

Mar. 6, 1923.

W. M. BACON

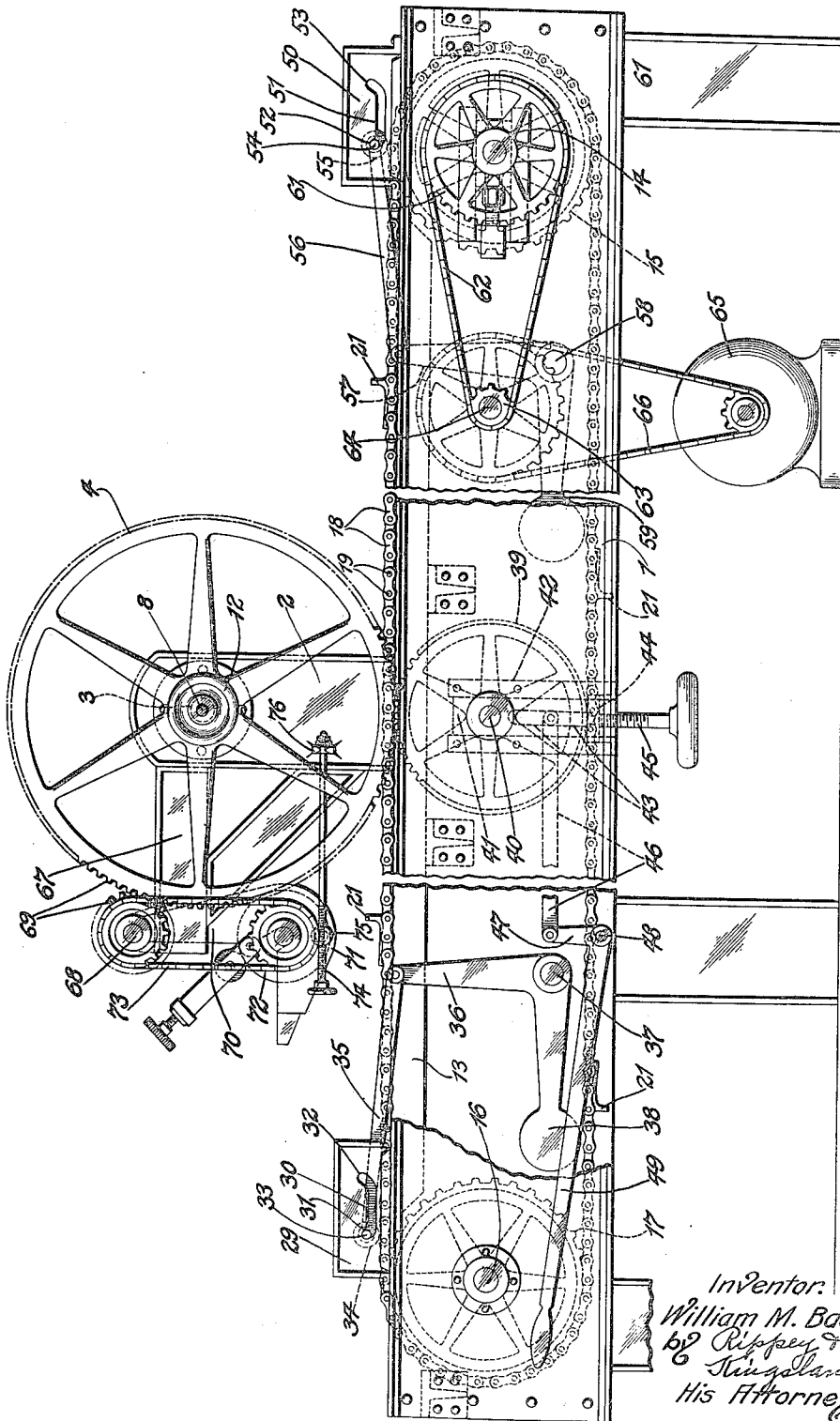
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PRINTING MACHINE

