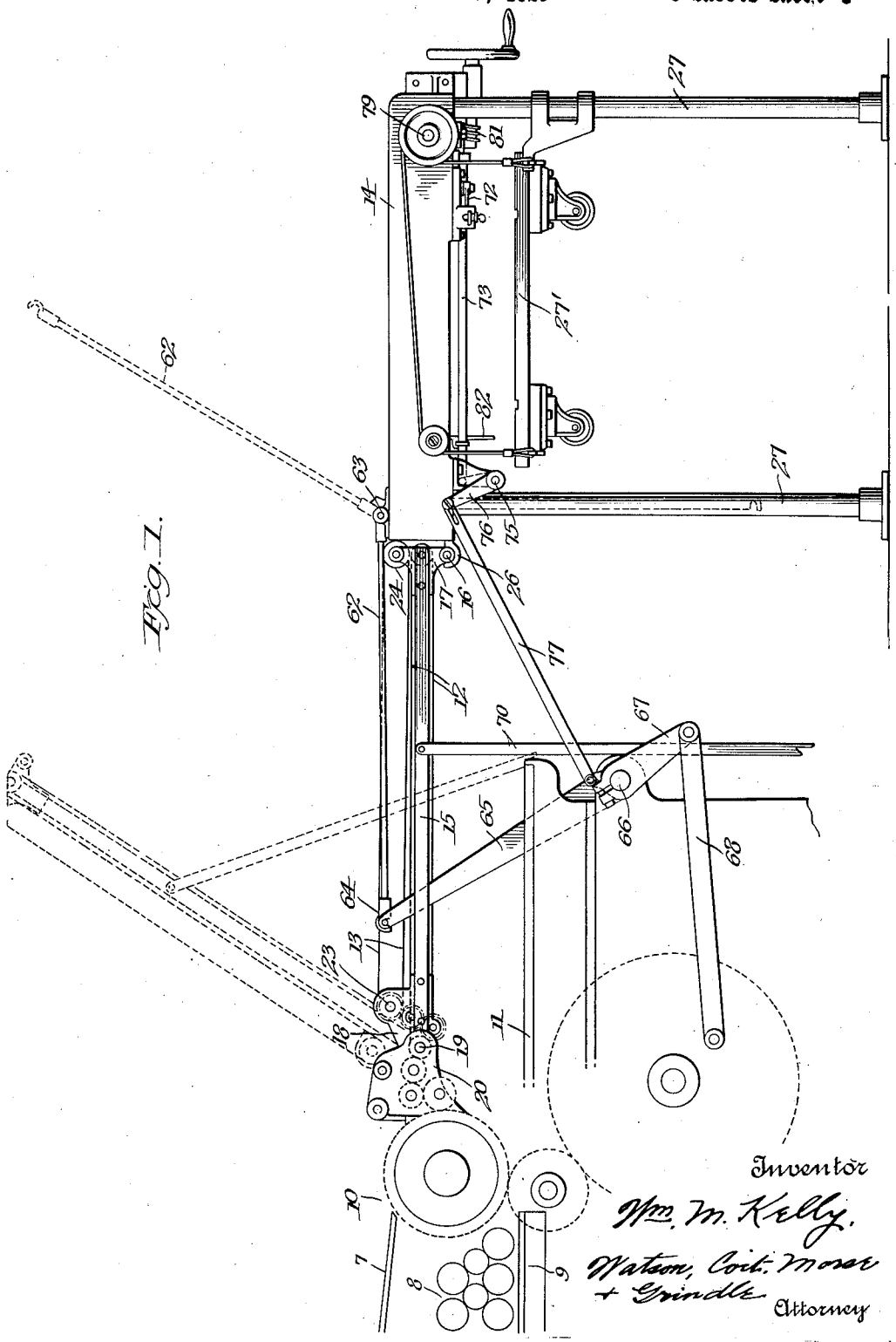
Oct. 18, 1927. 1,645,993

W. M. KELLY

EXTENSION SHEET DELIVERY

Filed June 3, 1925 5 Sheets-Sheet 1



Oct. 18, 1927. 1,645,993

W. M. KELLY

EXTENSION SHEET DELIVERY

Filed June 3, 1925 5 Sheets-Sheet 2

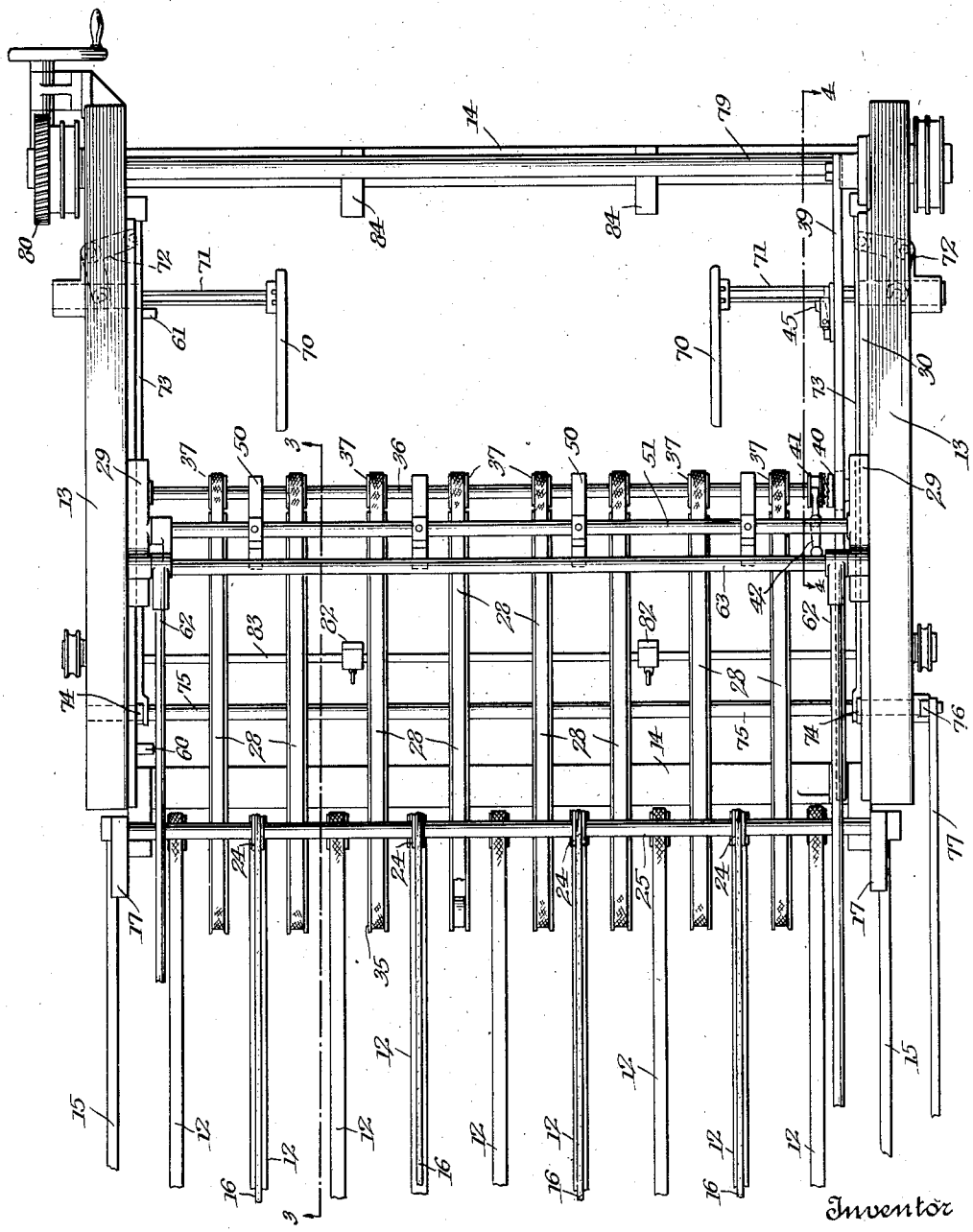


