M. A. DROITCOUR.

SHEET ADVANCING MECHANISM.

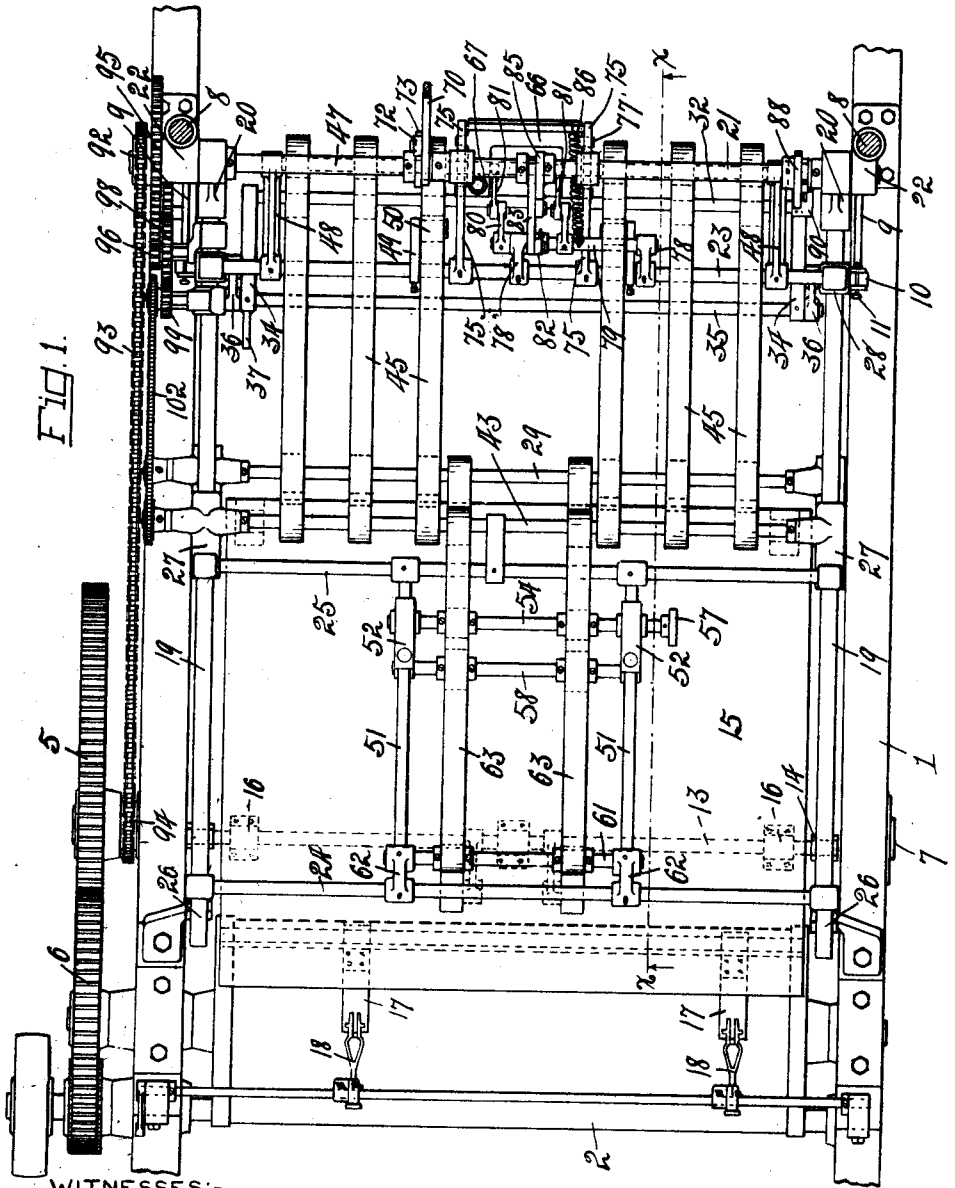
APPLICATION FILED DEC. 8, 1914.

1,170,053.

Patented Feb. 1, 1916.

4 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:-

R. G. Allen

F. E. Aul.

INVENTOR.

Michael A. Droitcour,

By Burns, Brown & Crampton,

His attys.

M. A. DROITCOUR.

SHEET ADVANCING MECHANISM.

APPLICATION FILED DEC. 8, 1914.

1,170,053.

Patented Feb. 1, 1916.