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2 sheets-sheet 1

Fig. 1-



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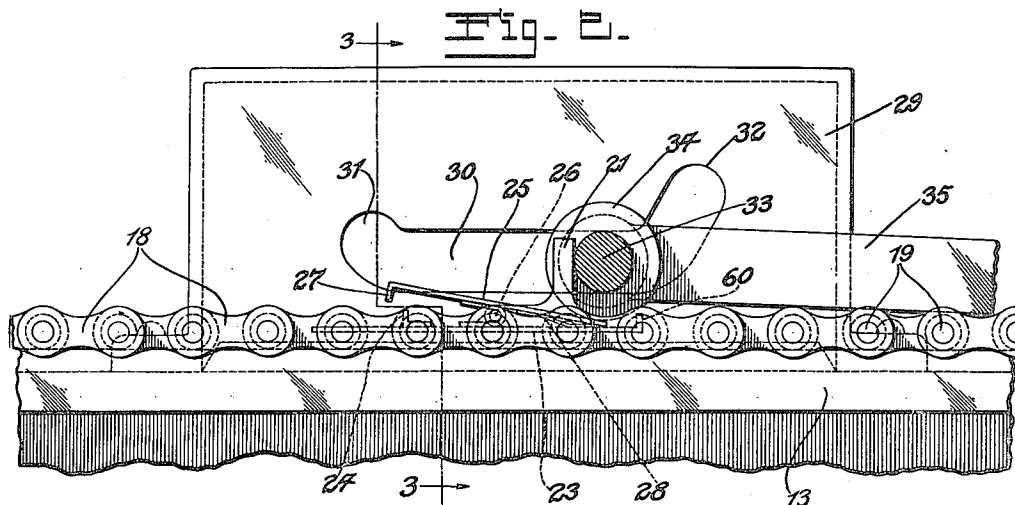
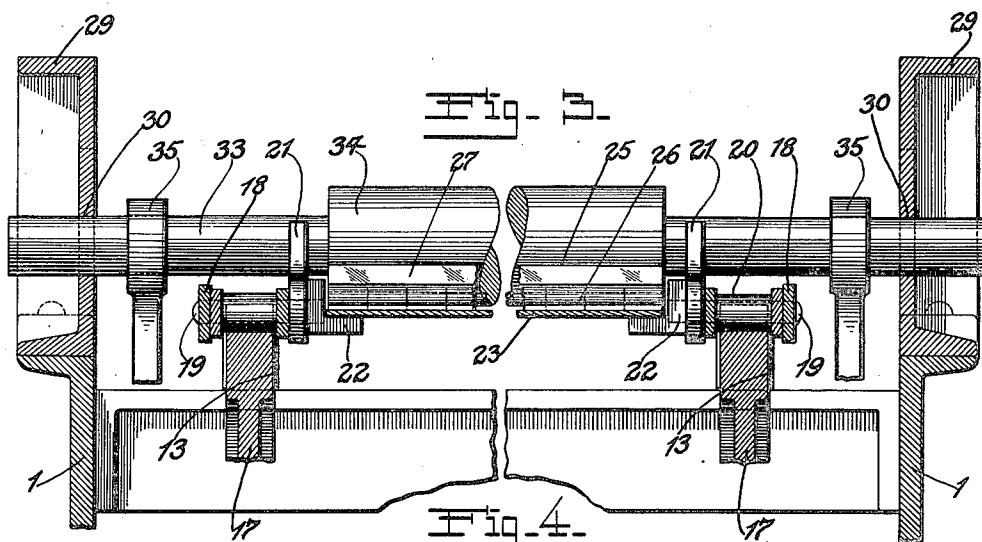
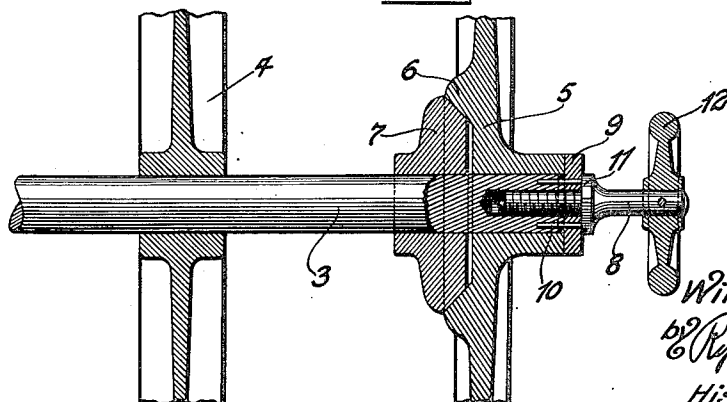
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2 sheets-sheet 2



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UNITED STATES PATENT OFFICE.