Fig. 2.

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Oct. 18, 1927. **1,645,993**

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EXTENSION SHEET DELIVERY

Filed June 3, 1925 5 Sheets-Sheet 3

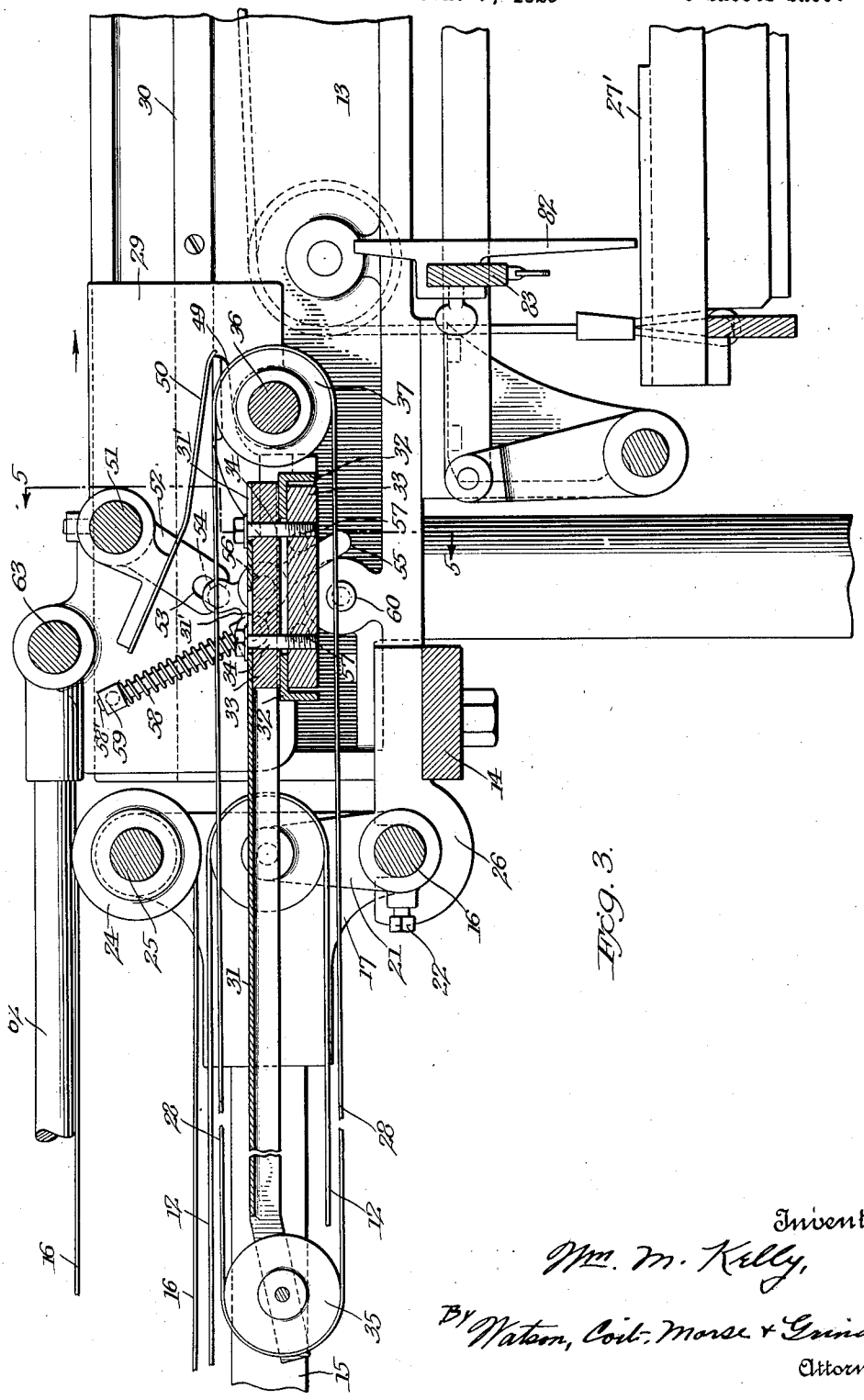


Fig. 3.