4 SHEETS—SHEET 2.

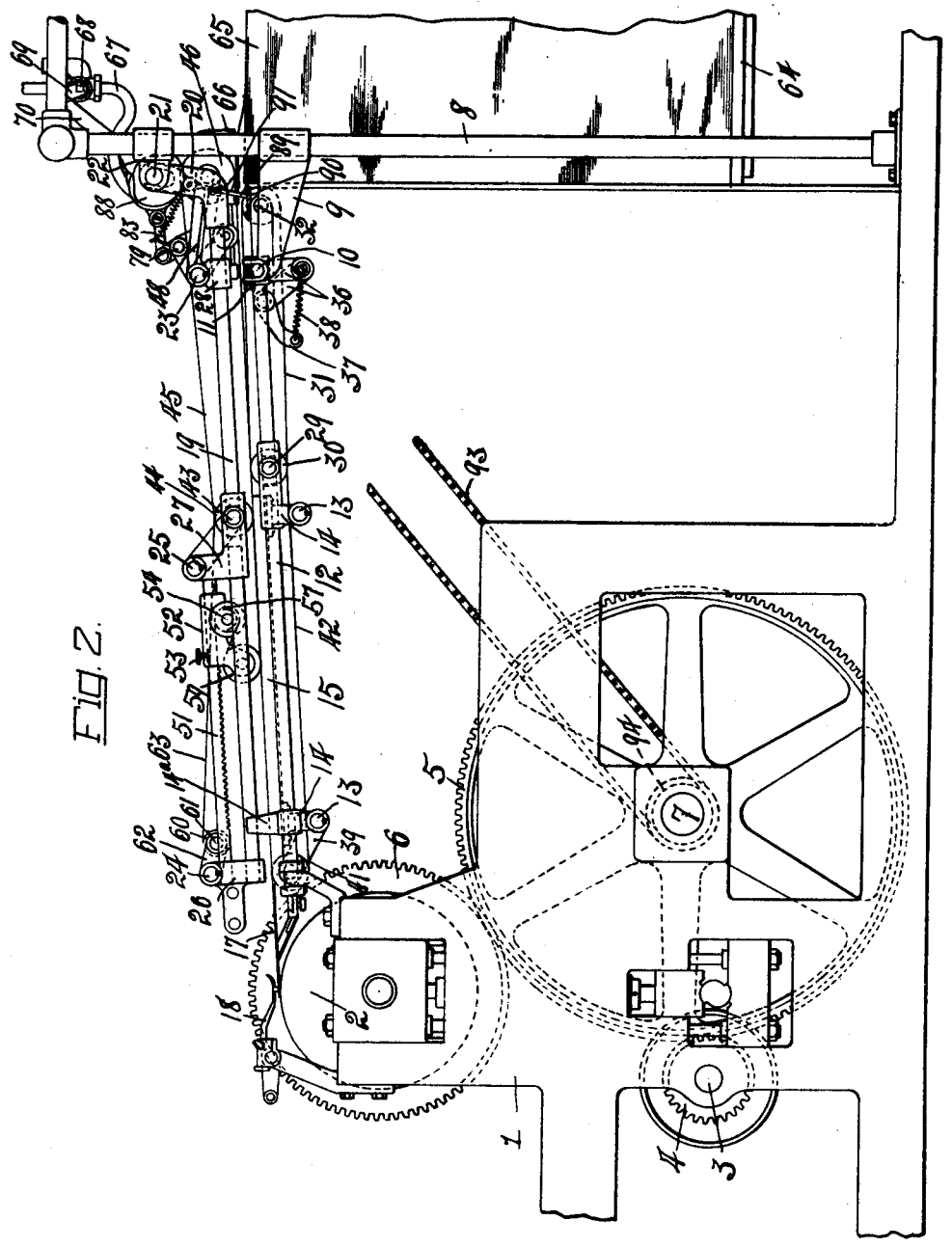


Fig. 2.

WITNESSES:-

R. S. Allen.

F. E. Aul.

INVENTOR.

Michael A. Droitcour,

By Owen, Owen & Crampton,

His attys.

M. A. DROITCOUR.

SHEET ADVANCING MECHANISM.

APPLICATION FILED DEC. 8, 1914.

1,170,053.

Patented Feb. 1, 1916.

4 SHEETS—SHEET 3.

Fig. 3.