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PRINTING MACHINE.

Application filed October 10, 1921. Serial No. 508,628.

To all whom it may concern:

Be it known that I, WILLIAM M. BACON, a citizen of the United States, residing at Chicago, Cook County, Illinois, have invented a new and useful Improvement in Printing Machines, of which the following is a specification.

This invention relates to printing machines.

An object of the invention is to provide an improved printing machine of the type adapted to print on large, flat and plane surfaces, comprising a form impression cylinder for supporting the forms and arranged to receive paint from an appropriate paint applying device, and a novel work conveyor for conveying the work to the form impression cylinder and for discharging the work after the impressions have been made.

Another object of the invention is to provide a machine of the character mentioned, including a novel form of conveyor for the work, and means for effectively and conveniently controlling the conveyor.

Other objects will appear from the following description, reference being made to the drawings in which—

Fig. 1 is a side elevation of the machine with parts of the framing broken away to disclose operative structure.

Fig. 2 is an enlarged detailed view showing the construction and arrangement of one of the work grippers.

Fig. 3 is a sectional view on the line 3—3 of Fig. 2.

Fig. 4 is a view showing the clutch device for holding the form impression cylinder in proper adjustment.

In the embodiment of the invention shown the frame 1 is provided with standards or brackets 2 for supporting the axial shaft 3 of the form impression cylinder 4. The forms may be applied or secured to the form cylinder in any known or approved manner.

The form cylinder is mounted on the axial shaft 3 and may be retained in different adjusted positions thereon by the clamp or clutch devices shown. As shown (Fig. 4) a gear wheel 5 at one end of the form cylinder has a clutch portion 6 adapted to engage a clutch member 7 rigid with the axial shaft 3. The end of the shaft 3 has a threaded hole therein receiving the threaded end of

a screw clamp 8. The washer 9 is supported by the screw clamp 8 and is held from turning by pins 10 engaging in the washer and in the end of the shaft 3. A flange 11 on the screw clamp 8 prevents the pins 10 from working out. A hand wheel 12 on the outer end of the screw clamp 8 constitutes means for operating the same. By turning the screw clamp 8 in the proper direction the washer 9 will force the end 5 of the form cylinder in clutch engagement with the clutch member 7, thus holding the form cylinder rigid on the shaft 3. This permits the form cylinder to be adjusted in proper position for starting and continuing the work after the forms have been placed on the cylinder.

The frame supports a pair of track members 13 forming tracks for the endless chains. A drive shaft 14 is supported at one end of the tracks and has a pair of sprocket wheels 15 thereon. A shaft 16 is supported by the frame at the opposite end of the tracks and has a pair of sprocket wheels 17 thereon. The wheels 15 and 17 are in alinement with the track members 13, respectively.

A carrier for the work includes a pair of endless chains mounted on the tracks and around the wheels 15 and 17. As shown, each chain is of double formation comprising two series of links 18, the links of each series being united to the other series of links by pivot or hinge pins 19 having rollers 20 thereon separating the series of links and operating on the track members 13 and the wheels 15 and 17. At proper intervals an inner link of each chain is formed with an arm 21. The link of each chain carrying the arm 21 supports an angular bracket 22. The bracket 22 on each chain is in line with the bracket 22 on the other chain, thus forming pairs of brackets. Each pair of brackets 22 has a plate 23 secured thereto for supporting the work. The feeding-in end of each plate 23 has an abutment 24 thereon for the forward edge of the work sheet. A gripper device is pivotally supported by each of the plates 23. As shown, each gripper device includes a plate 25 pivotally supported by a hinge 26 above the plate 23 and having a down-turned flange 27 for engaging the upper surface of the work to clamp the work upon the plate 23.

A spring 28 located between the plate 23 and the plate 25 is effective to press the plate 25 to clamp the edge 27 thereof upon the work with sufficient pressure to convey or

5 carry the work along with the conveyor.

