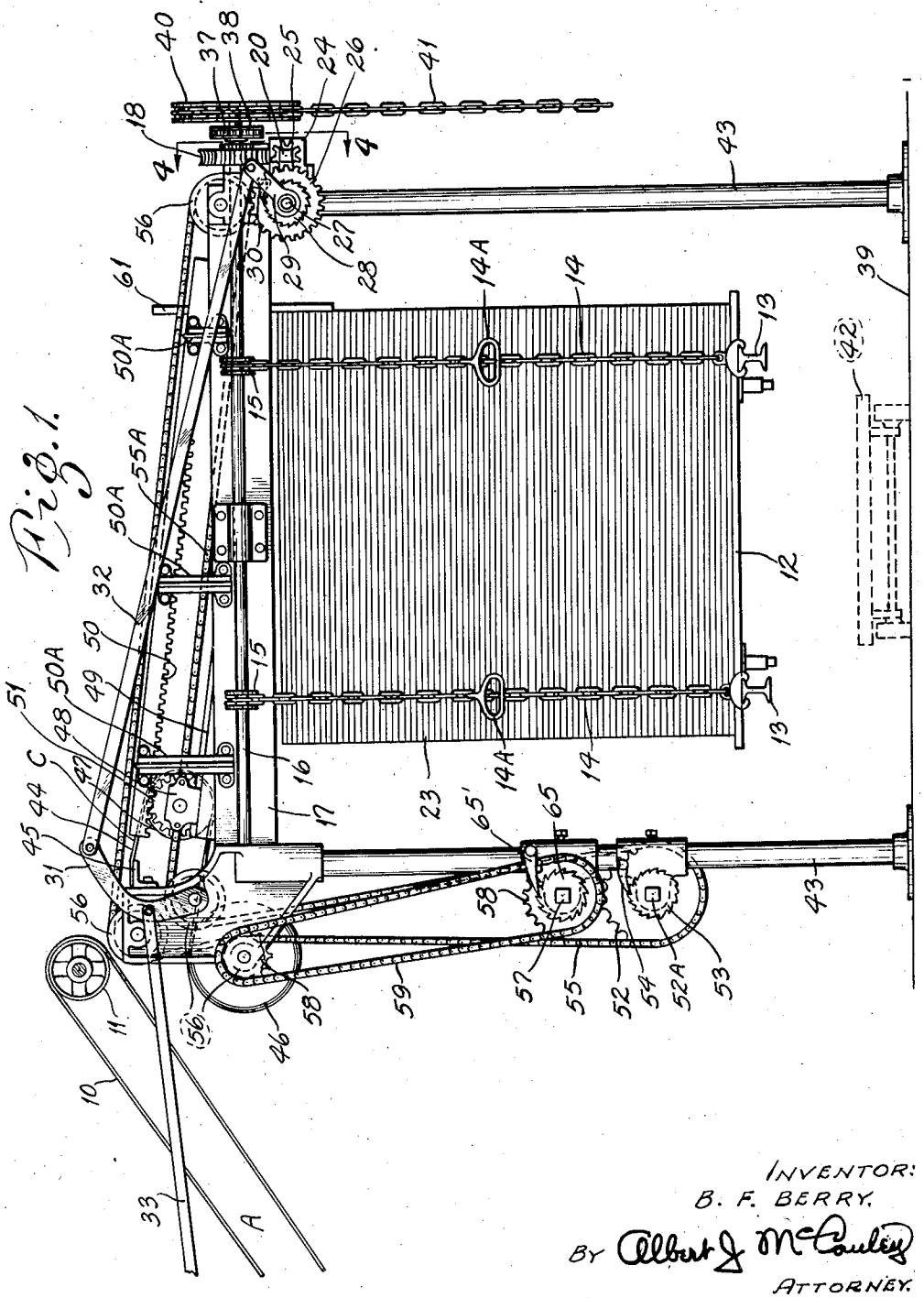
May 7, 1929. B. F. BERRY 1,711,827

DELIVERY APPARATUS FOR FEEDING MECHANISM

Filed March 1, 1928 4 Sheets-Sheet 1