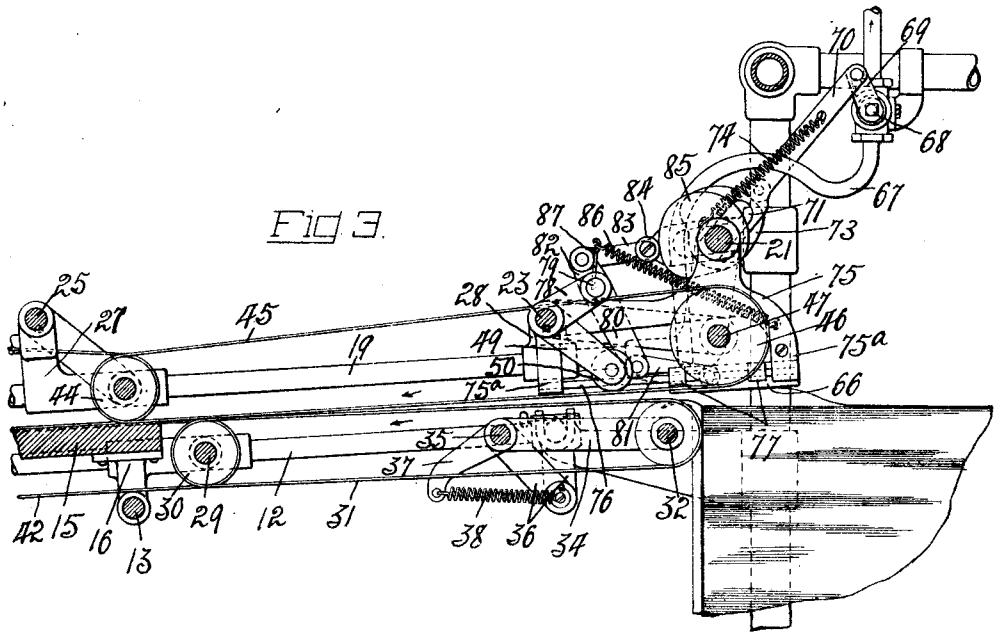
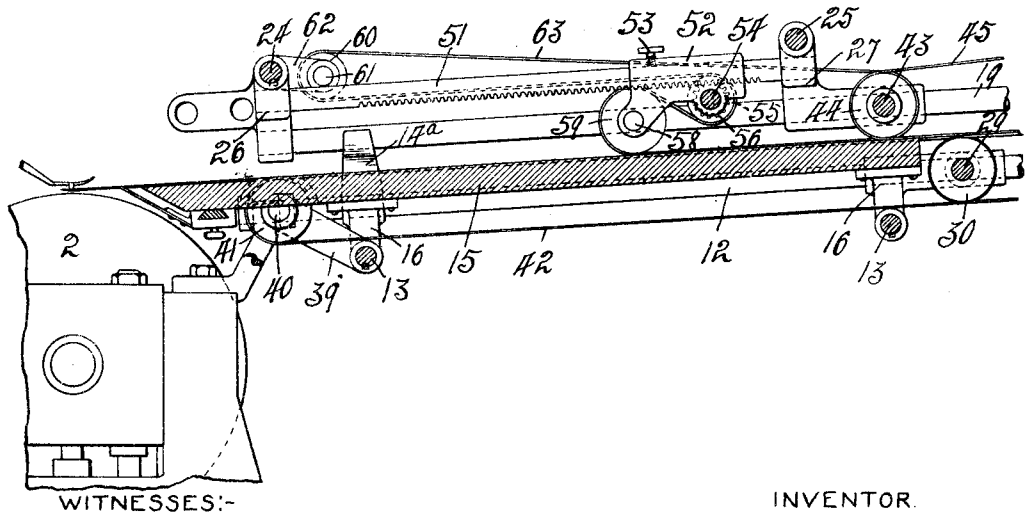


Fig. 4.



WITNESSES:-

R. G. Allen.

F. C. Aul.

INVENTOR.

Michael A. Droitcour,

By Owen, Owen & Crampton,

His attys.

M. A. DROITCOUR.

SHEET ADVANCING MECHANISM.