At the feeding-in end of the machine a pair of brackets 29 are attached to the side members of the frame. Each of said brackets is provided with a slot comprising a

10 horizontal portion 30, the short upwardly-extended portion 31 toward the feeding-in end of the machine, and the longer up-turned portions 32 at their inner ends. A shaft 33 has its ends extending into the slots

15 in the two brackets 29. A roller 34 is on the shaft 33 between the conveyor chains and is normally held in the outer up-turned ends 31 of the slots into which the ends of the shaft extend. A pair of links 35 have

20 their outer ends pivoted to the shaft 33 and their inner ends pivoted to upwardly extending arms 36 attached to a shaft 37. A weight 38 is supported by an arm attached to the shaft 37 and is sufficient to actuate the

25 shaft 33 into the up-turned ends 31 of the slots that guide the shaft. As the conveyor travels around, the upper portion thereof moving to the right as seen in Fig. 1, the upper end of the plate 25 passes under the

30 roll 34 after which the projections 21 on the conveyor chains engage the shaft 33 and move said shaft from the up-turned portions 31 of the guide slots into the horizontal portions 30 thereof, thus raising the end of the

35 plate 25 to lift the flange 27 thereof to the position shown in Fig. 2. This permits the edge of the work, comprising mat board or the like, to be inserted between the flange 25 and the plate 23 into contact with the abut-

40 ment 24. The projections 21 continue to move the shaft 33 until said shaft is raised into the up-turned portions 32 of the guide slots above said projections 21, permitting the latter to pass under the shaft and per-

45 mitting the spring 28 to actuate the gripper plate to grip the work. The work will then be carried along by the conveyor under the form cylinder against which the work will be held by a compression cylinder 39.

50 The compression cylinder 39 is supported on a horizontal shaft 40 in vertically adjustable bearings 41. The bearings 41 are mounted in guides 42. The bearings 41 are supported by toggle devices comprising

55 pivotally united links 43, the lower ends of the lower links being pivoted to blocks 44 adjustably supported by screw bolts 45 operating in the machine frame. By raising or lowering the blocks 44 the compression

60 cylinder 39 may be raised or lowered. Also, by breaking the toggle on the links 43 the compression roller may be lowered.

The pivots uniting the toggle links 43 have links 46 connected therewith. The op-

65 posite ends of the links 46 are connected to

arms 47 attached to a shaft 48 to which a lever 49 is connected for manipulating the toggle.

The work is moved by the conveyor in the manner described over the compression 70 cylinder and under the form cylinder. At the opposite or feeding-out end of the machine the gripper device is released to discharge the work. The feeding-out end of the machine supports a pair of brackets 50 75 having guide slots therein similar to the guide slots in the brackets 29. The guide slots in the brackets 50 include horizontal portions 51, short up-turned portions 52 at the inner ends of the horizontal portions, 80 and relatively long up-turned portions 53 at the outer ends of the horizontal portions. A shaft 54 operates in the slots just described and has a roller 55 thereon, like the roller 34. Links 56 have their outer ends 85 pivoted to the shaft 54 and their inner ends pivoted to upwardly extending arms 57 attached to a shaft 58. A weight 59 in connection with the shaft 58 is effective to actuate the connections described in order to 90 retain the shaft 54 normally in the up-turned portions 52 at the inner ends of the guide slots.

When the upper ends of the plate 25 pass under the roller 55 the gripper plate is 95 released from the work. Next the projections 21 engage the shaft 54 and actuate said shaft along the guide slots and into the up-turned portions 53 of said slots, permitting the gripper mechanism to pass thereunder 100 after work has been released and after the gripper mechanism has passed beyond the work. As the next gripper device comes along a projection 60 (Fig. 2) thereon contacts with the work and pushes it along to 105 discharge it from the machine.

A drive shaft 14 is provided with a pulley or wheel 61 having a driving connection 62 connected with the pulley 63 on a shaft 64. The shaft 64 is driven from a motor 65 by 110 driving connections 66.

The paint is applied to the forms on the form cylinder automatically as an incident to the operation of the machine. The brackets 2 support extensions 67 in which a 115 shaft 68 is journaled. The shaft 68 is rotated by the form cylinder by gearing 69. Swinging members 70 are supported by the extensions 67. The swinging members 70 support a basin or fountain 71 in which a 120 roller 72 operates to apply paint to the forms on the cylinder. A driving connection 73 from the shaft 60 to the roller 72 serves to operate the latter.