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DELIVERY APPARATUS FOR FEEDING MECHANISM

Filed March 1, 1928 4 Sheets-Sheet 2

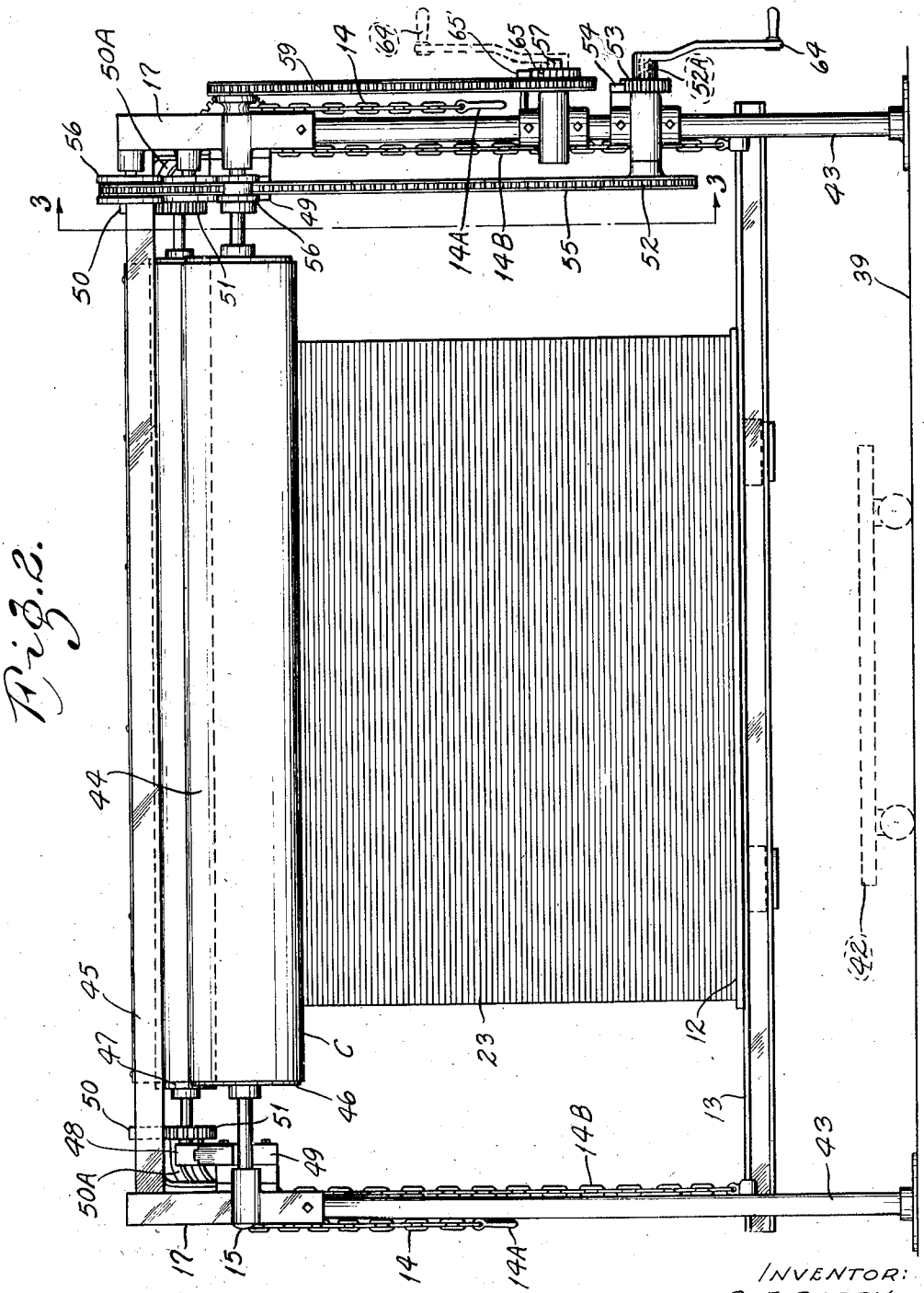


Fig. 2.