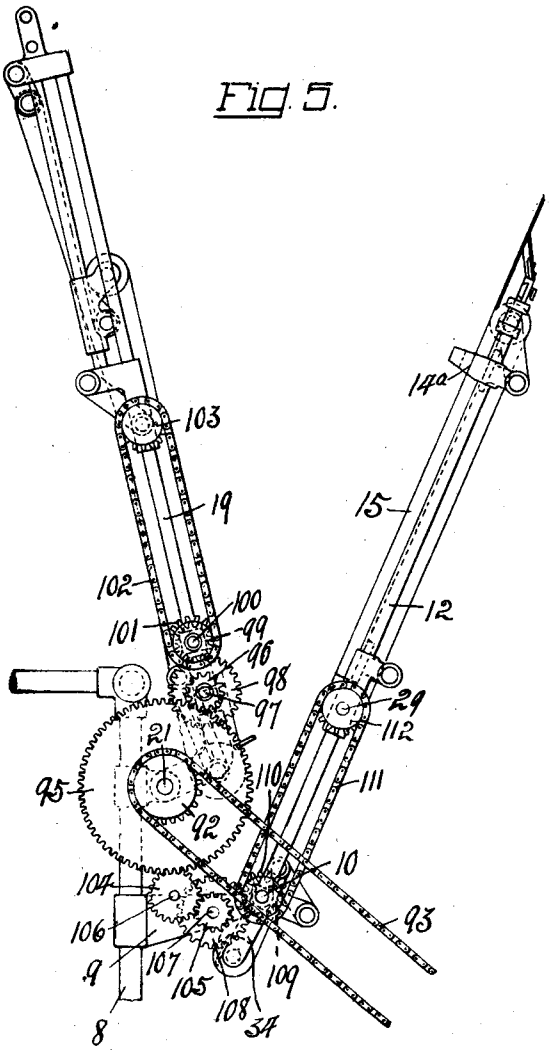
APPLICATION FILED DEC. 8, 1914.

1,170,053.

Patented Feb. 1, 1916.

4 SHEETS—SHEET 4.

Fig. 5.



WITNESSES.

R. G. Allen.

F. E. Aul.

INVENTOR.

Michael A. Droitcour,

By Owen, Owen & Crampton

His attys.

UNITED STATES PATENT OFFICE.

MICHAEL A. DROITCOUR, OF DELPHOS, OHIO.

SHEET-ADVANCING MECHANISM.

1,170,053. Specification of Letters Patent. Patented Feb. 1, 1916.

Application filed December 8, 1914. Serial No. 876,037.

To all whom it may concern:

Be it known that I, MICHAEL A. DROITCOUR, a citizen of the United States, and a resident of Delphos, in the county of Van Wert and State of Ohio, have invented a certain new and useful Sheet-Advancing Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates particularly to sheet advancing means for printing presses or the like.

The object of my invention is the provision of an improved mechanism of this character which is simple and efficient in its construction and operation, and is capable of easy and rapid adjustment to suit it for the feeding of sheets of different lengths.

A further object of my invention is the provision of mechanism of this character having upper and lower frame parts and associated sheet advancing means, which are capable of being independently swung in an easy and efficient manner from horizontal operative to vertical inoperative positions, or substantially so, whereby to enhance the practicability and commercial value of mechanisms of this character.

Further objects and advantages of the invention will be apparent from the following detailed description thereof.

The invention is fully described in the following specification, and while, in its broader aspect, it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a plan view of a portion of a printing press with the mechanism embodying my invention associated therewith. Fig. 2 is a side elevation thereof with parts removed. Figs. 3 and 4 are enlarged sections of the rear and forward portions of the mechanism taken on the line x, x in Fig. 1, with parts removed, and Fig. 5 is a side elevation of the opposite side of the mechanism from that shown in Fig. 2 with one of the two frames which carry the coöperating sheet advancing tapes partially and the other completely raised to inoperative position.