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EXTENSION SHEET DELIVERY

Filed June 3, 1925 5 Sheets-Sheet 4

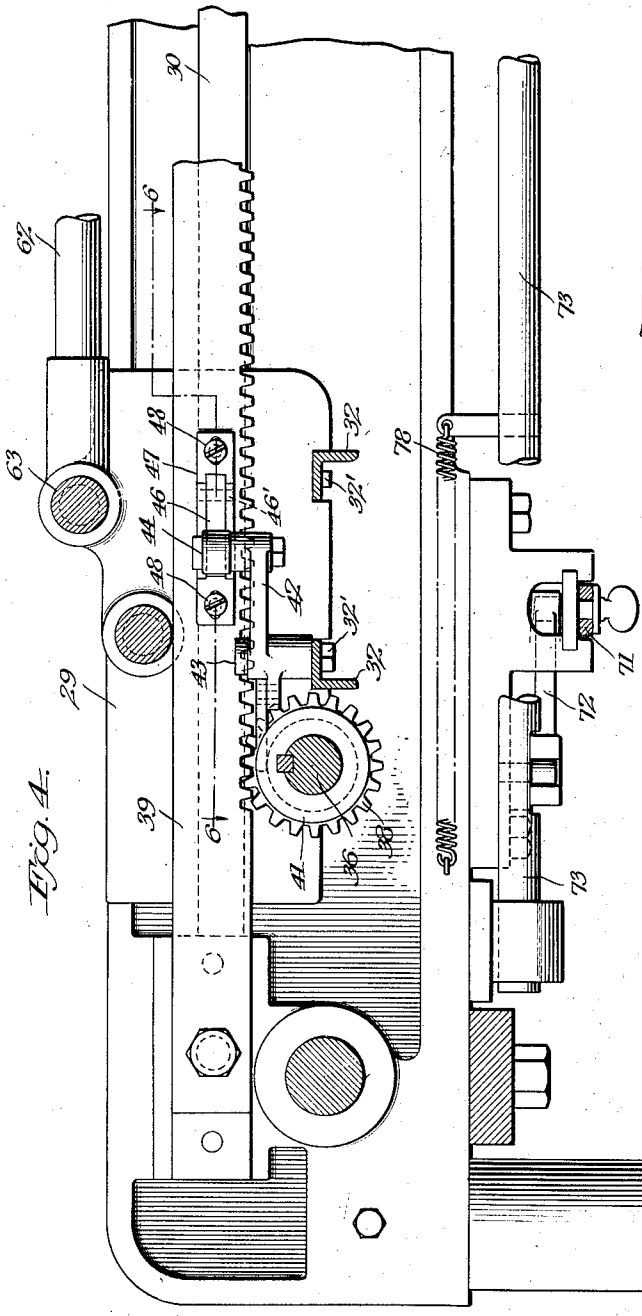


Fig. 4.

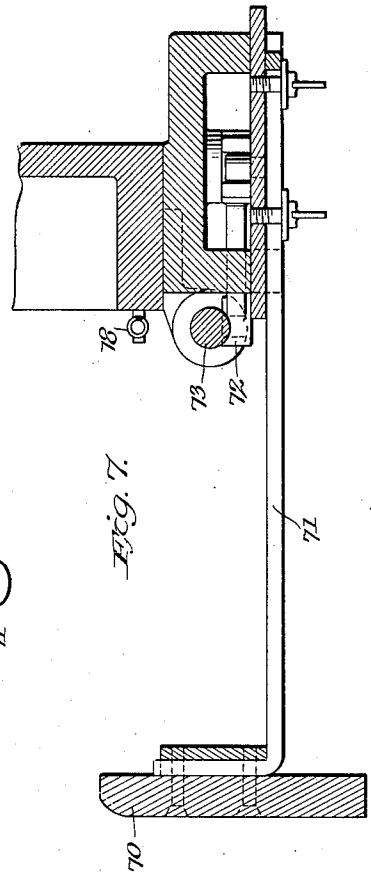


Fig. 7.

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Oct. 18, 1927. 1,645,993

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EXTENSION SHEET DELIVERY

Filed June 3, 1925 5 Sheets-Sheet 5

Fig. 5.