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DELIVERY APPARATUS FOR FEEDING MECHANISM

Filed March 1, 1928 4 Sheets-Sheet 3

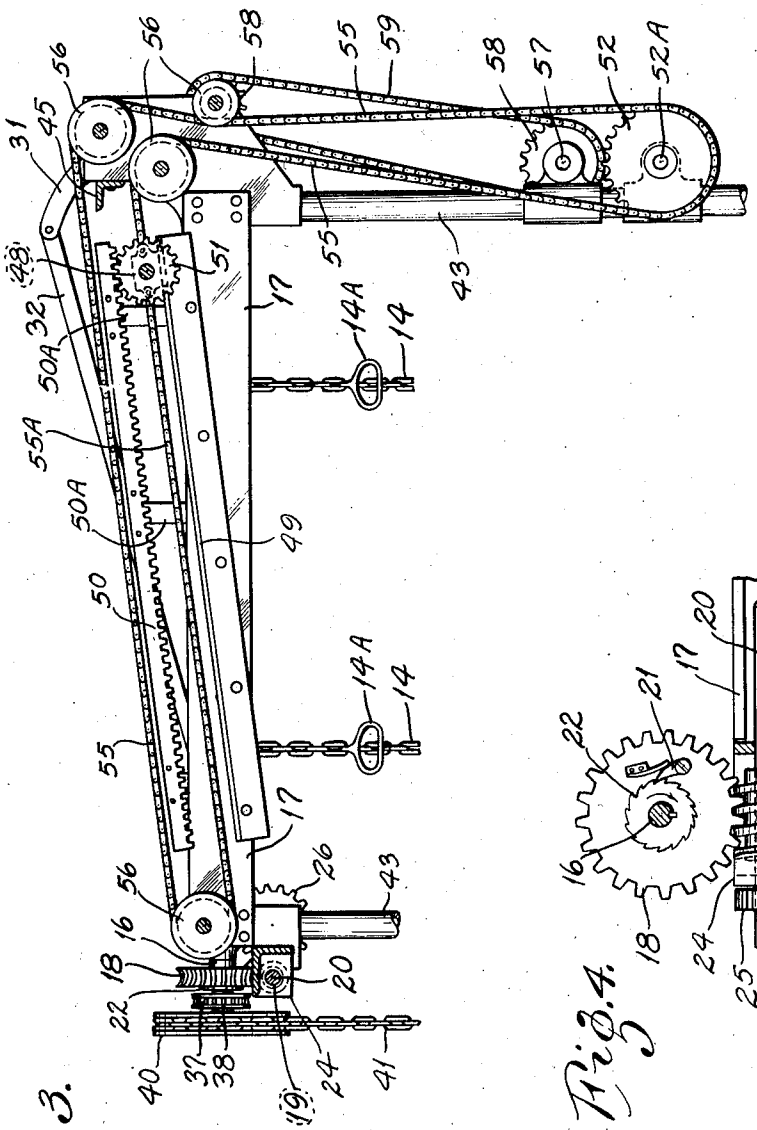


Fig. 3.

Fig. 4.

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DELIVERY APPARATUS FOR FEEDING MECHANISM

Filed March 1, 1928 4 Sheets-Sheet 4

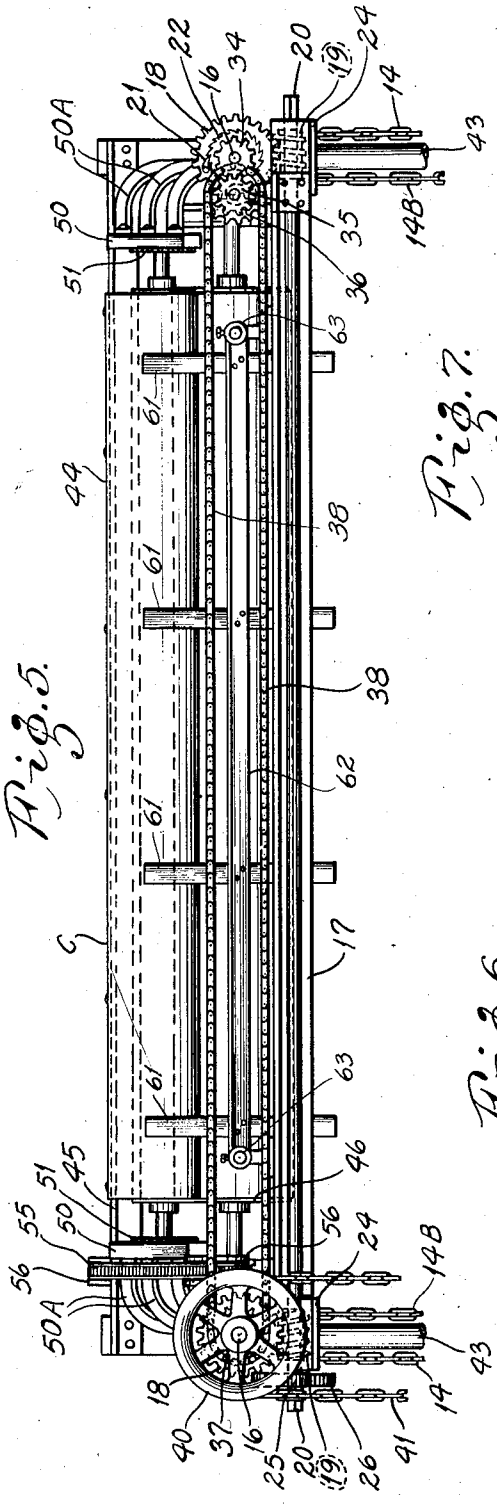


Fig. 5.