Referring to the drawings, 1 designates the frame of a printing press, and 2 the customary platen cylinder, which is mounted therein, said cylinder, in the present instance, being connected to a drive shaft 3 through a train of gears 4, 5, 6, the gear 6 being mounted on a shaft 7. Mounted at the rear of the platen cylinder, at a distance therefrom, is a frame having two upright corner standards 8, 8, which are spaced transversely of the press frame, and preferably in line with the respective sides thereof, as shown in Figs. 1 and 2. Projecting forward from each standard 8 is a bracket-arm 9 having a bearing in its outer end for removably receiving the adjacent end of a shaft 10. The bearing openings in the arms 9 for receiving the shaft 10 are of U-form with open tops, which are closed by removable pins 11 to permit an easy transverse removal of the shaft from the bearings. Projecting forward from the shaft 10 adjacent to each bearing arm 9 is a frame bar 12, which is connected to its companion frame bar in advance of the shaft by a pair of spaced cross bars 13, 13, which are connected to the respective side bars through brackets 14. Carried by the cross bars 13, 13 between the forward end portions of the side bars 12, 12 is a table 15, which is mounted on a set of brackets or castings 16 carried by the bars 13. The table 15 projects at its forward edge over the adjacent edge of the cylinder 2 in substantially tangential relation thereto, and is provided at such edge with a plurality of forwardly projecting fingers 17, on which gage fingers 18 rest when in lowered sheet obstructing position, as is well understood in the art.

Mounted over the table frame, in substantially parallel relation thereto, is an upper frame having the opposed side bars 19, which bars are provided at their rear ends with upwardly angled arms 20 that have loose bearings in the respective ends of a shaft 21. This shaft is journaled at its ends in bearing arms 22, which are shorter than the bearing arms 9, 9, and project from the standards 8, 8 above such arms. The frame bars 19 are rigidly connected adjacent to their rear ends by a cross bar 23, at their front ends by a bar 24, and substantially midway between said bars 23 and 24 by a

bar 25. The bars 24 and 25 have their ends rigidly connected to and supported above the respective bars 19 by bearing brackets 26 and 27, respectively, and the shaft 23 is shown as being carried above the plane of the bars 19 by bearing brackets 28. When the upper frame is in its reclining or operative position the forward end portions of the side bars 19 thereof loosely rest on the upper extended end portions 14^a of the bearing brackets 14 and serve to retain the upper and lower frames in proper spaced relation.

The lower or table frame 12—15 carries a cross-shaft 29, which is suitably journaled at its ends to the respective brackets 14 at the rear of the table 15, and carries a plurality of tape-wheels 30, a portion of which are connected by lower sheet advancing tapes 31 to registering tape-wheels on a rearwardly-disposed shaft 32. The shaft 32 is carried at the rear ends of a pair of arms 34, which project rearward from a rock shaft 35 to which they are fixed. This rock shaft 35 is journaled in angled arms 36, which project downward and then upward and forward from the lower frame shaft 10, or from a convenient part of the frame bars 12, in fixed relation thereto, as best shown in Figs. 2 and 3. It is thus apparent that the shaft 35 is mounted, in the present instance, slightly in advance of the shaft 10 and in fixed relation to the lower frame 12—15. One of the arms 34 has a tail-piece 37 projecting forward and downward therefrom and connected by a coiled contraction spring 38 to the elbow of the angled arm 36. The action of the spring 38 is such as to urge an upward rocking movement of the connected arms 34, 34 and shaft 32 for the purpose hereinafter described.

Projecting upward and forward, in the present instance, from the forward bar 13 of the table frame in fixed relation thereto are a pair of bearing arms 39, which arms, in the present instance, are disposed near the center of the bar 13 and carry a short shaft 40 at their free ends. A pair of tape-wheels 41 are mounted on the shaft 40, and these are connected by advancing-tapes 42 to registering tape-wheels 30 on the shaft 29. The tape-wheels 41 project into registering openings in the table 15, 15, with their upper peripheral edges in substantially the top surface plane of the table, as are also the upper edges of the tapes of the tape-wheels 30, thus adapting the upper portion of each tape 42 to travel in substantially the surface plane of the table, as is best shown in Fig. 4.

The upper frame of the mechanism has a cross-shaft 43 journaled at its ends in the respective brackets 27 thereof, preferably in position to stand over the rear edge of the table 15, and this shaft is provided with a plurality of tape wheels 44, which are connected by tapes 45, to respective tape-wheels 46, which are carried by a cross-shaft 47 at the rear of the upper frame. The shaft 47 is journaled at its ends in the free ends of a pair of arms 48, which project rearward from the cross-bar 23 to which they are fixed (see Figs. 1 and 2). A pair of arms 49 project downward and rearward from the shaft 23 in adjustable fixed relation thereto at the sides, in the present instance, of two of the tapes 45, and carry pressure rolls 50 at their free ends for bearing downward on the lower portion of the respective tapes 45 to resist an upward pressure of the tapes at their points of contact therewith. The tape wheel shaft 47 is preferably disposed slightly to the rear of the vertical plane of the shaft 32, as shown in Fig. 3.