The roller 72 may be held in or out of 125 contact with the form cylinder by a rod 74 threaded through a support 75 having swivel connection with the end wall of the basin or fountain 71. The inner end of the rod 74 has swivel connection with a sta- 130

tionary part 76 permitting the rod 74 to be turned. Turning of the rod 74, due to its threaded connection with the support 75, will move the fountain toward or away from the form cylinder.

From the foregoing it will be seen that my invention is a complete machine for obtaining all of its intended objects and purposes. The construction and arrangement of the parts may be varied as desired, without departure from the nature and principle of the invention as set forth in the appended claims.

What I claim and desire to secure by Letters Patent, is:—

1. A machine of the character described, comprising a pair of endless chains forming a conveyor, tracks upon which the chains operate, sprocket wheels for operating the chains, plates for supporting the work, gripper plates for gripping the work on the supporting plates, devices for raising the gripper plates to permit insertion of the work, and elements operated by the chains for moving said devices out of engagement with the gripper plates.

2. A machine of the character described, comprising a pair of endless chains forming a conveyor, sprocket wheels for operating the chains, plates supported by the chains for supporting the work, gripper plates pivotally supported above said plates for gripping the work on the supporting plates, devices for raising the gripper plates to permit insertion of the work, and elements operated by the chains for moving said devices to position to permit the gripper plates to engage the work.

3. A machine of the character described, comprising a pair of endless chains forming a conveyor, sprocket wheels for operating the chains, a plate supported by the chains for supporting the work, a gripper plate pivoted above the supporting plate for gripping the work on the supporting plate, a device for engaging and moving the gripper plate to position to permit insertion of the work between the gripper plate and the supporting plate, and means operated by the chains for moving said device out of engagement with the gripper plate.

4. A machine of the character described, comprising a pair of endless chains forming a conveyor, sprocket wheels for operating the chains, a gripper for gripping the work in connection with the chains, a device for opening the gripper for engagement with the work, means operated by the chains for moving said device to position to permit the gripper to engage the work, another device for opening the gripper to release the work also movable to position by said means to permit the gripper to close after the work has been released, a form impression cylinder supported above the chains, and a com-

pression cylinder for supporting the work as the work is moved under the form cylinder.

5. A machine of the character described, comprising a pair of endless chains forming a conveyor, sprocket wheels for operating the chains, a gripper for gripping the work in connection with the chains, a device for opening the gripper for engagement with the work, means operated by the chains for moving said device to position to permit the gripper to engage the work, another device for opening the gripper to release the work also movable to position by said means to permit the gripper to close after the work has been released, a form impression cylinder supported above the chains, a compression cylinder for supporting the work as the work is moved under the form cylinder, and a device for supporting the compression cylinder in selected adjusted positions relative to the form cylinder.

6. A machine of the character described, comprising a pair of endless chains forming a conveyor, sprocket wheels for operating the chains, a gripper for gripping the work in connection with the chains, a device for opening the gripper for engagement with the work, means operated by the chains for moving said device to position to permit the gripper to engage the work, another device for opening the gripper to release the work also movable to position by said means to permit the gripper to close after the work has been released, a form impression cylinder supported above the chains, a compression cylinder for supporting the work as the work is moved under the form cylinder, a device for supporting the compression cylinder, and means co-operating with said device to support the compression cylinder in different adjusted positions relative to the form impression cylinder.

7. A machine of the character described, comprising a pair of endless chains forming a conveyor, sprocket wheels for operating the chains, a gripper for gripping the work in connection with the chains, a device for opening the gripper for engagement with the work, means operated by the chains for moving said device to position to permit the gripper to engage the work, another device for opening the gripper to release the work also movable to position by said means to permit the gripper to close after the work has been released, a form impression cylinder supported above the chains, a compression cylinder for supporting the work as the work is moved under the form cylinder, a device for supporting the compression cylinder, means co-operating with said device to support the compression cylinder in different adjusted positions relative to the form impression cylinder, and means

for operating said device to move the compression cylinder toward and away from the form cylinder.