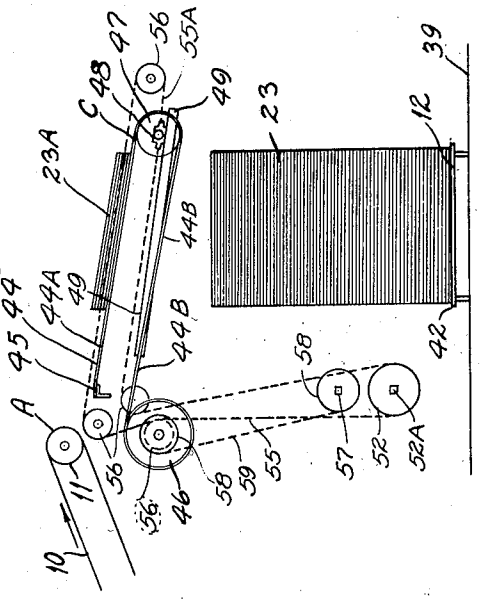


Fig. 7.

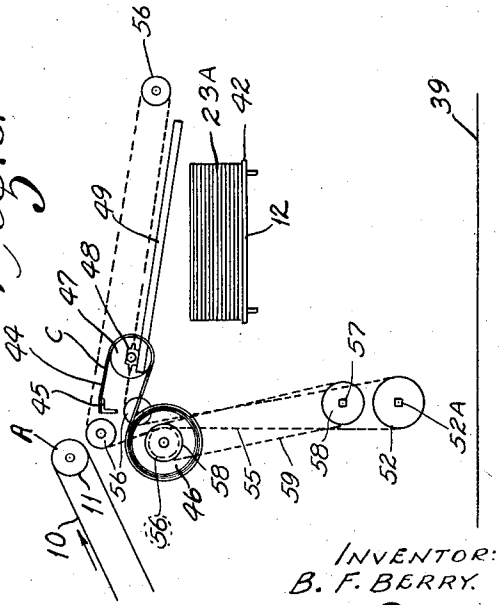


Fig. 6.

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UNITED STATES PATENT OFFICE.

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DELIVERY APPARATUS FOR FEEDING MECHANISM.

Application filed March 1, 1928. Serial No. 258,213.

This invention relates to delivery apparatus for feeding mechanism, and the novel features may be advantageously used in the delivery of material, for example, heavy sheet material to a support on which the material accumulates. One of the objects is to provide an apparatus of this kind with an auxiliary support movable into and out of the path of the material passing to the first mentioned support, so as to permit continued operation of the feeding mechanism while the accumulated material is being removed.

In one form of the invention, the mechanism may be used to feed large, heavy sheets from a printing press to a delivery table, or platform, on which the sheets accumulate in a pile.

Such presses frequently are provided with suitable means for transferring the sheets to a delivery table, the delivery table being lowered relative to the discharge end of the delivery carrier as the pile of sheets on the table increases.

However, the usual delivery table and the means at present employed for lowering the same, are not entirely satisfactory in handling very heavy stock, such as large cardboard sheets. A pile of such sheets on the delivery table is of greater weight than can conveniently be handled by hand, so it is necessary to handle the same by means of cranes or trucks or the like, which, of course, takes time and, heretofore, it has been necessary to suspend the operations of the press pending the removal of the pile of printed sheets. It is, therefore, one of the objects of my invention to provide an auxiliary support movable into and out of the path of the sheets discharged from the delivery carrier, so as to support said sheets while the loaded table is being removed and replaced by an empty table, thus permitting the continuous operation of the press.

Such an auxiliary support, however, must support a pile of the heavy sheets and eventually drop them onto the table without causing a very substantial horizontal displacement of the sheets, even though an approximately horizontal movement is imparted to the auxiliary support. I have therefore devised an auxiliary support movable from beneath the superimposed sheets without frictional or sliding contact therewith, and this constitutes another object of my invention.