Extending between the upper frame bars 24 and 25 and rigidly connecting the same are a pair of rack bars 51, which are spaced transversely of the frame and have their rack teeth on the bottom edges thereof, as shown in Fig. 4. A slide 52 is mounted for longitudinal reciprocatory movements on each rack bar 51 and is provided with a set-screw 53 for securing it to the rack bar in properly adjusted relation thereto. A shaft 54 connects and is journaled at its ends in the respective slides 52 and fixedly carries a pinion 55 in mesh with the teeth of each rack bar. The shaft 54 also carries a pair of tape-wheels 56, and is provided at one end with a hand wheel 57 to facilitate a hand turning of the shaft when it is desired to effect an adjustment of the slides relative to the rack bars 51. The slides 52 are connected in advance and below the plane of the shaft 52 by a shaft 58, which carries a pair of tape guiding rolls 59, the lower peripheral edges of which stand in approximately the surface plane of the table 15 when the frames are in operative relation, as shown in Fig. 4. The tape wheels 56 and 59 aline with each other and with tape-wheels 44 on the shaft 43 and tape-wheels 60 on a shaft 61, which is journaled in arms 62 fixedly projecting forward from the frame bar 24. A tape 63 connects and is guided in its course of movement by each of said sets of registering tape wheels, having its upper portion extending directly from one to the other of the wheels 44 and 60, and has its lower portion extending forward from the wheel 44, thence upward around the forward side of the wheel 59 and rearward and upward around the rear side of the wheel 55 and then forward to the wheel 60. The portion of the tape, which connects the wheels 44 and 59, is disposed in substantially the surface plane of the table 15 and in contact with the upper portion of the respective tape 42, the coacting portions of said tapes being forwardly driven to effect the forward feeding of a sheet entering therebetween.

It is evident that an adjustment of the slide frame, which comprises the slides 52 and shafts 54 and 58, which adjustment is effected by a turning of the shaft 54, will place the tape-wheels 59 closer to or farther from the forward edge of the table to suit the lengths of sheets being fed to the cylinder. The position of the wheels 59, or the forward ends of the lower advancing portions of the tapes 63, should be such as to stand slightly to the rear of a sheet which has been fed to the cylinder gripping position, so that such sheet will be released from between the coacting portions of the tapes 42 and 63 slightly before the sheet has been moved to stop gage coacting position.

Disposed at the rear of the sheeet advancing mechanism and mounted for vertical movements between the standards 8, 8 is a table 64, on which a pile of sheets 65 to be successively advanced to the cylinder, is mounted. The top of the pile of sheets is maintained at substantially the same height during an operation of the press by any suitable automatic mechanism. As this mechanism forms no part of the present invention the same will not be described.

The sheets, in the present instance, are successively picked up from the top of the pile and advanced into position to be engaged between the two rear sets of tapes 31 and 45 by a pneumatic mechanism, of which 66 is the sheet picking up and advancing mouth-piece. This mouth-piece has connection with a suitable suction creating means through a tube 67 in which is disposed a shut-off valve 68. The valve 68, which is of the rotary type, has its stem provided with a crank arm 69 to which one end of a bar or link member 70 is pivotally connected, the other end of said bar being forked, as shown at 71, to adapt it to straddle the shaft 21 for limited reciprocatory movements transversely thereof. The bar 70 is provided on one side thereof with a roller 72, which rides on a cam 73 that is fixed to and rotates with the shaft 21. The roller 72 is held to the periphery of the cam 73 by a coiled contractile spring 74, which connects the bar 70 and an adjacent portion of the upper frame of the advancing mechanism, as, for instance, to one of the frame arms 75. The frame arms 75 are two in number and project rearwardly from the shaft 23 at opposite sides of the sheet picking up mouth piece 66 and are loosely carried at their rear end portions by the shaft 21, as best shown in Figs. 1 and 3. The arms 75 are provided at their opposite ends with depending portions 75ª, which are connected by guide bars 76. The guide bars 76 are disposed at opposite sides of the pick-up mouth-piece 66 and project loosely through apertured ears 77 projecting from the respective sides of the mouth-piece, whereby said mouth-piece is permitted to have forward and rearward reciprocatory movements relative to the arms 75, so that the mouth-piece, when at the rear end of its stroke, may pick up a sheet from the pile and then throw such sheet forward into position to be engaged between the rear end portions of the coacting feed tapes 31 and 45.