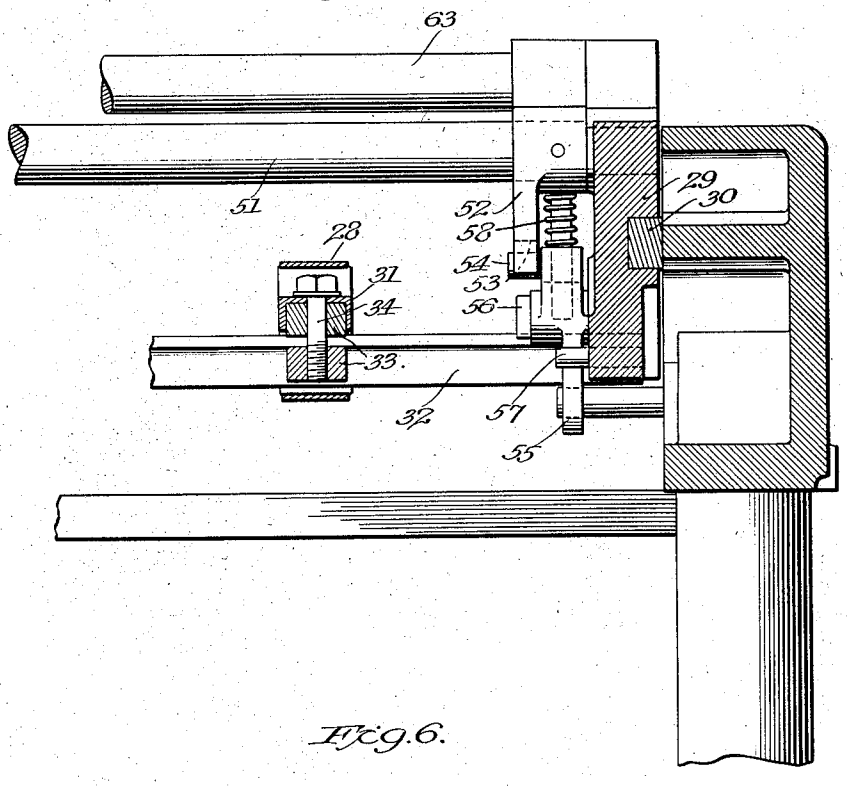
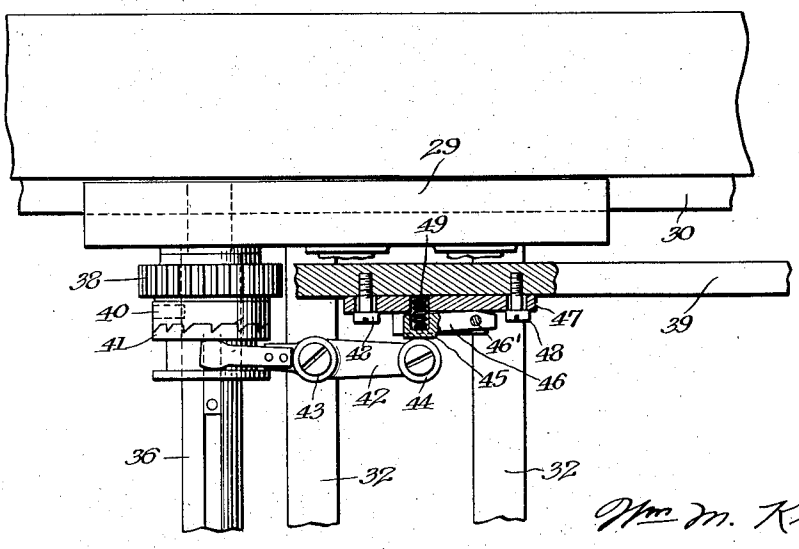


Fig. 6.



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Patented Oct. 18, 1927. 1,645,993

UNITED STATES PATENT OFFICE.

WILLIAM M. KELLY, OF WESTFIELD, NEW JERSEY.

EXTENSION SHEET DELIVERY.

Application filed June 3, 1925. Serial No. 34,687.

The present invention relates to sheet delivery mechanism adapted particularly for use with printing presses of the bed and cylinder type.

One of the principal aims of the present invention is to provide an extension delivery including a frame that may be raised without disturbing its actuating mechanism, so that access may be had to parts under the same.

Another aim is to provide means whereby parts may be adjusted to afford an unobstructed passageway between the end of the press and a delivery table spaced from said end.

This application is a continuation in part of my copending application filed August 6, 1921, Serial No. 490,290, wherein is shown an extension sheet delivery for a bed and cylinder press, comprising a sheet receiving table spaced from the delivery end of the press sufficiently to provide a space for workmen and a set of continuously running tapes less than head high bridging the space between the press and the delivery table adapted to receive sheets stripped from the cylinder and convey them to the delivery table, said tapes being mounted on a pivoted frame and driven by gearing including a wheel coaxial with the pivots of the frame, whereby the tapes can be raised without disturbing the gearing whenever it is desired to provide an unobstructed space for workmen at the end of the press.

In addition to the structure shown in my copending application, the present application includes a reciprocating sheet carriage in the form of a set of endless tapes telescoping with the continuously moving tapes and intermittently driven so as to receive the sheets from the continuously moving tapes and deposit them on the table, the construction being such that the continuously moving tapes can be raised to provide a passageway between the table and press when the reciprocating tapes have been moved to the outer limit of their throw. The present invention, therefore, includes in addition to the form of extension delivery shown in my copending application, the combination therewith of a reciprocating carriage of the type mentioned, permitting the raising movements of the extension delivery, and also a number of constructional details of the extension delivery, as will hereinafter clearly appear.

Briefly stated, the present invention comprises a press having the cylinder intermediate its ends, a delivery table spaced from the delivery end of the press, and means to take sheets from the cylinder and deliver them to said table, said means being disposed at an elevation substantially not more than head high, and being adapted to be retracted without disturbing the actuating mechanism, to provide a free passage between the press and the delivery table, and to permit free access to the form on the bed, or other parts disposed between the cylinder and the delivery end of the press.

Referring to the accompanying drawings:

Figure 1 is a side view of the sheet delivery mechanism, showing a fragment of a printing press;

Figure 2 is a plan view;

Figures 3 and 4 are vertical sections respectively on lines 3—3 and 4—4 of Figure 2, showing on an enlarged scale certain details of the delivery mechanism;

Figure 5 is a transverse vertical section on line 5—5 of Figure 3;

Figure 6 is a horizontal section on line 6—6 of Figure 4, and

Figure 7 is a section through the jogger mechanism taken on line 7—7 of Figure 2.

The sheet delivery mechanism embodying the present invention is illustrated in connection with a bed and cylinder press of the two revolution type, the cylinder being located intermediate the ends of the press. The press includes an impression cylinder 10 and a frame 11, on which the bed 9 is slidingly mounted, being reciprocated by any suitable mechanism. The inking mechanism is shown at 8, being located under the means 7 for advancing sheets to the cylinder. The bed reciprocates into the spaces between the cylinder and the delivery end of the press, and free access to the form may be had by raising the delivery frame subsequently described herein.

