July 1, 1930. F. S. ENGLISH 1,768,676

DELIVERY DEVICE FOR PRESSES.

Filed Sept. 2, 1926 5 Sheets-Sheet 1

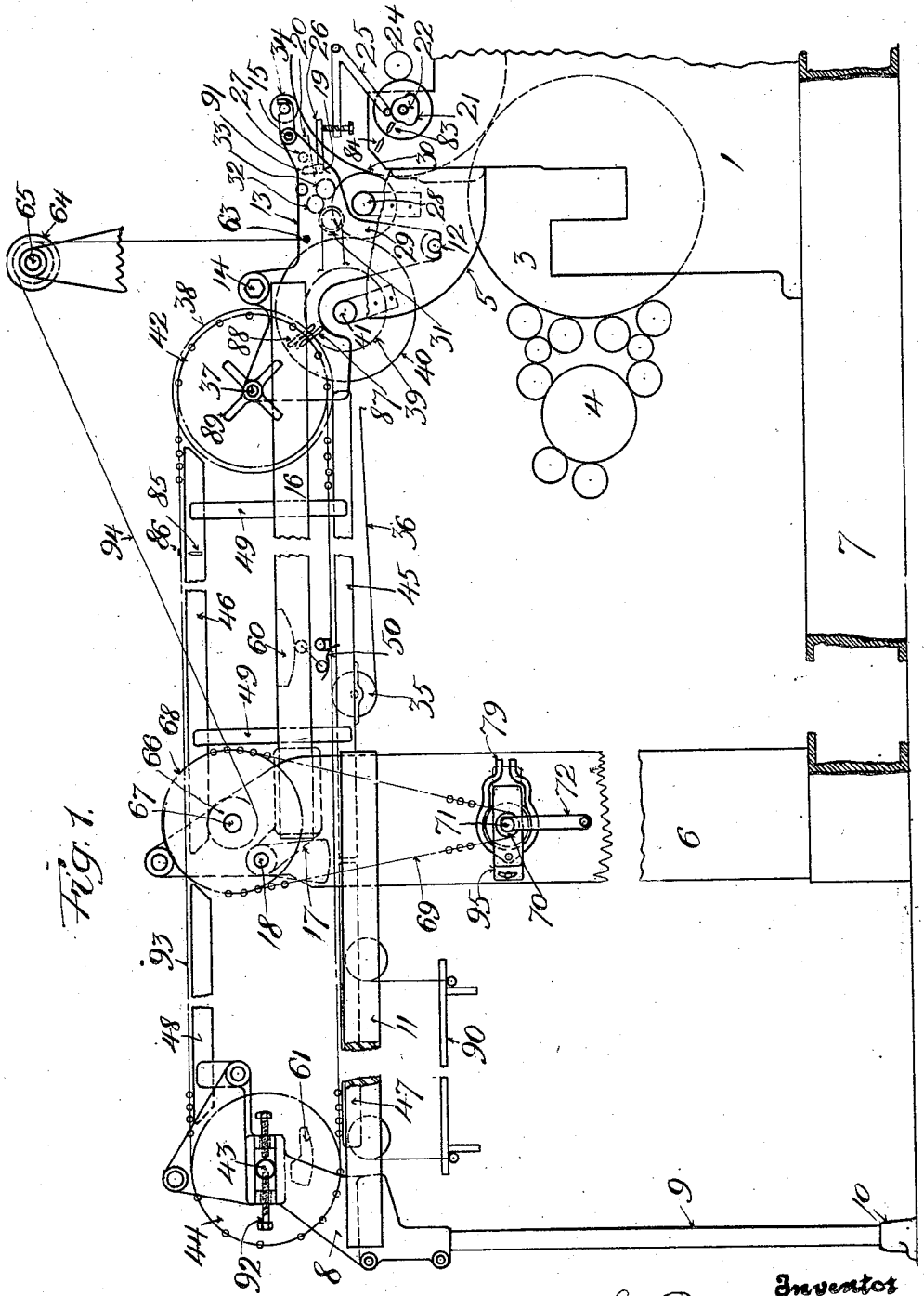


Fig. 1.