The means for imparting reciprocatory movements to the mouth-piece will now be described.

Projecting rearward from the upper frame bar 23 adjacent to the arms 75 are a pair of bearing arms 78, which carry a short rock-shaft 79 at their free ends. A pair of rocker arms 80 project downward from the shaft 79 and have connection at their free ends with the top portion of the mouth piece 66 through respective links 81. An arm 82 projects upward from the shaft 79 and is pivoted at its free end to the forward end of a bar or link member 83, which has its rear end forked and straddling the shaft 21 for reciprocatory movements transversely thereof. A roller 84 is carried by the bar 83 at one side thereof and rides on the periphery of a cam 85 that is carried by and rotates with the shaft 21. A coiled contractile spring 86 is connected at one end to the rear end portion of one of the arms 75 and at its other end to a pin 87, which projects upward from the rock shaft 79, thus urging a rocking movement of the shaft in a direction opposed to the movement imparted thereto by the cam 85. The formation of the cam 85 is such as to cooperate with the spring 86 to impart properly timed to and fro movements to the mouth-piece 66.

Fixed to the shaft 21, in the present instance, over the left hand arm 34 is a cam 88, which has peripheral coaction with a roller carried by a thrust bar 89, the lower end of which bears downward against a plate 90, which is fixed to the rear end of said arm 34, and has its upper end forked and straddling the shaft 21 for transverse reciprocatory movements relative thereto. The bar 90 passes through a guide finger 91, which projects from one side of the adjacent upper frame arm 20. The purpose of this means is to intermittently effect a lowering of the rear end portions of the advancing tapes 35 against the upward urging action of the springs 38. The formation of the cam 88 is such that the rear end portions of the tapes 31 are held lowered relative to the tapes 45 during the advancing of a sheet by the mouth-piece 66, the tapes 31 rising in time to coact with the tapes 45 to grip the sheet when it has been advanced therebetween and released by the closing of the valve 68 in the vacuum tube 67. It will be understood that a sheet is

picked up and fed to the advancing mechanism at each complete rotation of the shaft 21.

The shaft 21, which is the main drive shaft of the sheet picking-up and advancing mechanism, carries a sprocket-wheel 92 at one end, which is connected by a chain 93 to a sprocket-wheel 94 on the shaft 7 of the press, thus communicating rotation directly from the shaft 7 to the shaft 21. The shaft 21 has a large gear 95 on the end thereof adjacent to the sprocket wheel 92, and this gear meshes with and drives a small pinion 96 on a stub-shaft 97 projecting from the adjacent side bar 19 of the upper frame. Fixed to the pinion 96 at one side thereof is a larger pinion 98, which meshes with and drives a gear 99 on a stub-shaft 100, which also projects from the frame bar 19. The gear 99 has a sprocket-wheel 101 fixed to the side thereof and this sprocket-wheel is connected by a sprocket-chain 102 to a sprocket-wheel 103 at the outer end of the tape shaft 43, which is carried by the upper frame of the mechanism. The gear 95 also meshes with and drives a small pinion 104, which in turn meshes with and drives a smaller pinion 105, said pinion being mounted respectively on stub-shafts 106 and 107 projecting from the adjacent sprocket arm 9. Fixed to the side of the pinion 105 is a larger pinion 108 which meshes with and drives a gear 109 mounted loosely on the adjacent end of the shaft 10. Fixed to the side of the gear 109 is a sprocket-wheel 110 that is connected by a sprocket-chain 111 to a sprocket-wheel 112, which is fixed to the adjacent end of the tape shaft 29. The gear trains, which connect the master gear wheel 95 to the respective driven tape shafts, are proportioned to communicate the desired sheet advancing movements to the respective shafts 29 and 43, so that the advancing of the sheets by the tapes will be timed to suit the movements of the sheet picking up and advancing mouth-piece and the running of the press, as will be understood by those skilled in the art.