The printed sheets stripped from cylinder 10 are received between continuously running tapes 12 and cords 13, and are conveyed thereby to reciprocating sheet delivery mechanism mounted in a frame 14 spaced from the end of press frame 11. These continuously running tapes and cords are mounted in a frame comprising side bars 15 and a tie rod 16, the rod 16 being secured to brackets 17 attached to the outer ends of bars 15. The inner ends of the bars are attached to brackets 18 which are swung on a shaft 19

journaled in brackets 20 rigid with the cylinder housings. Shaft 19 is continuously rotated in one direction during the operation of the press from the large gear concentric with the cylinder through the train of gear wheels clearly indicated in Figure 1. The tapes 12 pass over pulleys secured to shaft 19 and over pulleys journaled on upstanding arms 21 which are adjustably secured to tie rod 16 by means of set screws 22 (see Figure 3). The cords 13 pass over driving pulleys secured to a shaft 23 journaled in brackets 18 and over idler pulleys 24 rotatable on a rod 25 secured to the upper ends of brackets 17. Shaft 23 is driven from shaft 19 through a train of gear wheels indicated in Figure 1. It will be observed therefore that the frame carrying the tapes and cords can be swung upwardly from the position shown in Figure 1, about the axis 19, without disturbing the driving connections of said tapes and cords. When the tape frame is in the position of Figure 1, it is supported by lugs 26 on frame 14, said lugs being formed with upwardly opening sockets in which the tie rod 16 rests.

The frame 14 supporting the delivery table, is spaced from the press and is an open rectangular structure supported on the tops of four pedestals 27. Mounted in this frame is a reciprocatory sheet delivery mechanism adapted to take sheets from tapes 12 and drop them on to a delivery table or board 27'. This mechanism includes a set of endless tapes 28 supported on a reciprocating carriage comprising connected slides 29 mounted on parallel ways 30 secured to the side members of frame 14. The tape supports each consist of a rigid finger 31 adjustably secured to transverse members carried by the slides, the fingers projecting from such transverse members towards the press. Referring particularly to Figures 3, 4 and 5, it will be observed that a pair of parallel angle irons 32 are secured to the respective slides 29 by having their ends fitting notches formed in the under sides of said slides and fastened by means of bolts 32' (see Figure 4). Each of the fingers 31 consists of a metal bar having in cross section the shape of an inverted U as clearly shown in Figure 5. These bars are clamped at longitudinally spaced points on angle irons 32 by means of upper and lower blocks 33 engaging the top and bottom faces respectively of the horizontal flanges of angle irons 32, bolts 34 being provided to clamp the blocks to the angle irons and to secure the fingers to the upper blocks. The fingers are provided with longitudinal slots 31' for the passage of bolts 34 and to permit longitudinal adjustment of the fingers with respect to the carriage. The end portions of the fingers are downwardly inclined and have their web portions cut away to provide bifurcations in which the tape rollers 35 are journaled (see Figure 3).

The channel shape of the fingers 31 together with the fastening and support thereof at two longitudinally spaced points eliminates all vibration or displacement of the free ends of the fingers, even at high speeds, one of the bad features of this type of delivery as previously constructed.

Secured on a shaft 36 which is journaled at its ends in the slides 29 are tape rollers 37 equal in number and in longitudinal alignment with rollers 35, a tape 28 passing over each pair of aligned rollers 35, 37. Shaft 36 has loosely mounted thereon at the inside of one of the slides a toothed gear 38 (see Figure 4) which meshes with rack teeth formed in the under side of a bar 39 which is secured at its end to the frame 14 and which extends longitudinally along the inside of the path of the adjacent slide 29, the slide reciprocating in the space between the bar 39 and the frame (see Figure 6). Referring particularly to Figure 6, gear 38 has a hub 40 formed with ratchet teeth projecting parallel to the axis of said gear. Splined on shaft 36 is a collar 41 having ratchet teeth complementary to the teeth on hub 40 and formed with an annular groove engaged by one end of a lever 42 fulcrumed on a pin 43 secured to one of the angle irons 32, the other end of the lever having a roller 44 adapted to engage a cam 45 when the carriage reaches the outer limit of its movement. Cam 45 is formed on a member 46 which is pivotally mounted on a vertical pin 46' between spaced horizontal flanges projecting from a piece 47 secured by screws 48 to rack bar 39, the piece 47 being provided with elongated apertures for the passage of screws 48 whereby cam 45 may be longitudinally adjusted. Cam 45 has a yielding coaction with roller 44 to prevent shock and minimize wear, such coaction being effected by a spring 49 which tends to hold the cam inwardly or yieldingly against the roller, the inward movement of the cam being limited by the engagement of the tail end of member 46 with piece 47.

The construction of this clutch is important for the reason that clutches of the roller, pawl and ratchet type, and the like, are not sufficiently dependable or will break when the delivery is operated at high speeds, such as 3500 sheets per hour and up. It was only after many experiments and operating various devices in presses installed in printing shops, that I finally discovered the trouble and conceived the present device, which operates continuously without a failure.

A set of four pairs of grippers are provided to retain the sheets during the outward movement of the reciprocating tapes 28. Each pair consists of a lower rigid finger 49 (see Figure 3) secured to one of

the angle bars 32 and extending therefrom upwardly and outwardly over tape shaft 36, and an upper spring finger 50 secured to a collar fixed on a shaft 51 which is rotatably mounted at its ends in the slides 29. Shaft 51 is automatically operated at the limits of movement of the reciprocating carriage to open and close the grippers by means of mechanism shown particularly in Figures 3 and 5. Pinned on shaft 51 just inside one of the slides 29 is an arm 52 in the free end of which is an open slot 53 engaged by a pin 54 projecting horizontally from the upper end of a lever 55 fulcrumed on a pin 56 secured to the carriage slide. The lower arm of lever 55 is adapted to engage stop pins 57 projecting from slide 29, and a spring 58 is adapted to hold the lever against one or the other stop pin. Spring 58 surrounds a rod 58′ which is pivoted at its lower end to an arm of the lever 55 and which slidingly engages a block 59 horizontally pivoted to carriage slide 29, the spring being compressed between this collar and between an annular shoulder formed on the lower end of the rod. A pin 60 (see Figure 3) secured to the frame is adapted to engage the lever 55 when the carriage approaches the limit of its inward movement, and a similar pin 61 (see Figure 2) is adapted to engage said lever when the carriage approaches the limit of its outward movement (movement away from the press).