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DELIVERY DEVICE FOR PRESSES

Filed Sept. 2, 1926 5 Sheets-Sheet 2

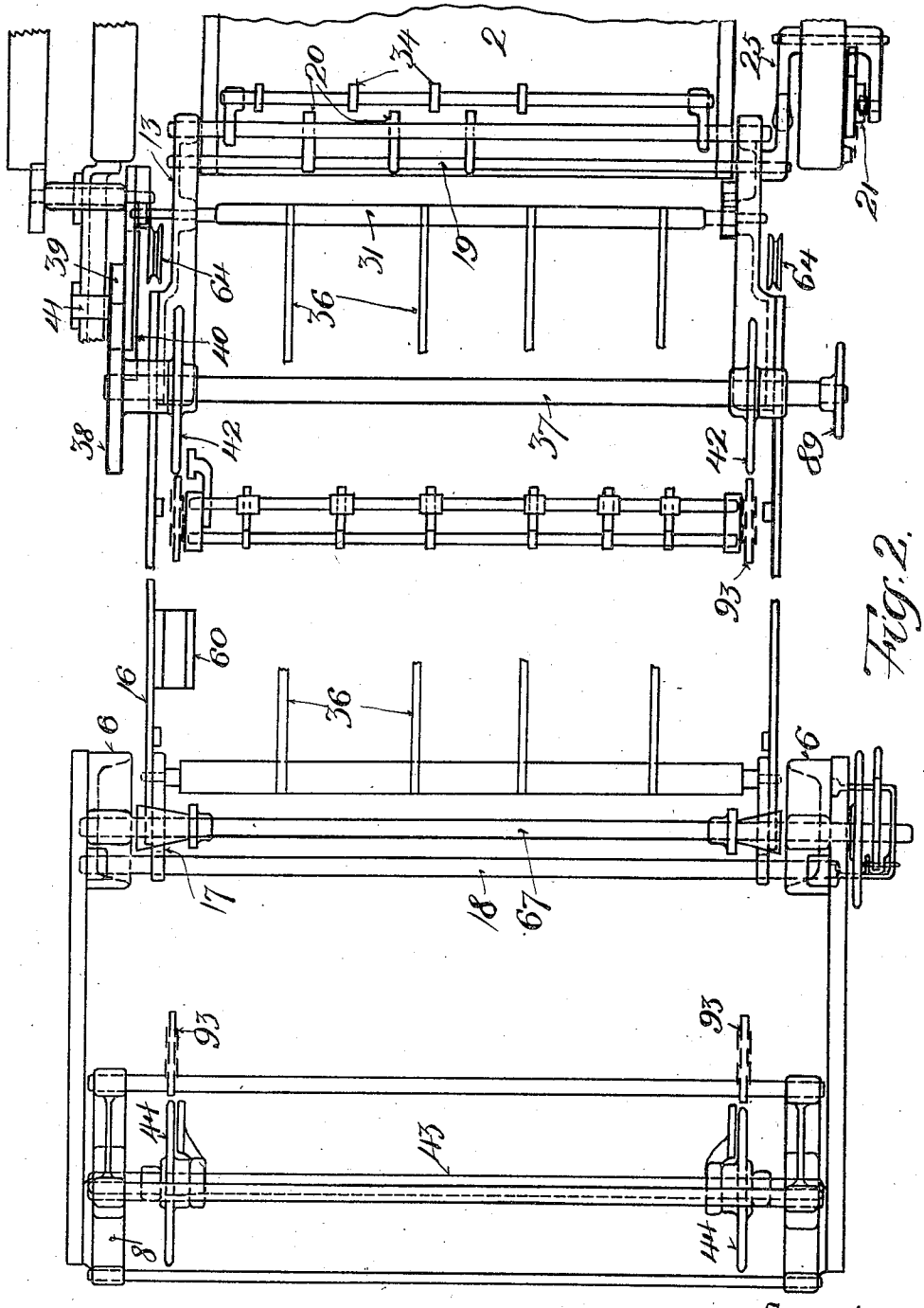


Fig. 2.

