T. C. DEXTER.

PAPER FEEDING MACHINE.

APPLICATION FILED SEPT. 9, 1908.

961,744. Patented June 14, 1910.

6 SHEETS—SHEET 1.

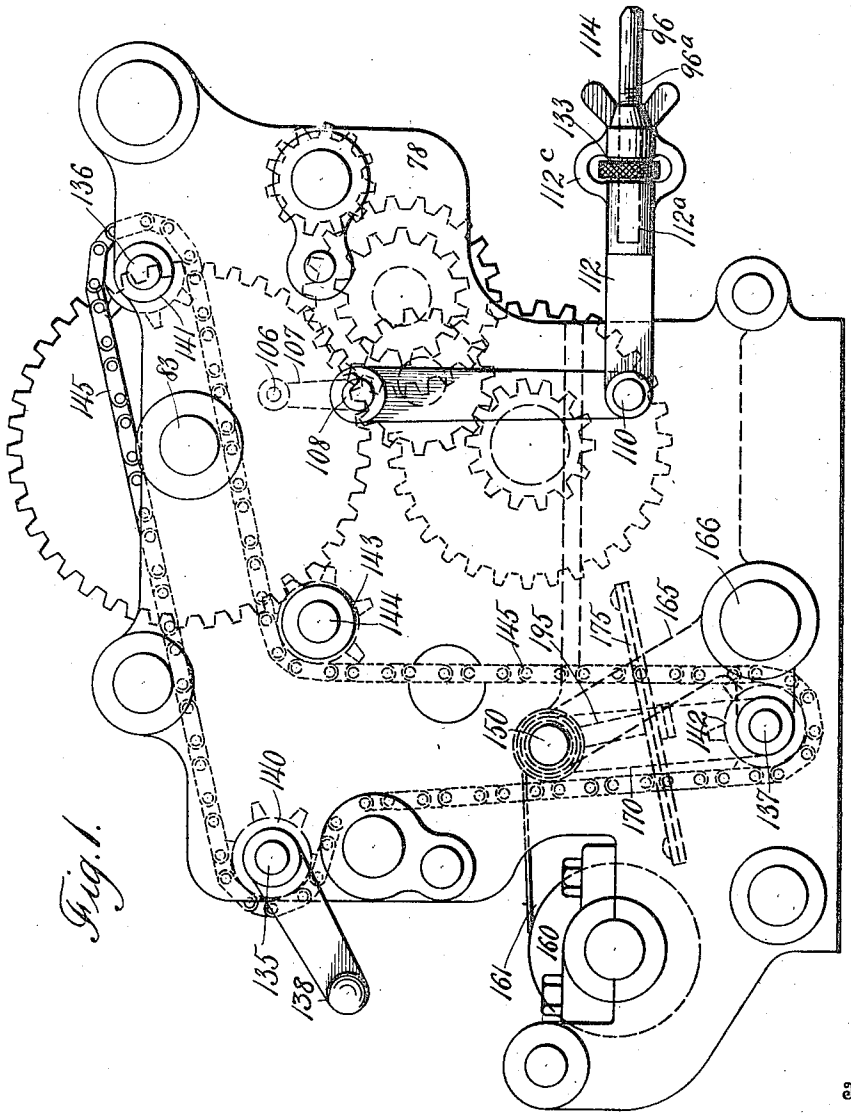

Fig. 1.

Witnesses

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6 SHEETS—SHEET 2.