The means illustrated for reciprocating the carriage comprises a pair of links 62 which are sleeved at their outer ends on a cross shaft 63 mounted in ears extending upwardly from slides 29. The inner ends of links 62 have hooks 64 which normally engage over laterally projecting pins secured to the upper ends of arms 65 rigid with a rock shaft 66 extending across the delivery end of the press and mounted in bearings on the press frame. An arm 67 is secured to one end of rocker 66 and has its free end pivoted to one end of a link 68, the other end of which is pivoted to some suitable rotating element of the press operating gear.

Jogger mechanism is shown in connection with the feed board and delivery, such mechanism comprising side jogger pads 70 secured to slidably mounted transverse rods 71. Rods 71 are reciprocated by bell cranks 72 connected to longitudinal rods 73 which in turn are connected to arms 74 secured to a transverse shaft 75 (see Figure 1). An arm 76 on one end of shaft 75 has a pin and slot connection with a link 77 pivoted to an arm rigid with rocker shaft 66. The connection of link 77 with the arm on rocker 66 comprises a laterally projecting pin on the arm and a hook on the link permitting easy disconnection of these parts. The joggers are moved in one direction by the connections described and in the other direction by springs 78 which are secured at one of their ends to pins on the respective rods 73 and at their other ends to frame 13 (see Figure 4).

The delivery table 27′ is slidably mounted on the two outer pillars 27 and is adapted to be raised and lowered manually by the connections shown in Figures 1 and 2. It will be seen that the table is suspended at its four corners by cords which pass over idler and driving pulleys, and that the driving pulleys are secured on a shaft 79 provided at one end with a worm wheel 80 engaging a worm 81 on a hand-wheel shaft. Front stops for the sheets are indicated at 82 mounted on a transverse rod 83 and back stops are indicated at 84.

The operation of the delivery mechanism is as follows:

A sheet stripped from cylinder 10 (by any of the well-known devices) passes on to the continuously moving tapes 12 and is forwarded thereby to the reciprocating sheet delivery mounted on frame 14, being properly held down on the tapes by the cords 13 which operate at the same velocity as the tapes. The operating mechanism is so timed that while the sheet is moving from the cylinder towards the delivery on frame 14, the reciprocating carriage on which the tapes 28 are mounted is moving towards tapes 12 and when the front edge of the sheet is projected from tapes 12, tapes 28 will have telescoped with tapes 12 and will thus be in position to receive the sheet, as will be clearly apparent from an inspection of Figure 3. It will be understood that since the upper runs of tapes 28 are below the plane of the upper runs of tapes 12, the telescoping movement does not disturb the position of the sheet on tapes 12. When the front edge of the sheet passes between the grippers 49, 50, lever 55 engages pin 60 and is moved thereby over the dead center of spring 58 with respect to the pivot of said lever, spring 58 thereupon instantly moving lever 55 against the stop pin 57 and causing the spring grippers 50 to snap down and clamp the front edge of the sheet against the lower fingers 49, the parts now being in the relative positions shown in Figure 3. The reciprocating carriage then moves back to position the sheet over the delivery board 27′. In this backward movement the shaft 36 is not rotated to drive tapes 28 with respect to the carriage for the reason that the rotation of toothed wheel 38 by the rack is in such a direction that the slope of the ratchet teeth on hub 40 and collar 41 causes disengagement of said teeth, collar 41 moving longitudinally on shaft 36 to permit such disengagement. When the carriage approaches the limit of its backward movement, the grippers 50 are raised to release the sheet by engagement of lever 55 with pin 61, such engagement caus-

ing the lever to move with a quick snap action to the opposite limit of its movement from that shown in Figure 3, as will be obvious. Substantially simultaneously with the opening of the grippers, the roller 44 on lever 42 engages cam 45, as shown in Figure 6 and moves clutch collar 41 into engagement with hub 40 of gear 38. The carriage now moves forward, the upper runs of the tapes 28 being caused to move backwardly with respect to the carriage at the same velocity with which the carriage moves forward, it being observed that the direction of rotation of gear 38 by the rack is now such that the rotation is transmitted to collar 41 through the coaction of the perpendicular faces of the ratchet teeth, so that there are no components tending to disengage the teeth. The sheet is therefore projected from tapes 28 at the same velocity as that with which they are carried forward by the bodily movement of said tapes and hence the sheet will remain over the delivery board and will drop thereon as the tapes move forward from beneath it.

Whenever it is desired to provide a passageway between the end of the press and the sheet delivery frame, links 62 are unhooked from arms 65 and raised to the dotted line position shown in Figure 1; the reciprocating carriage is then moved away from the press to carry the bodily movable tapes 28 out of telescoping relation to tapes 12, whereupon frame 15 carrying tapes 12 and cords 13 is raised up about the axis of shaft 19 to a position where it is out of the way of one occupying the passage between the press and sheet delivery frame, the frame 15 being held in such position by engaging the notched end of a rod 70 with the edge of press frame 11. The jogger operating rod 77 is also detached from rocker 66 and permitted to assume a vertical position. There is thus provided a free unobstructed passage between the end of the press and the sheet delivery frame which enables the workmen to have easy access to the form.

It will be understood, in some cases the reciprocating frame carrying the telescoping tapes will not be used, that is to say, the sheet will be discharged from the tapes on the pivoted delivery frame 15 directly onto the delivery table 27'.

I am aware of Patent No. 881,223 to Brown and Johnston, and do not claim anything shown or described therein.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. The combination with a printing press having a base, of an extension sheet delivery projecting beyond the delivery end of said base, said delivery being mounted for movement to bring the same within the confines of the base.