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DELIVERY DEVICE FOR PRESSES

Filed Sept. 2, 1926 5 Sheets-Sheet 3

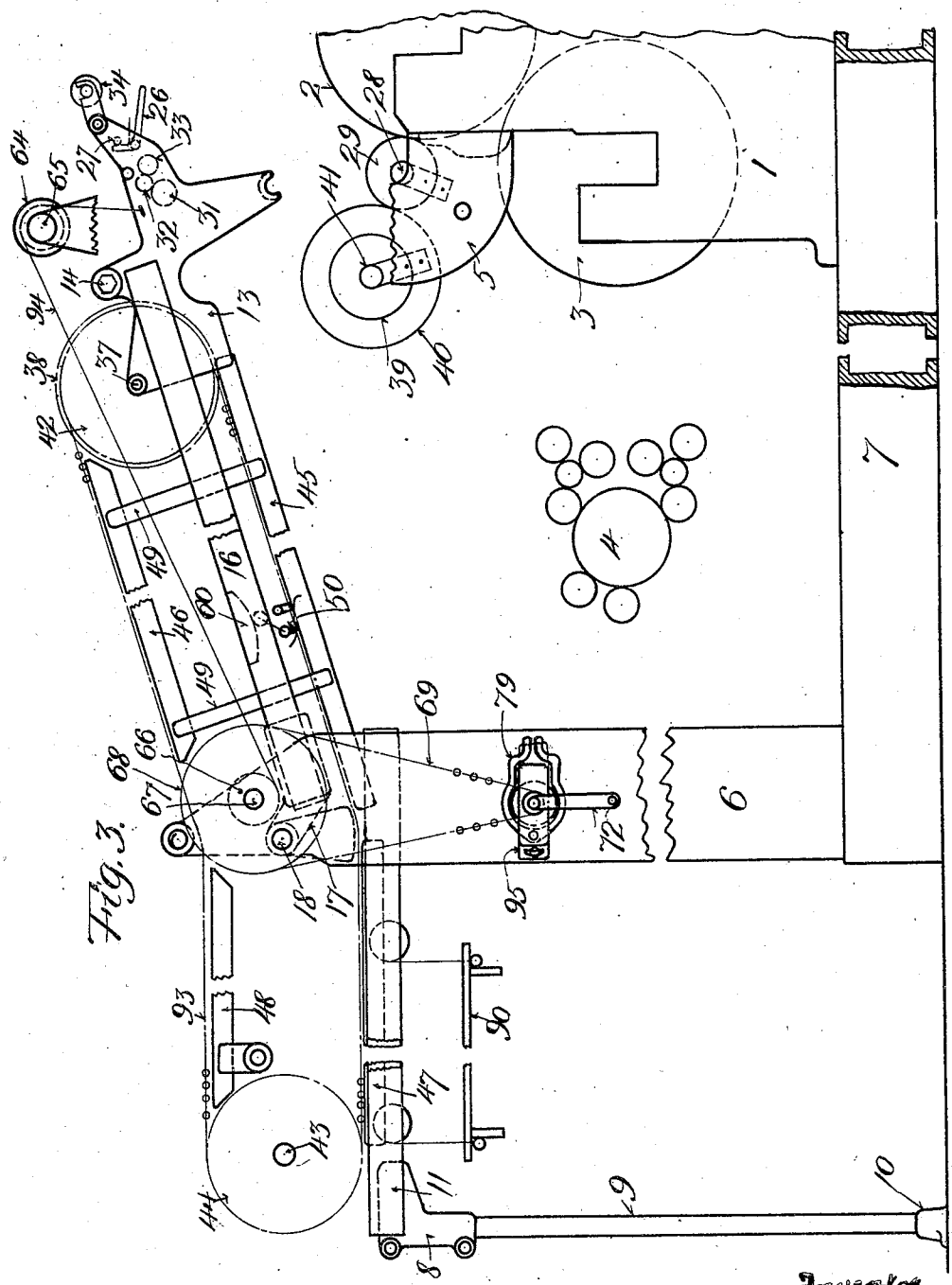


Fig. 3.

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July 1, 1930. F. S. ENGLISH 1,768,676

DELIVERY DEVICE FOR PRESSES

Filed Sept. 2, 1926 5 Sheets-Sheet 4

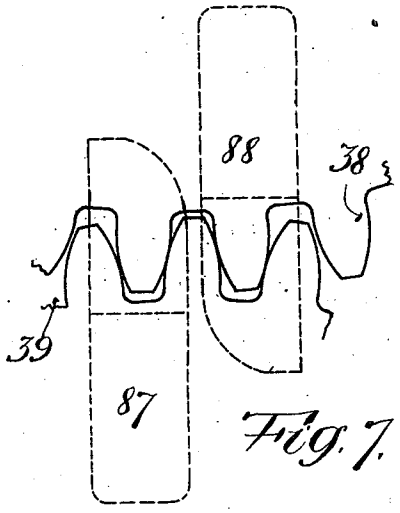


Fig. 7.

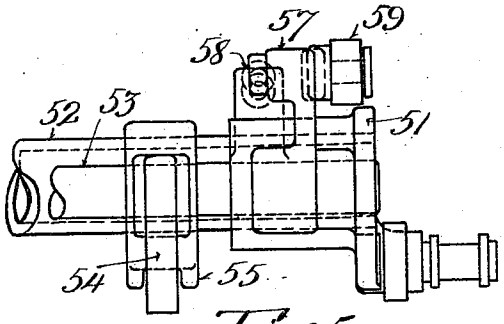


Fig. 5.

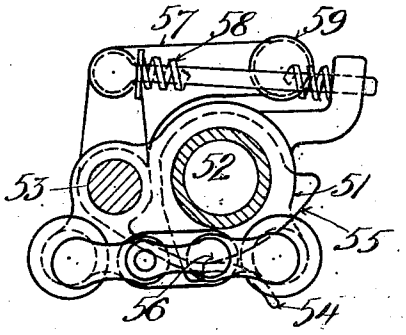


Fig. 4.

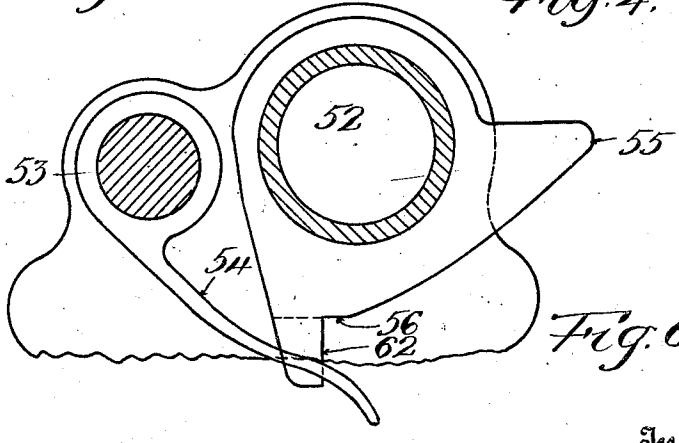


Fig. 6.