8. In a machine of the character described, a form impression cylinder, a pair of endless chains forming a conveyor for moving the work to and from the form impression cylinder, a support for the work operated by said chains, a gripper plate pivoted on said support, a spring for actuating the gripper plate to position to grip the work on the support, an element for releasing the gripper plate from the work, a device for holding said element in position to engage the gripper plate to release the gripper plate from the work, and means supported and operated by the chains for moving said device out of engagement with the gripper plate to permit the gripper plate to close.

9. In a machine of the character described, a form impression cylinder, a compression cylinder below the form impression cylinder, means for supporting one of said cylinders in different adjusted positions relative to the other, a pair of endless chains, mechanism for operating said chains to move the work between said cylinders, a support for the work operated by said chains, a gripper plate pivoted on said support for holding the work on the support, a device for actuating the gripper plate to position to hold the work on the support, a device for releasing the gripper plate from the work, and means supported and operated by the chains for moving said element to position to release the gripper plate.

10. In a machine of the character described, a form impression cylinder, a compression cylinder below the form impression cylinder, means for supporting one of said cylinders in different adjusted positions relative to the other, a pair of endless chains, mechanism for operating said chains to move the work between said cylinders, a support for the work operated by said chains, a gripper plate pivoted on said support for holding the work on the support, a device for actuating the gripper plate to position to hold the work on the support, an element supported independently of the chains for moving the gripper plate to position to permit the work to be passed between the gripper plate and the supporting plate, and means supported and operated by the chains for controlling said element to permit the gripper plate to engage the work.

11. In a machine of the character described, a form impression cylinder, a compression cylinder below the form impression cylinder, means for supporting one of said cylinders in different adjusted positions relative to the other, a pair of endless chains, mechanism for operating said chains to move the work between said cylinders, a support for the work operated by said

chains, a gripper plate pivoted on said support for holding the work on the support, a device for actuating the gripper plate to position to hold the work on the support, an element supported independently of the chains for moving the gripper plate to position to permit the work to be passed between the gripper plate and the supporting plate, means supported and operated by the chains for controlling said element to permit the gripper plate to engage the work, and an element supported independently of the chains for releasing the gripper plate from the work to permit the work to be discharged from the machine.

12. In a machine of the character described, a form impression cylinder, a compression cylinder below the form impression cylinder, means for supporting one of said cylinders in different adjusted positions relative to the other, a pair of endless chains, mechanism for operating said chains to move the work between said cylinders, a support for the work operated by said chain, a gripper plate pivoted on said support for holding the work on the support, a device for actuating the gripper plate to position to hold the work on the support, an element for moving the gripper plate to position to permit the work to be passed between the gripper plate and the supporting plate, means for controlling said element to permit the gripper plate to engage the work, an element for releasing the gripper plate from the work to permit the work to be discharged from the machine, and means operated by the chains for controlling said element.

13. In a machine of the character described, a form impression cylinder, a compression cylinder, mechanism for supporting the compression cylinder in different adjusted positions relative to the form impression cylinder, a pair of endless chains forming a conveyor for moving the work between said cylinders, a supporting element in connection with said chains, a gripper plate supported by said supporting element for holding the work on the supporting element, a device supported independently of the chains for moving the gripper plate to position to permit insertion of the work, a device supported independently of the chains for moving the gripper plate to position to release the work, and means supported and operated by the chains for moving said first-named device to position to permit the gripper plate to engage the work after the work has been inserted and for moving the second-named device to position to permit the gripper plate to close after the work has been released.

14. In a machine of the character described, a form impression cylinder, a compression cylinder, mechanism for support-

ing the compression cylinder in different adjusted positions relative to the form impression cylinder, a pair of endless chains forming a conveyor for moving the work between said cylinders, a supporting element in connection with said chains, a gripper plate supported by said supporting element for holding the work on the supporting element, a device for moving the gripper plate to position to permit insertion of the work, a device for moving the gripper plate to position to release the work, and means operated by the chains controlling said devices.

15. In a machine of the character described, a pair of endless chains forming a conveyor, mechanism for operating said chains, a supporting plate carried by said chains, a gripper plate for holding the work on the supporting plate, a device for operating the gripper plate to position to hold the work on the supporting plate, a roller for raising the gripper plate from the supporting plate, and means operated by the chains for releasing the roller from the gripper plate to permit the gripper plate to engage the work.