Furthermore, a self lowering table for use with heavy stock must be positively lowered step by step, or in synchronism with the delivery of the stock thereto, in order to have a minimum drop of the sheets from the discharge end of the delivery carrier to the top of the pile on the table, and it is a further object of my invention to accomplish the aforesaid purpose and also to provide an associated means for quickly elevating the table to said minimum distance from the discharge end of the delivery carrier.

With the foregoing and other objects in view, the invention comprises the novel method, construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown the preferred embodiment of the invention. However, it is to be understood that the invention comprehends changes, variations and modifications which come within the scope of the claims hereunto appended.

Fig. 1 is a side elevation of an apparatus embodying the features of this invention.

Fig. 2 is a rear view thereof.

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

Fig. 4 is a fragmentary sectional view along the line 4—4 of Fig. 1.

Fig. 5 is a front view of the device, with the lower parts broken away.

Fig. 6 is a sectional diagrammatic view of the auxiliary support in its retracted position.

Fig. 7 is a sectional diagrammatic view of the auxiliary support in its extended position.

In Fig. 1 of the drawings I have shown the discharge end of an extension delivery carrier A of a printing press (not shown), said carrier consisting of an endless belt 10 passing over a pulley 11. The printed sheets are deposited upon the upper run of

this belt and are thus transported to and passed over the pulley 11 onto a delivery table or support which will be hereafter described. I do not wish to be limited to the particular form of means shown, the construction and mode of operation of which is not material to my present invention.

The self lowering delivery table or main support comprises a platform or table 12 alined with the delivery carrier A for the reception of printed sheets therefrom, and, due to the weight of the pile of sheets on the loaded table 12, it is expedient that the sheets and table be removed together and then replaced by an empty table.

The table, or platform, is removably supported on beams or members 13 extending transversely beneath the discharge end of the delivery carrier A a suitable distance forwardly therefrom to permit the sheets to be deposited by gravity upon the table 12 which rests upon the top of said beams. It will be readily seen that any selected size table or platform may be placed upon the beams, and, as will hereinafter appear, the platform may be readily removed from the beams when loaded.

The beams 13 are secured to the lower ends of chains 14, each passed over a sprocket 15 mounted upon its respective one of the hoisting shafts 16. There are two of the shafts 16, one at each side of the top frame 17 of the device. In the embodiment shown, the shafts 16 are normally urged to rotate in opposite directions, because the loaded run 14^B of each of the chains 14 is on the inside face of one of the sprockets 15, the weight of the sheets and their support placing the said loaded runs 14^B of the chains under tension. The free ends of the other runs of the chains terminate in hand holds 14^A, for use, when desired, in elevating the platform, although I have provided other means for this purpose, as will hereinafter appear.

For lowering or elevating the delivery platform 12 I provide a mechanism embodying means for lowering the platform step by step in synchronism with the delivery of the printed stock thereto, so that the top of the pile of sheets will always be at a selected minimum distance below the discharge end of the delivery carrier A. I also provide means selectively and separately operable from the lowering means for elevating the platform so that the top of the same, or the top of a pile of sheets thereon, may be positioned at said minimum distance below the discharge end of the carrier A.

For the foregoing purposes I provide worm gears 18, loosely mounted on the forward ends of the shafts 16, said gears 18 being in mesh with worms 19 mounted on the respective ends of a shaft 20 extending across and supported by the forward portion of the frame 17. Pawls 21 (Fig. 4) are pivoted to the respective gears 18, and each pawl engages a ratchet wheel 22 fixed to one of the shafts 16, each pawl being spring set to oppose the lowering of the platform 12. However, the loosely mounted worm gears 18 may be rotated to lower the platform or table 12, and in this event the ratchet wheel 22 will follow the pawl 12. The worms 19 are respectively right and left hand, as shown in Fig. 5, and they therefore rotate the gears 18 in opposite directions suitable to the proper rotation of the shafts 16 for the purpose of lowering the platform 12, and inasmuch as the gears are connected together by the medium of the shaft 20, the opposite ends of the beams 13 will be lowered equal distances so that the platform 12 thereon may be maintained in the desired horizontal plane.