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July 1, 1930. F. S. ENGLISH 1,768,676

DELIVERY DEVICE FOR PRESSES

Filed Sept. 2, 1926 5 Sheets-Sheet 5

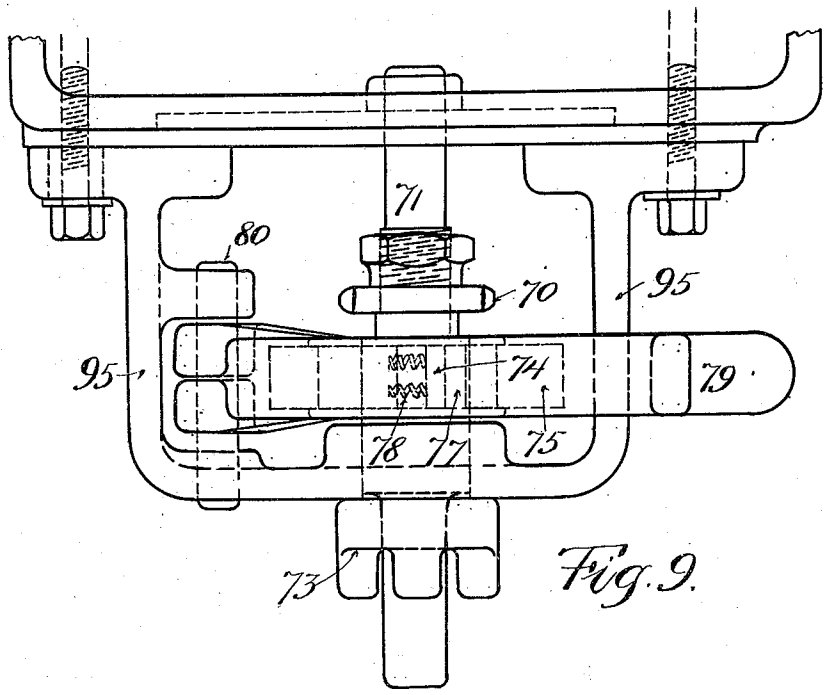


Fig. 9.

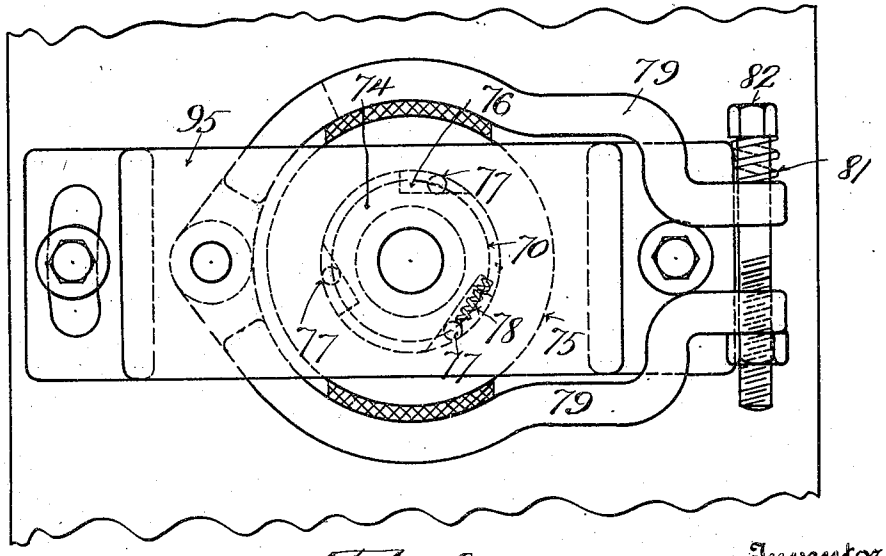


Fig. 8.

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Patented July 1, 1930 1,768,676

UNITED STATES PATENT OFFICE

FRED S. ENGLISH, OF NEW LONDON, CONNECTICUT

DELIVERY DEVICE FOR PRESSES

Application filed September 2, 1926. Serial No. 133,217.

The present invention relates to delivery devices especially adapted for printing presses and cutting and creasing presses, although the invention may be applied to any type of machine from which sheets are delivered into a pile. The present invention relates to a delivery of the type in which carrier chains are arranged to carry the sheet from the printing or other machine onto a pile table or support. Preferably, the invention is employed in conjunction with a press having a lowering pile table set off at the end of the press, and upon which a large stack of sheets is adapted to be accumulated before the pile is removed. One object of the present invention is to provide a delivery device of the above described character which may be lifted up clear of the impression cylinder of the press, in order to provide access to the impression cylinder for make ready purposes and to give access to the form cylinder of the press, or other mechanisms. Another object is to provide for the quick displacement of the delivery device for access to the press and the quick return of the same to operative position. Another object is to provide for the return of the delivery device to operative position with the parts properly timed in relation to the position of the impression cylinder of the press. Another object of the invention is to provide a delivery device in which the sheet is slowed down in stages from the speed with which it moves upon the impression cylinder, in order that the speed of the sheet may be gradually reduced as it approaches the pile table. I have chosen to illustrate my invention applied to a rotary press but it is to be understood that the same may be applied to other types of presses.