2. The combination with a printing press having a base, of an extension sheet delivery projecting beyond the delivery end of said base, said delivery being mounted for swinging movement to retract the overhanging end substantially within the confines of the base.

3. The combination with a printing press, a cylinder intermediate the ends thereof, of an extension sheet delivery disposed over the space bewteen the cylinder and one end of the press and projecting beyond said end, said delivery including a frame, tapes carried by said frame, means pivotally supporting said frame for raising movement to give free access to parts thereunder, and means for driving said tapes operative in all swinging adjustments of said frame.

4. The combination with a printing press, of an extension delivery including a frame pivoted intermediate the ends of the press and overhanging an end thereof, sheet delivery means carried by said frame, a wheel coaxial with the pivot of said frame, means to drive said wheel, and means to actuate the sheet delivery means from said wheel, whereby the frame may be raised without disturbing the drive for the sheet delivery means.

5. In combination, a printing press, a sheet receiving table spaced from an end of the press, means for delivering a sheet from the press to said table including a frame disposed at an elevational lower than head high and projecting over the space between the press and table and means supporting said frame for withdrawal from said space to afford a free passage through said space.

6. In combination, a printing press, a sheet receiving table spaced from an end of the press, means for delivering a sheet from the press to said table including a frame disposed at an elevation not over head high and projecting over the space between the press and table and means supporting said frame on one part for raising movement to afford the operator access to said space.

7. In combination, a printing press, a sheet receiving table spaced from an end of the press, means for delivering a sheet from the press to said table including a frame disposed at an elevation lower than head high and projecting over the space between the press and table and means pivotally supporting said frame on one part for raising movement to afford the operator access to said space, tapes carried by said frame and means to drive said tapes including an element coaxial with the pivots of said frame whereby the frame may be raised without disturbing the tape driving means.

8. Apparatus of the character described including, in combination, a printing press having a cylinder intermediate the ends of the press, a horizontal bed reciprocable into the space between the cylinder and one end

of the press, a delivery frame disposed over said space and projecting beyond the end of the press, sheet delivery mechanism carried by said frame, means to actuate said mechanism, and means supporting said frame for upward swinging movement about an axis adjacent said cylinder without disturbing said actuating means, whereby access may be had to parts under said frame.

9. In a sheet delivery, in combination, a carriage mounted to reciprocate in a rectilinear path, a transverse shaft journaled on said carriage, pulleys on said shaft, belts passing over said pulleys, a gear loose on said shaft, a stationary rack engaged by said gear, said gear having axially projecting ratchet teeth, each tooth having one face inclined to a plane including said axis and its other face parallel to said plane, a collar splined on said shaft having teeth complementary to said ratchet teeth, a lever having one end engaging said collar, and a stationary cam adapted to contact the other end of said lever when the carriage approaches the limit of its movement in one direction to effect engagement of said teeth.

10. In a sheet delivery, in combination, a carriage mounted to reciprocate in a rectilinear path, a transverse shaft journaled on said carriage, pulleys fast on said shaft, belts passing over said pulleys, a gear loose on said shaft, a stationary rack engaged by said gear, said gear having axially projecting ratchet teeth, a collar mounted on said shaft to rotate therewith and to move longitudinally thereof, said collar having teeth complementary to said ratchet teeth, all said teeth being so formed that when the gear is rotated in one direction the teeth will disengage and when rotated in the opposite direction the teeth will remain in engagement clutching the shaft to the gear, and means for moving the collar to engage the teeth when the carriage approaches the limit of its movement in one direction.

11. In a sheet delivery, in combination, a carriage mounted to reciprocate in a rectilinear path, a transverse shaft journaled on said carriage, pulleys fast on said shaft, belts passing over said pulleys, a gear loose on said shaft, a stationary rack engaged by said gear, said gear having axially projecting ratchet teeth, a collar mounted on said shaft to rotate therewith and to move longitudinally thereof, said collar having teeth complementary to said ratchet teeth, said teeth being so formed that when the gear is rotated in one direction the teeth will disengage and when rotated in the opposite direction the teeth will remain in engagement clutching the shaft to the gear, a lever mounted on said carriage having one end engaging said collar, and a yieldable abutment adapted to engage the other end of said lever when the carriage approaches the limit of its movement in one direction to move the teeth into engagement.

12. In a sheet delivery, in combination, a carriage mounted to reciprocate, tapes mounted on said carriage, a transverse shaft mounted on said carriage for operating said tapes, a gear loose on said shaft, a stationary rack engaged by said gear, a clutch adapted to clutch the gear to the shaft when the gear is rotating in one direction only and means for operating said clutch when the carriage approaches the limit of its movement in one direction, said means comprising a lever mounted on the carriage and a stationary abutment.

13. In a sheet delivery, in combination, a reciprocating carriage, tapes mounted on said carriage, a transverse shaft journaled on said carriage operably connected to said tapes, a gear loose on said shaft, a stationary rack engaged by said gear, a clutch adapted to clutch the gear to the shaft and means for operating said clutch when the carriage approaches the limit of its movement in one direction, said means comprising a lever mounted on the carriage and a relatively stationary yielding abutment.

14. In a sheet delivery, in combination, a frame, a carriage reciprocable thereon and comprising a pair of parallel transverse bars, a plurality of pairs of upper and lower rectangular blocks engaging between their ends said bars, fingers of inverted channel shape in cross section fitting over said upper blocks and provided with longitudinal slots in their horizontal or web portions, bolts passing through said blocks and through said slots whereby said fingers may be clamped in adjusted positions on said carriage, rollers mounted at the free ends of said fingers, a transverse shaft journaled on said carriage, pulleys fast on said shaft, endless tapes passing over said rollers and pulleys, and means for rotating said shaft only when said carriage is moving in one direction of its reciprocation.

15. In a sheet delivery, in combination, a frame, a carriage reciprocable thereon, fingers projecting from said carriage and mounted for transverse and longitudinal adjustment with respect thereto, rollers mounted at the free ends of said fingers, a transverse shaft journaled on said carriage, pulleys fast on said shaft, endless tapes passing over said rollers and pulleys, and means for rotating said shaft only when said carriage is moving in one direction of its reciprocation.

