46 keyed to the adjacent mandrel 22. On each mandrel 22 is a gear wheel 47 of the spur type enmeshed with another spur gear wheel 48 carried by the shaft 20 of the inking roller 19. It will be noted that the shaft 20 is removably disposed in notches 49 of the pan 18, and since the pan 18 can be slid on its supports, roll 19 can be adjusted for contact with the periphery of the print roll 21 to accord with various diameters of print rolls, it being necessary to increase the diameter of gear 47 so as to mesh under such circumstances with gear 48.

As best shown in Figures 2, 5, and 7, the doctor blades 25 are carried in clamps terminating in horizontally reciprocable journals 50 slidably

mounted in guides or bearings 51. In order to drive the journals 50 for reciprocation, worms 52 are carried by each shaft section 42 which in turn drive worm wheels 53 rigid with shaft 54 connected to the frame portions 15. Each shaft 54 has an eccentric or cam 55 keyed thereto which operates within a ring 56 of pitmen or connecting rods 57 having arm connections at 58 with the said rods 50.

With more particular reference to Figure 1 the goods to be printed, in the form of a web, or the like, supplied from a roll, are shown at A, a grey goods, which serves as a blotter for color coming through the printed goods, is shown at B and the blanket which serves as a pad against which to print, is shown at C, such parts A, B, and C traveling in the direction of the arrows and passing over guide rollers at 60, 61, and 62, upon their entrance into the machine, and over guide rollers 63, 64, and 65, respectively, after passage through the machine, the blanket C being guided by suitable means as at 66 carried by the cap section 13, and being driven by being drawn through the various roll couples of print rolls and platen cylinders from any suitable source of power.

The print goods A and the grey goods B pass through a conventional spreader 67 and then together with the blanket, all traveling in the proper relation as shown between the print roll 21 and platen rolls 23.

Under certain circumstances, I will use an additional short endless blanket 70 surrounding and contacting with the platen rolls 23 in combination with tensioning devices 71 for such blanket 70. Any number of the tensioning devices 71 may be used and they may be applied at any desired locations on the base 10, cap 13, or the sections 14, two of such devices being shown by way of example only, and one on the base and one on the cap. This feature enables tensioning of the blanket C and permits the use of blanket 70 which supplies an extra padding which is oftentimes necessary to eliminate markoffs when printing fine patterns.

It will be realized that in the present machine, the web material A, B, and C takes substantially a U-shaped path through the machine. At the same time, the machine may be built so that the material will take a straight line or rectilinear path, or even may take a path in the shape of a V and built into a frame 80 as suggested in Figure 8. Obviously any equivalent of these arrangements may be resorted to.

Changes may be made within the spirit and scope of the invention.

I claim as my invention:—

1. A printing machine of the class described, having a frame, a printing roll, an arbor for said printing roll, a shaft journaled on said frame, drive gearing between said shaft and said arbor, means to ink the printing roll, a platen roll associated with the printing roll, means operable to vary the position of the platen roll relatively to the print roll whereby various diameters of print rolls are accommodated, said frame constituting a machine section, said shaft also constituting a machine section, a doctor for said printing roll, and means driven from the shaft including an eccentric connection to reciprocate said doctor.

2. An intaglio printing machine of the class described, having an engraved print roll, a worm gear on said print roll, a drive shaft having a worm in mesh with said gear, a platen roll associated with the print roll driven by the friction

thereof and the material passing through the machine, means to ink the print roll, a doctor for the print roll, a pitman for the doctor, and means driven from said shaft having an eccentric and gear connection to said pitman.

3. An intaglio printing machine of the class described having a base member, drive means thereon, a cap member having lead and guide means thereon for the material passing through the machine, two color unit sections disposed in lateral alignment between said members, means detachably securing said sections to each of said members so that the cap member will have two point support, each section having an engraved print roll, means on each section attachable to said drive means to drive the print roll, a platen roll coacting with each print roll and driven by the friction of the latter and the material passing between the rolls, and means to ink the print roll.

4. An intaglio printing machine of the class described having a base member, drive means thereon, a cap member, two color unit sections between said members in laterally spaced relation each having a print roll and a platen roll, said cap member having lead and guide means thereon for the material passing through the machine, each section having a frame, means detachably securing said frames intermediate their ends to the cap member so that the frames serve to support the cap member at two locations, and open portions on each frame on opposite sides of the last mentioned means mounting and permitting removal of said rolls.

5. An intaglio printing machine of the class described, having a frame, an engraved printing roll, an arbor for said printing roll, an upstanding shaft journaled on said frame, drive gearing between said shaft and said arbor, means to ink the printing roll, a platen roll associated with the

printing roll and driven through the friction of the same and the material passing through the machine, hook-shaped portions on opposite sides of said frame journaling and removably mounting said printing roll and platen roll, and means operatively mounted by one of the hook-shaped portions to vary the position of the platen roll relatively to the print roll according to the diameter of the latter.

6. An intaglio printing machine of the class described, having a frame provided with an upstanding part, an engraved print roll mounted on said frame on one side of said part, a worm gear on said print roll, an upstanding drive shaft journaled on said frame having a worm in mesh with said gear, a platen roll journaled on said frame on the other side of said upstanding member associated with the print roll driven by the friction thereof and the material passing through the machine, means on said frame to ink the print roll, a doctor for the print roll, a pitman for the doctor, and means driven from said shaft having an eccentric and gear connection to said pitman.

7. An intaglio printing machine according to claim 3 wherein the position of the platen roll of each unit is innermost, and an endless blanket trained over said platen rolls.

8. An intaglio printing machine according to claim 3 wherein the position of the platen roll of each unit is innermost, an endless blanket trained over said platen rolls, and tensioning means for said blanket disposed between the units and on said base member and said cap member.

9. An intaglio printing machine according to claim 4 wherein the platen rolls of the respective units are innermost, and an endless blanket trained over said platen rolls.

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