In the drawings forming part of this application,

Figure 1 is a side elevation of my invention showing the extreme end of a rotary printing press and showing the invention in operative position,

Figure 2 is a plan view thereof,

Figure 3 is a view similar to Figure 1 with some of the parts omitted for simplicity and in this view the delivery device is shown lifted to provide access to the working parts of the press,

Figure 4 is a sectional view showing one of the gripper bars which is carried by the delivery chains,

Figure 5 is a front elevation of the same,

Figure 6 is a sectional view on a larger scale of the gripper mechanism with the grippers in open position,

Figure 7 is a diagrammatic view showing the members on the gears for guiding them into mesh,

Figure 8 is an elevation of part of the raising and lowering device, and

Figure 9 is a plan view of the same parts.

Referring first to Figure 1 I have shown at 1 the main side frames of the press, a portion of the impression cylinder 2, and the plate cylinder 3, it being understood that the latter is present in this instance because the device is shown applied to a rotary press. At 4 I have shown diagrammatically the series of rollers for inking the form or plate on the cylinder 3, this inking mechanism being shown close up to the cylinder in Figure 1, which is the operative position, and in Figure 3 I have shown the same moved away from the form cylinder to permit the operator to have access to the cylinder. At 5 I have shown brackets attached to the main frame 1 for the purpose of supporting the rear end of the delivery device. At 6 I have shown brackets attached to the main supporting rails 7 of the press for supporting the central portion of the delivery device; and at 8, 9 and 10 I have shown the members which support the front end of the delivery device and which rest upon the floor in spaced relation with the end of the press. The rails 11 are attached to the brackets 6 and 8 and support the lowering pile table 90. The latter is adapted to be lowered step by step as the sheets are piled thereon, so that the top of the stack of sheets remains at a constant level; and the devices for operating this pile table are well known in the art and need no detailed description herein. The sheets are adapted to be delivered upon this table from above by the delivery mechanism, and the table is lowered gradually as the sheets accumulate thereon.

The several supporting devices above described are duplicated at opposite sides of the press so that a description of the parts at one side will suffice.

There is a rod 12 extending crosswise of the press and fixed in the brackets 5 to act as a support and positioning member for the rear end of the delivery mechanism, when the latter is in operative position. There are brackets 13 which carry the rear end of the mechanism of the delivery device which is adjacent to the cylinder, and these brackets are braced crosswise of the press by means of rods 14 and 15 which are bolted thereto. These brackets are connected to the longitudinally extending rods or bars 16 which are bolted thereto and the front ends of these bars are bolted to brackets 17 which are pivoted to swing on the shaft 18, the latter extending laterally of the press and being fixed in the brackets 6. The brackets 13, together with their tie rods 14 and 15 and the supporting bar 16 form a swinging unit which carries the rear end of the delivery mechanism, and this unit may be readily raised upon the shaft 18 as its pivot, into the position shown in Figure 3.

There is a shaft 19 pivoted on the brackets 13 and this shaft carries a series of stripper fingers 20 which serve to strip the sheet from the cylinder and to guide the forward edge onto the delivery members. These fingers are moved alternately toward and from the impression cylinder 2 by means of a cam 21 arranged on a spindle 22, the latter being gear-driven from the shaft of the cylinder 2 through a series of gears 23 and 24 mounted respectively on the spindle 22 and the shaft of the impression cylinder. The cam 21 acts on one arm of a bell crank lever 25 and the other arm of this bell crank operates on a lever arm 26 which is fixed to the stripper finger shaft 19, whereby the latter is rocked to lower the stripper fingers against the impression cylinder at one moment and to lift these fingers at the time necessary to strip the sheet from the cylinder. As the lever arm 26 rests on the top of the lever 25 it may be lifted freely from it when the delivery mechanism is raised. To prevent the stripper fingers from dropping too low when this operation takes place, I have provided a stop 27 in the path of the small arm 91 on the shaft 19.

There is a series of wheels 34 supported in the end of the bracket 13 and these run against the surface of the impression cylinder for the purpose of driving the sheet out onto the delivery device after the grippers of the impression cylinder have been opened to deliver the sheet to the stripper fingers.