16. In a machine of the character described, a pair of endless chains forming a conveyor, means for operating said chains, a gripping device on the chains for engaging and holding the work, a roller for opening the gripping device to permit insertion of the work, means for holding the roller in position to engage and to open the gripping device to permit insertion of the work, and means operated by the chains for moving said roller to position to disengage the gripping device.

17. In a machine of the character described, a pair of endless chains forming a conveyor, a gripper on the chains for gripping the work, supports having slots therein, a shaft mounted in said slots, a roller on said shaft for engaging and opening the gripper to permit insertion of the work, and means operated by the chains for moving said roller to release the gripper.

18. In a machine of the character described, a pair of endless chains forming a conveyor, a device operated by the chains for engaging and holding the work, an element for engaging said device to release the work, means operated by the chains for moving said element to position to release said device, and means for returning said element to position to engage said device.

19. In a machine of the character described, a pair of endless chains forming a conveyor, mechanism for operating said chains, a support for the work operated by said chains, a gripper plate pivoted on said support for holding the work on the support, a device for actuating the gripper plate to position to hold the work on the support, an element for moving the gripper plate to position to permit the work to be passed

between the gripper plate and the supporting plate, means supported and operated by the chains for moving said element to position to permit the gripper plate to engage the work after the work has been passed between the gripper plate and the supporting plate, and means for returning said element to position to move the gripper plate to permit the work to be passed between the gripper plate and the supporting plate.

20. In a machine of the character described, a conveyor for the work, a gripper device on the conveyor for holding the work in connection with the conveyor, elements having slots therein and the slots having their ends extending upwardly from the conveyor, a shaft extending in said slots, a roller on said shaft for opening the gripper device, and means for moving said shaft into the upwardly extending ends of said slots to permit the gripper device to engage the work.

21. In a machine of the character described, a conveyor for the work, a gripper device on the conveyor for holding the work in connection with the conveyor, elements having slots therein and the slots having their ends extending upwardly from the conveyor, a shaft extending in said slots, a roller on said shaft for opening the gripper device, means for moving said shaft into the upwardly extending ends of said slots to permit the gripper device to engage the work, and means for actuating said shaft toward the other ends of said slots to position again to open the gripper device.

22. In a machine of the character described, a conveyor for the work, a gripper device on the conveyor for holding the work in connection with the conveyor, elements having slots therein and the slots having their ends extending upwardly from the conveyor, a shaft extending in said slots, a roller on said shaft for opening the gripper device, means for moving said shaft into the upwardly extending ends of said slots to permit the gripper device to engage the work, and means for opening the gripper device to release the work.

23. In a machine of the character described, a conveyor for the work, a gripper device on the conveyor for holding the work in connection with the conveyor, elements having slots therein and the slots having their ends extending upwardly from the conveyor, a shaft extending in said slots, a roller on said shaft for opening the gripper device, means for moving said shaft into the upwardly extending ends of said slots to permit the gripper device to engage the work, means for actuating said shaft toward the other ends of said slots to position again to open the gripper device, and means for opening the gripper device to release the work.

24. In a machine of the character described, a pair of endless chains forming a conveyor, and each chain comprising two spaced series of links; pivots uniting the
5 links of each series and also uniting each series of links with the other series of links of the chain; rollers on said pivots; a track on which each chain operates; sprocket wheels at the ends of said tracks engaging
10 the chains to operate the same; a gripper device supported by said chains for engaging and holding the work; a form impression cylinder for operating on the work; and means controlled by the chains for op-
15 erating said gripper device to engage and to release the work.

25. In a machine of the character described, a conveyor for the work, a gripper device for holding the work in connection
20 with the conveyor, an element for opening

the gripper device to permit insertion of the work, means operated by the conveyor to control said element, and brackets having slots therein for guiding said element.

26. In a machine of the character de- 25 scribed, a conveyor, a gripper device in connection with the conveyor for holding the work, brackets having slots whose opposite ends extend upwardly from the conveyor, a shaft extending into the up-turned ends 30 of the slots toward the feeding-in end of the conveyor, a roller on said shaft for opening the gripper device to permit insertion of the work, and means operated by the conveyor for actuating said roller to move said shaft 35 into the up-turned ends of the slots away from the feeding-in end of the conveyor to position to permit the gripper device to close.

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