Each end of the shaft 20 is extended beyond its bearing housing 24 and one end has mounted thereon a pinion 25 (Fig. 1) operatively engaging a gear 26 journaled on a stud 27 mounted on the frame 17. A ratchet wheel 28 is fixed to the gear 26, and a pawl arm 29 is journaled on the stud 27. This pawl arm carries a pawl 30 adapted to operatively engage the ratchet wheel 28 for movement of the same in a direction to lower the platform as will hereinafter appear. The pawl arm 29 may be operatively connected in any convenient manner with the printing press, but in the embodiment shown (Fig. 1) I employ a crank 31 pivotally mounted on the rearward portion of the frame 17 and operatively connected to the pawl arm 29 by a link 32. An oscillating motion is imparted to the crank 31 through the medium of a connecting rod 33, which may be driven by a moving part of the press (not shown) in synchronism with the delivery of the printed sheets from the belt 10 to the delivery table, thus imparting an intermittent movement to the shaft 20 through the pawl 30, ratchet wheel 28, gear 26 and pinion 25, and thus to the shafts 16 as described in a direction proper for lowering the platform.

Inasmuch as the pawl 30 engaging the ratchet wheel 28 imparts a movement to the shaft 20 only in the direction necessary to lower the platform, while each worm 19 and worm gear 18 normally lock the adjacent shaft 16 against rotation in one direction independently of the shaft 20, I have provided the pawls 21 and ratchet wheels 22, heretofore described, as a means for unlocking the shafts 16 for elevating movement only.

To provide for the elevating movement, the shafts 16 are each extended forwardly and one of the shafts has mounted thereon a pinion 34 (Fig. 5) meshing with a pinion 35, and a sprocket wheel 36 is secured to the

pinion 35. The other shaft 16 has a like sprocket wheel 37 mounted thereon (Figures 1, 3 and 5), and a sprocket chain 38 is passed over the said sprocket wheels 36 and 37 so that the shafts 16 may be rotated together independently of the movement of the worm gears 18 and in directions opposite to that imparted by said gears. A chain wheel 40 is mounted on the extended end of one of the shafts 16 (Fig. 5) having a hand chain 41 passed thereover, whereby the operator may impart an elevating movement to the shafts 16, the ratchet wheels 22 (Fig. 4) turning independently of their respective pawls 21 so as to permit such movement. In this connection it is to be understood that the worm gears 18 are not fixed to the shafts 16.

As the depth of the pile of sheets 23 (Figures 1 and 2) supported upon the platform 12 increases, and the platform is lowered correspondingly, it is finally brought to rest upon a truck 42 provided for the ready transportation of the platform with its pile of sheets to any suitable destination. Rotary movement of the shafts 16, lowers the beams 13 from engagement from the platform 12, and they may then be swung to one side clear of the platform for the removal of the same.

One of the objects of my invention is to permit the press to continue in operation while the loaded platform is being removed, and for this purpose I have provided an auxiliary support C movable into or out of the path of the sheets discharged from the delivery carrier A, which auxiliary support is extended into the path of said sheets and over the platform 12 a sufficient length of time before the platform rests upon the truck 42 to insure that the pile of sheets 23 on the platform 12 will pass under the frame 17 when being removed, and further to provide a temporary support for the sheets 23^A that are printed while the loaded platform is being removed and replaced by an empty platform.

To illustrate a suitable auxiliary support I have shown a shutter curtain 44, as diagrammatically illustrated in Figures 6 and 7, extending across and below the discharge end of the carrier A, and having one end fixed to a cross member 45 mounted in the rearward portion of the frame 17, the other end being fastened to a rotatable drum 46 extending across the frame below the member 45, and the said curtain 44 is intermediately supported by and passed over the forward face of a roller 47 journaled in boxes 48 slidably mounted on ways 49 supported by opposite sides of the frame 17.

The roller 47 is horizontally disposed, and the upper run 44^A (Fig. 7) of the shutter curtain is passed from the member 45 over the front face of the roller 47, which roller is adapted for movement into or out of the path of the sheets discharged from the carrier A, thereby extending said upper run of the curtain 44 in a shutter-like manner over the platform 12 and into said path. The lower run of the curtain extends rearwardly from the roller 47 and is wound around the drum 46 a sufficient number of times to provide the requisite length of curtain.