There is a gear 29 which revolves freely on the stud 28, the latter being mounted in the bracket 5, and this gear meshes with the cylinder gear 30 and it serves to drive the operating parts of the delivery mechanism. At 31 I have shown a rear tape roller extending across the press and running freely in the brackets 13. This tape roller is positively driven from the gear 29 through the intermediate gears 32 and 33 which mesh with each other and the former meshes with a gear on the shaft of the roller 31. These gears are so proportioned that the roller 31 is driven at a surface speed less than that of the impression cylinder, so that when the sheet is fully delivered on the tapes, hereinafter described, it will be moving at a slower speed than the impression cylinder. The gear 33 is mounted in position above the gear 29, which permits it to lift freely from the latter when the delivery device is raised. There are endless tapes or belts 36 which travel around the tape roller 31 and also around the tape rollers or wheels 35 which are supported upon the rails 45. These tapes receive the sheet from the stripper fingers 20 and convey it to a point where it is taken by the chain delivery and, as above set forth, these tapes operate at a lower speed than the peripheral speed of the impression cylinder.

There is a free running shaft 37 extending across the press and journaled in the brackets 13. On one end of this shaft there is a gear 38 which meshes with and is driven by the gear 39, which latter is secured to the gear 40 and both revolve freely on a stud 41 which is secured to one of the side brackets 5. The gear 40 meshes with and is driven by the gear 29 previously described, so that both gears 29 and 40 are driven from the impression cylinder gear. On the shaft 37 there is a pair of sprockets 42 located at opposite sides of the press and outside of the path of the sheets; and these sprockets are driven through the gear 39 which meshes with the gear 38 on the shaft 37. The chain of gears, including the gears 29, 40, 39 and 38 are so proportioned that the surface speed of the sprockets 42 is something less than the speed of the tapes 36 and therefore this speed is considerably less than the surface speed of the impression cylinder.

Near the front end of the delivering device there is a pair of idler sprockets 44 similar to the sprockets 42 and they are mounted on the shaft 43 in vertical planes corresponding with the sprockets 42. The shaft 43 is mounted in the brackets 8 and is subject to adjustment to take up the slack in the chains by means of the adjusting screws 92. Endless chains 93 engage around the sprockets 42 and the sprockets 44 and to prevent the upper and lower runs of these chains from sagging between the sprockets I have provided supporting bars 45 and 47 arranged under the lower runs of these chains and supporting bars 46 and 48 arranged under and adapted to support the upper runs of these chains. The bars 45 and 46 are supported by

the brackets 49 which are mounted on and carried by the bars 16, whereas the supporting bars 47 and 48 are attached to the frame of the machine.

The chains 93 carry several sets of grippers, one of which is shown at 50 in Figure 1; and the detailed construction of these is shown in Figures 4, 5 and 6. These gripper units are of well known construction and are at present used on chain delivery devices. They are constructed as follows: There is a pair of brackets 51 attached to the links of the chains at opposite sides of the press, and they carry a fixed supporting bar or tube 52, as well as an oscillating gripper shaft 53 on which latter the grippers 54 are mounted The gripper pads 55 are mounted on the tube 52 and form a seat for the grippers so that the sheet may be pinched between the face of the grippers and the seat at the point 56 in Figure 6. These grippers are closed upon the sheet to grip it and are opened to release the sheet, by the oscillation of the shaft 53 which operation is performed through a lever 57, the retracting spring 58 and the cam roller 59 which latter is operated on by the stationary cams 60 and 61 arranged, respectively, over the forward end of the tapes 36 and over the forward edge of the lowering pile table.

There are attached to the brackets 13 at opposite sides of the press, lifting cables 94 which extend upwardly over the sheaves 64, which are freely revolvable on the shaft 65 extending crosswise of the press and mounted on the top of the brackets 5, some distance above the rear end of the delivery device. From the sheaves 64 these cables extend forwardly and their opposite ends are wound on a pair of winding drums 66 which are fixed on the shaft 67 arranged crosswise of press and journaled on the brackets 6. On one end of the shaft 67 there is a sprocket 68 over which engages an endless chain 69, and the latter also engages around a sprocket 70 which is mounted on a short shaft 71 as shown in Figures 8 and 9. This shaft is journaled in the brackets 95 bolted to the side of the brackets 6. On one end of the shaft 71 there is a hand crank 72 which operates through a clutch to revolve the shaft 71. For holding the rear end of the delivery mechanism in elevated position, I have provided a ratchet device and brake as follows: There is a ratchet disc 74 fixed to the shaft 71, and there is a shell or brake drum 75 surrounding this disc. In the notches 76 of the disc 74 there are rolls 77 pressed in one direction by the spring 78 (only one of which is shown) and these rolls grip the shell 75 in one direction and release the same in the opposite direction, this type of clutch being well known in the art. There is a pair of brake shoes 79 pivoted at the point 80 and engaging at opposite sides on the outer surface of the brake drum 75. These shoes are presesd toward the brake drum by means of a spring 81, the tension of which may be adjusted by the bolt 82. The mechanism just described allows the hand crank shaft 71 and the sprocket 70 to turn freely when one end of the delivery device is being raised. When the delivery device is raised the brake, acting on the member 75 holds the delivery device in raised position and when it is desired to lower the delivery device the hand crank 72 may be turned by exerting just enough force to overcome the gripping action of the brake which, as above pointed out, may be adjusted by the spring 81 and bolt 82.