16. In a sheet delivery, a frame, a carriage reciprocable thereon, fingers projecting from said carriage and mounted for longitudinal adjustment with respect thereto, rollers mounted at the free ends of said fingers, a transverse shaft journaled on said carriage, pulleys fast on said shaft, endless

tapes passing over said rollers and pulleys, and means for rotating said shaft only when said carriage is moving in one direction of its reciprocation.

17. A sheet delivery comprising, in combination, a frame, a carriage reciprocably mounted on said frame, tapes mounted on said carriage, a transverse shaft journaled on said carriage operably connected to said tapes, a gear loose on said shaft, a rack on said frame engaged by said gear, a clutch adapted to clutch the gear to the shaft, and means for operating said clutch when the carriage approaches the limit of its movement in one direction, said means comprising a lever mounted on the carriage and a yieldable cam adjustably mounted on the frame.

18. In sheet delivery mechanism, in combination, a reciprocating carriage, means thereon to support sheets, a transverse shaft journaled on said carriage above said supporting means, gripper fingers secured to said shaft, an arm fixed to said shaft having a slot in its free end, a lever pivoted on said carriage below said shaft having an upper arm provided with a laterally projecting pin engaging said slot and having a depending arm, stops engaging said depending arm to limit the throw of the lever, a spring adapted to hold the lever in engagement with either stop, and stationary abutments positioned to be struck by said depending arm when the carriage approaches the limit of its movement in either direction, to open and close said fingers.

19. In sheet delivery mechanism, in combination, a reciprocating carriage, means thereon to support sheets, a transverse shaft journaled on said carriage above said supporting means, gripper fingers secured to said shaft, a lever pivoted on said carriage below said shaft and operably connected therewith, a spring having its ends respectively secured to said lever and to said carriage and having its line of action passing to one side or the other of the pivotal axis of the lever when the lever is at one or the other limit of its movement, stops for limiting the movement of the lever, and stationary abutments positioned to be struck by the lever when said carriage approaches the limit of its movement in either direction, to open and close said fingers.

20. In combination with a printing press, a frame spaced from one end of the press, a reciprocating sheet delivery mechanism mounted on said frame comprising a carriage and a set of endless tapes supported thereon, a second frame pivoted at one end to the press frame and supported at its other end by the first frame, a set of endless tapes carried by said second frame with which said reciprocating tapes are adapted to telescope, and means for reciprocating said carriage comprising a rocker shaft journaled in the frame of the press and driven by the operating mechanism of the press, an upwardly extending arm rigid with said rocker shaft and a link pivoted at one end to the carriage and detachably connected at its other end to said arm.

21. In combination with a printing press, a frame spaced from an end of the press, a reciprocating sheet delivery mechanism mounted on said frame comprising a carriage and a set of endless tapes projecting therefrom towards the press, means for driving said tapes when the carriage is moving towards the press, a set of continuously running tapes bridging the space between said frame and press, said reciprocating tapes adapted to telescope with said continuously running tapes, detachable connections for reciprocating said carriage from the press operating gear and means supporting said continuously running tapes for removal from the space between the press and said frame.

22. In combination with a printing press, a frame spaced from an end of the press, reciprocating sheet delivery mechanism mounted on said frame comprising a carriage and a set of endless tapes projecting therefrom towards the press, means for driving said tapes when the carriage is moving towards the press, a set of continuously running tapes bridging the space between said frame and press, said recirpocating tapes adapted to telescope with said continuously running tapes when approaching the limit of their movement towards the press, and means for removing said continuously running tapes from the space between the press and said frame.

23. In sheet delivery mechanism, in combination, a reciprocating carriage, means thereon to support sheets, a transverse shaft journaled on said carriage above said supporting means, stops on said carriage for limiting the rotation of said shaft, gripper fingers secured to said shaft, relatively stationary abutments, means on said carriage adapted to strike said abutments when the carriage approaches the limits of its movements for initially rotating said shaft and spring means for completing the rotation of said shaft.

24. A sheet delivery mechanism comprising, in combination, a set of continuously running tapes and a set of bodily reciprocable endless tapes telescoping therewith, means for driving said bodily reciprocating tapes during the bodily movement thereof towards the continuously moving tapes, and means supporting the continuously running tapes for raising movement and holding them in raised position without disturbing their operating connections.

25. A sheet delivery mechanism compris-

ing, in combination, two devices spaced from each other to provide a passageway, a set of continuously running tapes mounted on a frame pivoted to one of said devices and bridging the space between the same, a set of bodily reciprocating endless tapes mounted on the other device and telescoping with said continuously running tapes and means supporting the continuously running tapes for raising movement to provide an unobstructed passageway between said devices.

26. A sheet delivery mechanism comprising, in combination, two devices spaced from each other to provide a passageway, a frame pivoted at one end to one of said devices and supported at its free end on the other device, endless tapes carried by said frame, means for operating said tapes comprising a wheel coaxial with the pivots of said frame, and a set of bodily reciprocating endless tapes mounted on said other frame and telescoping with said continuously running tapes.

27. In combination, a press having a cylinder, a delivery table spaced from one end of said press and structurally independent thereof, a sheet delivery adapted to take sheets from the cylinder and deposit them on said table including a set of continuously running tapes bridging the space between said cylinder and table, a reciprocating frame mounted on said table adapted to transfer sheets from said tapes to said table and including devices telescoping between said tapes, and means supporting said tapes for raising movement to provide an unobstructed passageway between said press and table, said devices at one end of their reciprocation being retracted out of said passageway.

28. In a sheet delivery having a reciprocating frame and fingers projecting therefrom, a pair of slightly spaced rigid transverse members carried by said frame and means securing each finger adjacent one end to each member.

In testimony whereof I hereunto affix my signature.

WILLIAM M. KELLY.