The operation of my improved sheet picking up and advancing mechanism is as follows: When the sheet picking up mouth-piece 66 is at the rear end of its stroke, the cam 88 acts on the push rod 89 to effect and maintain a lowering of the rear end portions of the rocker arms 34 to retain the rear end portions of the lower tapes 31 in spaced or open sheet receiving relation to the upper tapes 45, and the cam 73 acts on the bar 70 to open the vacuum valve 68 to permit a sheet picking up suction to take place within the mouth-piece. After the opening of the vacuum valve 68 the mouth-piece controlling cam 85 permits a forward movement of the mouth-piece under the action of the spring 86, and this movement of the mouth piece draws the forward edge of the engaged sheet forward into gripping position between the rear portions of the coacting feed tapes 31 and 45. When the mouth piece has reached the limit of its forward movement, or substantially so, the vacuum controlled cam 73 will have moved sufficiently to permit a closing of the vacuum valve under the action of the spring 74, thus effecting a releasing of the engaged sheet from the mouth-piece, and the cam 88 will have moved sufficiently to permit an upward movement of the thrust rod 89 to permit a raising of the rear end portions of the lower tapes 31 under the action of the spring 38. The sheet is now advanced by the tapes 31 and 45 into position to be received between the forward sets of advancing tapes 42 and 63, the tapes 63 releasing the sheet when it has been advanced substantially to cylinder gripping or stop gage coacting position. The distance of advancing of the sheet by the feed tapes is controlled by an adjustment of the slide frame 52—54—58, which adjustment is effected by a turning of the shaft 54 due to the pinions 55 thereon engaging the teeth of the rack bars 51. The advancing of this slide frame advances or retracts the tape-wheels 59 relative to the tape wheels 44 and effects a corresponding lengthening or shortening of the sheet feeding portions of the tapes 63, which connect said tape wheels.

It is apparent that the upper and lower tape carrying frames are capable of being easily and quickly raised to inoperative upright position to facilitate access to the cylinder or rear portions of the press, the upper frame swinging on the shaft 21, as an axis, and the lower frame swinging on the shaft 10 as an axis. The swinging of the frames is accomplished without disconnecting the tape driving gear, as is evident by reference to Fig. 5, and without disconnecting or changing the adjustment of the sheet picking up and initial advancing means.

It is evident that I have provided a simple and efficient sheet advancing mechanism, which is automatically operable to pick up and initially advance a sheet to tape engaging position and then to continue the advancing of the sheet by the tapes, the tape means being adjustable to release their advancing engagement with a sheet at a predetermined point in the advancing movement of the sheet, thus enhancing the practicability and commercial value of mechanisms of this character.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts as it is capable of numerous modifications and

changes without departing from the spirit of the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is,—

1. In combination, a plurality of sets of coöperating sheet advancing means, separate frames carrying different sets of said advancing means and pivotally mounted to have independent raising and lowering movements to place them in upright or reclining positions.

2. In combination, a plurality of sets of coöperating sheet advancing means, separate frames carrying different sets of said advancing means and pivotally mounted to have independent raising and lowering movements, and means operable to drive said sets in any position of movement of said frames.

3. In combination, a plurality of sets of coöperating sheet advancing means, separate frames carrying different sets of said advancing means and being independently movable into and out of operative position, a drive member, and separate means connecting said drive member and the advancing means of the different frames to communicate advancing movements to said advancing means from said member, said connecting means remaining in driving connection with said member during a movement of the frames to and from operative position.

4. In a printing press, a feed board, and mechanical sheet feeding means having upper and lower sets of sheet advancing tapes which deliver sheets in successive order to cylinder picking-up position on the feed board and then release them.

5. In a printing press, a feed board, and mechanical means for successively feeding sheets to cylinder picking-up position on the feed board, said means embodying upper and lower runs of feeding tapes with the upper sheet advancing portion of the lower tapes in substantially flush parallel relation with the top surface of the feed board.

6. In a printing press, a feed board, and mechanical means for successively feeding sheets to cylinder picking-up position on the feed board, said means embodying upper and lower runs of feeding tapes with the upper sheet advancing portion of the lower tapes in substantially flush parallel relation with the top surface of the feed board and with the upper tapes provided with looped sheet advancing portions which are adjustable to regulate the forward feeding of the sheets by said means.

7. In a printing press, a cylinder, a feed table, mechanical means for advancing sheets to cylinder picking-up position on said table, said means comprising separately hinged upper and lower sections to permit the sections to have raising movements from operative position and one of said sections carrying the feed board.

In testimony whereof, I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

MICHAEL A. DROITCOUR.

Witnesses:
N. R. WILLIAMS,
M. F. WEGER.