When the delivery device is lifted, the driving gears 38 and 39 disengage or are thrown out of mesh and it is necessary that these be brought into mesh at such point when the delivery device is lowered, in order that the grippers on the chains may be properly timed in relation to the delivery of the sheets. For this purpose I provide a pointer 83 attached to the gear 23, and there is a co-operating pointer 84 fixed to a stationary part of the press, whereby the angular displacement of the shaft 22 may be determined according to the register of the pointers 83 and 84. There is also a pointer 85 arranged upon the stationary bar 46 and this co-operates with the pointer 86 one one of the delivery chains, in order that the position of these chains may be regulated for the proper return of the delivery device to active position. The several pointers are sufficient for roughly gauging the position of the several parts, but I prefer to provide means for returning the several gears into accurate meshing engagement. For this purpose I have arranged extra long teeth 87 and 88, the former of which is fixed in the outside of the gear 39 and the latter of which is fixed on the outside of the gear 38. These extra teeth are located at the correct distance apart and opposite the regular teeth of the respective gears as shown in Figure 7, so that when these extra teeth are in contact and the pointers 83 and 84 are approximately in register, the gears 38 and 39 will accurately mesh with each other when the delivery device is lowered.

Operation

When the grippers of the impression cylinder (not shown) open to deliver the sheet, the stripper fingers 20 are close to the cylinder, so that as the sheet is driven by the latter and by the friction wheels 34, the sheet travels forwardly over the stripper fingers and onto the tapes 36. The upper runs of these tapes travel to the left in Figure 1 at a speed less than the peripheral speed of the cylinder, so that the sheet is slowed down somewhat when moved onto these tapes. The

sheet is carried forwardly on the tapes 36 until the leading edge of the sheet comes to the gripper mechanism 50 and as the chains 93 are travelling at a lower speed than the tapes 36, the forward edge of the sheet is moved up against the abutments 62 of the gripper pads. The grippers 54 then close on the sheet as the rolls 59 disengage from the cam 60. The sheet is now carried forwardly by the gripper devices 50 on the travelling chains until the sheet is moved to a position over the lowering pile table and until the roller 59 is acted upon by the stationary cam 61 to open the grippers which will allow the sheet to fall upon the pile table.

When it is desired to have access to the impression cylinder or the plate cylinder or inking device, the rear end of the delivery mechanism may be raised as shown in Figure 3, in which case this entire section of the delivery mechanism will swing from the shaft 18. This lifting of part of the delivery mechanism is effected by turning the hand crank 72 and the motion is transmitted by the sprocket 70 through the chain 69 to the sprocket 68. The drum 66 winds up the cables 94 and these serve to lift the rear end of the delivery mechanism into the position shown in Figure 3. There will now be sufficient space at the forward end of the press to permit the operator to get at the impression or form cylinders, or the inking mechanism. To lower the delivery device, the crank 72 is reversed and only enough force is required to release the clutch rolls 77.

When the delivery device is about to be lowered into operative position, the press is turned until the pointers 83 and 84 are approximately in register, then the hand wheel 89, which is fixed on the shaft 37, is turned until the pointers 85 and 86 are approximately in register. The delivery device is then lowered until the teeth of the gears 38 and 39 are nearly in mesh; and the shaft 37 is turned slightly until the guiding teeth 87 and 88 are in contact, whereupon the delivery device may be completely lowered. The teeth of the gears 38 and 39 will now accurately register and the gripper devices 50 of the chains will be properly timed in relation to the delivery of the sheets from the impression cylinder 2.

Having described my invention, what I claim is:

1. The combination with a press having a sheet carrying cylinder, a delivery device pivotally supported to be swung in relation to said cylinder, said delivery device including stripper fingers co-operating with said cylinder, means for operating said stripper fingers from said cylinder, and means movable with said delivery device and co-operating with said operating means when the delivery device is in operative position and adapted to freely disengage from said operating means when the delivery device is lifted away from said cylinder.

2. The combination with a press having a sheet carrying cylinder, a lever operated from said cylinder, a sheet delivery device for receiving the sheets from said cylinder and pivotally mounted whereby the end of said delivery device adjacent the cylinder may be swung away from said cylinder, said delivery device carrying stripper fingers, and operating means co-operating with said lever when the delivery device is in active position and adapted to disengage from said lever when the delivery device is raised.

3. The combination with a press having a sheet carrying cylinder, a delivery device for receiving the sheets from said cylinder and pivotally mounted whereby the end adjacent said cylinder may be swung out of position, stripper fingers, a stripper finger shaft and an arm mounted on said shaft, said fingers, shaft and arm being carried by said delivery device, and means for operating said arm and from which said arm is adapted to freely disengage when the delivery device is raised.

4. The combination with a press having a sheet carrying cylinder, a delivery device pivotally mounted whereby one end may be swung away from said cylinder, stripper fingers for co-acting with said cylinder and mounted on said delivery device, and co-operating parts for operating said stripper fingers and adapted to freely disengage from each other when the said delivery device is moved into inoperative position.