Spaced upwardly in parallel relation from each of the ways 49 is a rack 50, supported upon brackets 50^A mounted on the frame 17, which rack is co-extensive, with the ways, and operatively engages a pinion 51 to rotate the roller 47. This roller is provided with two pinions 51, one at each end, and there are two of the racks 50. As the roller 47 is extended to form, with the curtain 44, the said auxiliary support, a rotary movement is imparted to the roller, and both ends of the roller are positively driven by the racks and pinions at opposites of the apparatus, the parts being proportioned so that the peripheral travel of the roller exactly equals the linear travel of the curtain, from which it is readily seen that as the pulley 47 advances forwardly on the ways 49, the upper run of the shutter curtain 44 is rolled across the path of the discharge of the sheets from the carrier A.

The auxiliary support is thus formed by an anti-fraction device which does not impart horizontal movement to the sheets when said support is withdrawn to drop the sheets onto the platform or table 12.

As the roller 47 advances to extend the auxiliary support, the lower run 44^B of the shutter curtain 44 unwinds from the drum 46 and passes over the pulley 47 to provide the requisite length of curtain shutter for the run 44^A, as heretofore set forth. But it is important to note that while the lower run 44^B of the curtain will have a longitudinal movement relative to the ways 49, the upper run 44^A does not do so; any portion of the curtain, as soon as it becomes a part of the upper run, remains stationary and fixed with respect to the surrounding parts, and particularly with respect to any sheets that may be deposited thereon. In a similar manner, as the roller 47 is moved to its rearward position, so as to be retracted from the path of the material discharged from the carrier A, the upper run of the shutter curtain 44 is rolled out from under any pile of sheets that may be superimposed thereon, thus entirely avoiding any sliding or frictional engagement with the lowermost sheet of the pile. By the use of an anti-friction device, I provide an auxiliary support which may be moved into or out of the path of the sheets without causing a horizontal displacement of the pile of sheets.

For the operation of the mechanism of the

auxiliary support C, I provide a sprocket wheel 52 (Figs. 1 and 3) mounted on a shaft 52A journaled in a bearing on one of the posts 43, and a ratchet wheel 53 mounted on the shaft 52A with a pawl 54 associated therewith for moving the roller 47 and shutter curtain 44 to their extended positions. A sprocket chain 55 is operatively passed over the wheel 52, and then passes over pulleys 56 (Fig. 3) journaled suitably on the frame 17, so as to have one run 55A of the chain alined with and attached to one of the boxes 48, said run being substantially coextensive with and parallel to the respective ways 49. The shaft 52A is provided with a detachable crank 64 (Fig. 2) for manual operation of the sprocket wheel 52, whereby the roller 47 and shutter curtain 44 may be moved forwardly and into the path of the sheets discharged from the carrier A, or rearwardly and out of the path of said sheets.

Figures 1 and 3 show how the drum 46 is connected to an operating shaft 57 by means of sprocket wheels 58 secured to said drum and shaft, and a sprocket chain 59 passing around said wheels 58. To rewind the curtain onto said drum, the shaft 57 has a square end (Figures 1 and 2) adapted to receive the crank 64.

After the curtain 44 has been extended it can be tightened, or tensionally adjusted, by operating the shaft 57 to rewind a portion of the curtain onto the drum 46. To retain this adjustment, the shaft 57 may be provided with a ratchet wheel 65 cooperating with a pawl 65'.

To limit the motion of the sheets delivered to the auxiliary support C and platform 12, stops 61 (Figures 1 and 5) are secured to a bar 62 at the rear of the machine, and to provide for adjustment of said stops, the bar 62 is provided with extensions adjustable in bearings 63.

In the use of the invention, it will be readily seen from the foregoing description that as the sheets are printed on the press and transported to the platform, or table 12, by the carrier A, the platform will be lowered step by step to accommodate the increasing depth of the pile of sheets thereon, and, at the proper time, the roller 47 is moved forwardly into the path of the sheets discharged from the carrier A, thus rolling the shutter curtain 44 into said path, and providing an auxiliary support (Fig. 7) for the reception of the sheets as 23A, while the loaded platform is removed and replaced with an empty one. The operator then elevates the empty platform as high as the auxiliary support will permit, or as far as is desirable, and retracts the auxiliary support to the position shown in Fig. 6, thus the sheets 23A are transferred by gravity to the platform. The platform may then, if desired be further elevated, but usually this is not necessary, as the sheets 23A temporarily supported on the auxiliary support will suffice to bring the top of the pile to the proper distance below the discharge end of the carrier A.

I claim:

1. In a delivery apparatus for feeding mechanism, a main support to receive the material discharged from the feeding mechanism, said main support comprising a member on which the material accumulates, an auxiliary support movable into the path of the material to temporarily prevent delivery to said main support, said auxiliary support including an anti-friction device on which the material accumulates, and means whereby said anti-friction device is withdrawn from said path to drop the accumulated material onto the main support.

2. In a delivery apparatus for sheet-feeding mechanism, a main support to receive the sheets discharged from the feeding mechanism, said main support comprising a movable table on which the sheets accumulate, an auxiliary support movable over said table to temporarily prevent delivery of sheets thereto, said auxiliary support including an anti-friction device on which the sheets accumulate, and means whereby said anti-friction device is withdrawn from said path to drop the accumulated sheets onto said table.

3. In a delivery apparatus for sheet-feeding mechanism, a main support comprising a table to receive the sheets discharged from the feeding mechanism, said table being removable from the apparatus to remove the sheets supported thereon, an auxiliary support adapted to temporarily stop the sheets discharged from said feeding mechanism, so as to permit removal of the sheets on said table, said auxiliary support comprising an anti-friction device on which the sheets accumulate, said anti-friction device including a roller forming a support for the sheets, and means whereby said auxiliary support is shifted in a line at a right angle to the axis of said roller to drop the sheets from said anti-friction device to the table.

4. In a delivery apparatus for feeding mechanism, a main support to receive the material discharged from the feeding mechanism, an auxiliary support adapted to stop the material discharged from said feeding mechanism, said auxiliary support being movable into and out of the path of the material to temporarily prevent delivery to the main support, and means for shifting said auxiliary support, said means including driving members at opposite sides of said auxiliary support cooperating with each other to simultaneously shift both of said sides.

5. In a delivery apparatus for feeding mechanism, a main support to receive the

material discharged from the feeding mechanism, an auxiliary support adapted to stop the material discharged from said feeding mechanism, said auxiliary support being movable into and out of the path of the material to temporarily prevent delivery to the main support, and means for shifting said auxiliary support, said means including rotatable driving gears at opposite sides of said support, and racks meshing with said gears.

6. In a delivery apparatus for feeding mechanism, a main support to receive the material discharged from the feeding mechanism, said main support comprising a member on which the material accumulates, an auxiliary support movable into the path of the material to temporarily prevent delivery to said main support, said auxiliary support including an anti-friction device on which the material accumulates, and means whereby said anti-friction device is withdrawn from said path to drop the accumulated material onto the main support, said means including driving members at opposite sides of said auxiliary support cooperating with each other to simultaneously shift both of said sides.

7. In a delivery apparatus for sheet-feeding mechanism, a main support comprising a table to receive the sheets discharged from the feeding mechanism, said table being removable from the apparatus to remove the sheets supported thereon, an auxiliary support adapted to temporarily stop the sheets discharged from said feeding mechanism, so as to permit removal of the sheets on said table, said auxiliary support comprising an anti-friction device on which the sheets accumulate, said anti-friction device including a roller forming a support for the sheets, and means whereby said auxiliary support is shifted in a line at a right angle to the axis of said roller to drop the sheets from said anti-friction device to the table, said means including driving members at opposite sides of said auxiliary support cooperating with each other to simultaneously shift both ends of said roller.

8. In a delivery apparatus for feeding mechanism, a main support, means for delivering sheet material to said support, and an auxiliary support for the material, said auxiliary support comprising a curtain movable into and out of the path of the material between said means and the main support.

9. In a delivery apparatus, a support, means for delivering material to said support, a roller movable into or out of the path of the material between said means and the support, and a curtain cooperating with said roller for extension into said path to form an auxiliary support for said material.

10. In a delivery apparatus, a means for delivering sheet material to said support, and a curtain adapted to be rolled into or out of the path of the material between said means and said support.

11. In a delivery apparatus, a support, means for delivering material to said support, a roller movable into or out of the path of the material between said means and the support, and a curtain cooperating with said roller and adapted to be rolled into said path to form an auxiliary support for said material.

12. A support comprising a curtain movable to receive and release the material to be supported, said curtain being adapted to be rolled out of engagement with the material to be supported, and means for tensionally adjusting said curtain.

13. A support comprising a curtain movable to receive and release the material to be supported, said curtain having one end fixed and the other end tensionally adjustable, and a laterally movable roller intermediately supporting said curtain for rolling engagement of the curtain with the material to be supported.

In testimony that I claim the foregoing I hereunto affix my signature.

BENJAMIN F. BERRY.