5. The combination with a press having a sheet carrying cylinder, a delivery device pivotally mounted whereby one end may be swung away from said cylinder, stripper fingers for co-acting with said cylinder and mounted on said delivery device, and co-operating parts for operating said stripper fingers from said cylinder, and adapted to freely disengage from each other when the delivery device is moved into inoperative position.

6. The combination with a press having a sheet carrying cylinder, a stationary member, a sheet delivery device including traveling supports, one of which is provided with grippers for engaging the leading edge of the sheets, a portion of said delivery device pivotally supported to be moved toward and from said cylinder, a gear mounted on said stationary member, a gear mounted on said delivery device and co-acting with said first gear and auxiliary teeth on said gears for guiding said gears into mesh at a predetermined point when the delivery device is moved towards said cylinder to bring said grippers into correct timing relation to said cylinder.

7. The combination with a press having a sheet carrying cylinder, a stationary member, a sheet delivery device including sheet conveying members, one of which is provided

with grippers for gripping the leading edge of the sheet, a portion of said delivery device pivotally mounted to swing toward and from said cylinder, a driving gear mounted on said stationary member, a co-operating gear mounted on said delivery device, an extra long tooth mounted on each of said gears and co-operating with each other to guide said gears into mesh when the delivery device is swung into operative position to bring said grippers into proper timing relation to said cylinder.

8. The combination with a press having a sheet carrying cylinder, a delivery device adapted to be moved into and out of operative relation with said cylinder sheet conveying means having grippers to grip the leading edge of the sheet, a timing indicator associated with said cylinder, and a co-operating timing indicator associated with said delivery device by which the relative positions of said cylinder and the delivery mechanism may be determined when the delivery device is to be moved into active position to effect the correct timing relation of said grippers to said cylinder.

9. The combination with the press having a sheet carrying cylinder, a sheet delivery device adapted to be moved toward and from said cylinder, sheet conveying means having grippers to grip the leading edge of the sheet, a pair of timing indicators associated with said cylinder for determining the position thereof, and a pair of timing indicators associated with said delivery device for determining the position thereof in relation to the position of said cylinder to effect the correct timing relation of said grippers to said cylinder.

10. The combination with a press having a sheet carrying cylinder, a sheet delivery device adapted to be moved toward and from said cylinder, sheet conveying means having grippers to grip the leading edge of the sheet, co-operating members adapted to operate said delivery device when in operative relation with said cylinder and adapted to be separated when said delivery device is moved out of operative position, and co-acting indicators for determining the relative positions of said co-operating members to effect the correct timing relation of said grippers to said cylinder.

11. The combination with a press having a sheet carrying cylinder, a sheet delivery device adapted to be moved toward and from said cylinder, sheet conveying means having grippers to grip the leading edge of the sheet, and co-acting indicators associated with said cylinder and with said delivery device, respectively to effect the correct timing relation of said grippers to said cylinder.

12. The combination with a press having a sheet carrying cylinder, a delivery device pivotally mounted to swing toward and from said cylinder, sheet conveying means having grippers to grip the leading edge of the sheet, disengageable means for driving the operative parts of the delivery device from said cylinder, and co-acting indicators for indicating the relative positions of said cylinder and the delivery device when the delivery device is to be returned into active relation with said cylinder to effect the correct timing relation of said grippers to said cylinder.

13. The combination with a press having a sheet carrying cylinder, a pivoted delivery device for receiving the sheets from said cylinder, sheet conveying means having grippers to grip the leading edge of the sheet, gears for transmitting the operative force from said cylinder to said delivery device, said gears being adapted to be disengaged when said delivery device is swung out of active position, indicators for determining the relative positions of said cylinder and the delivery device, an auxiliary tooth on a plurality of said gears for guiding them into register when said delivery device is returned to active position to effect the correct timing relation of said grippers to said cylinder.

14. The combination with a press having a sheet carrying cylinder, a sheet delivery device pivotally supported to be swung in relation to said cylinder, and including sheet carrying means and means for manually positioning said sheet carrying means preparatory to said sheet device being returned into active relation with said cylinder.

15. The combination with a press having a sheet carrying cylinder, a pivotally mounted sheet delivery device for receiving sheets from said cylinder, flexible means for lifting one end of said delivery device, a winding drum for operating said flexible lifting means and a brake for said drum.

16. The combination with a press having a sheet carrying cylinder, a sheet delivery device pivotally mounted to swing toward and from said cylinder, flexible means for lifting said delivery device, a winding drum for said flexible means and a brake co-acting with said drum and operative only during the lowering action of said delivery device.

17. The combination with a press having a sheet carrying cylinder, a sheet delivery device pivotally mounted to swing toward and from said cylinder, a flexible member for lifting said delivery device, a winding drum, a ratchet device, and a brake acting on said drum through said ratchet device whereby said brake is effective during the lowering operation of said delivery device.

Signed at New London, county of New London and State of Connecticut, this 27th day of August, 1926.

FRED S. ENGLISH.