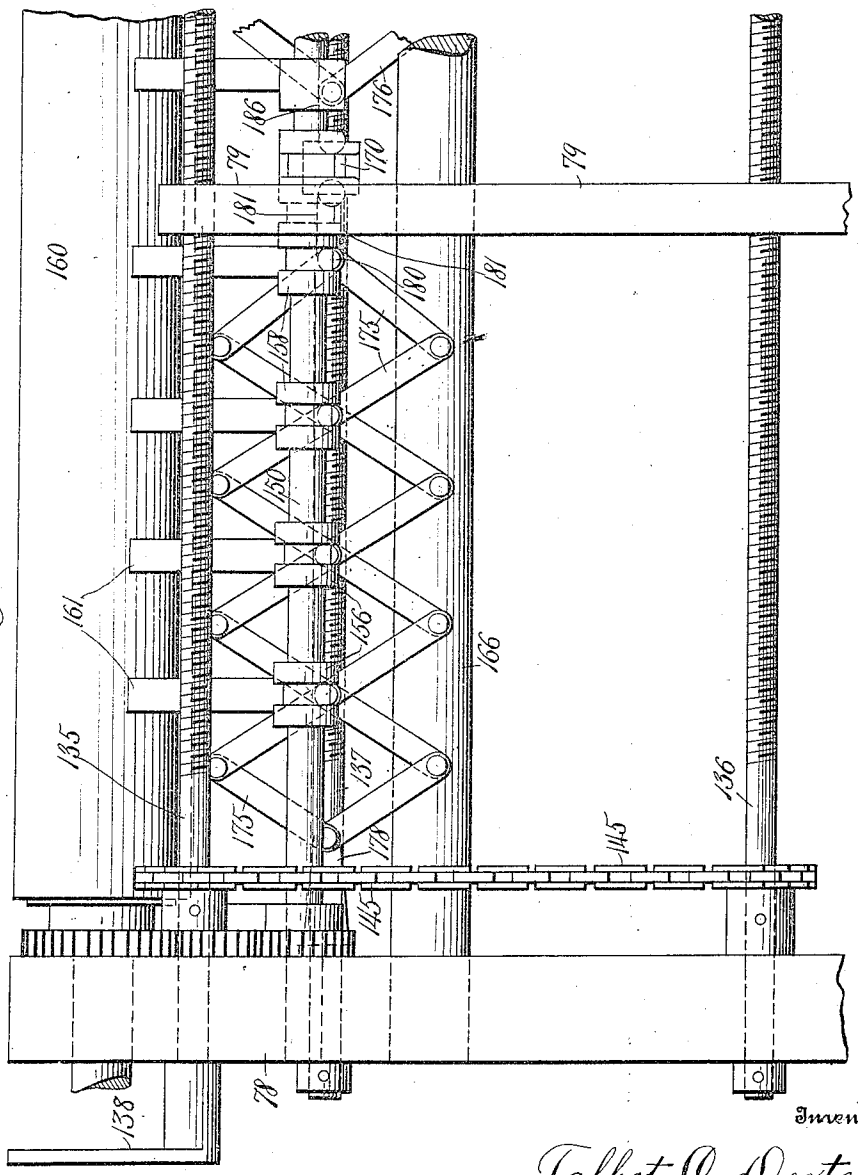

Fig. 2.

Witnesses

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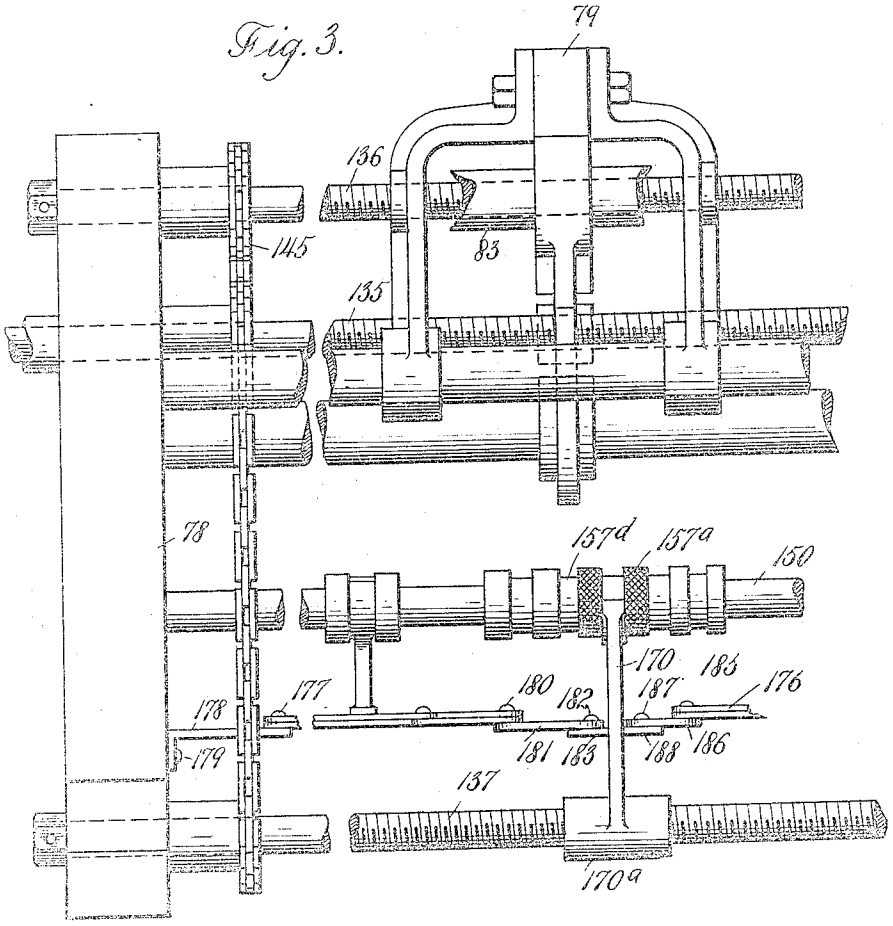
6 SHEETS—SHEET 3.

Fig. 3.



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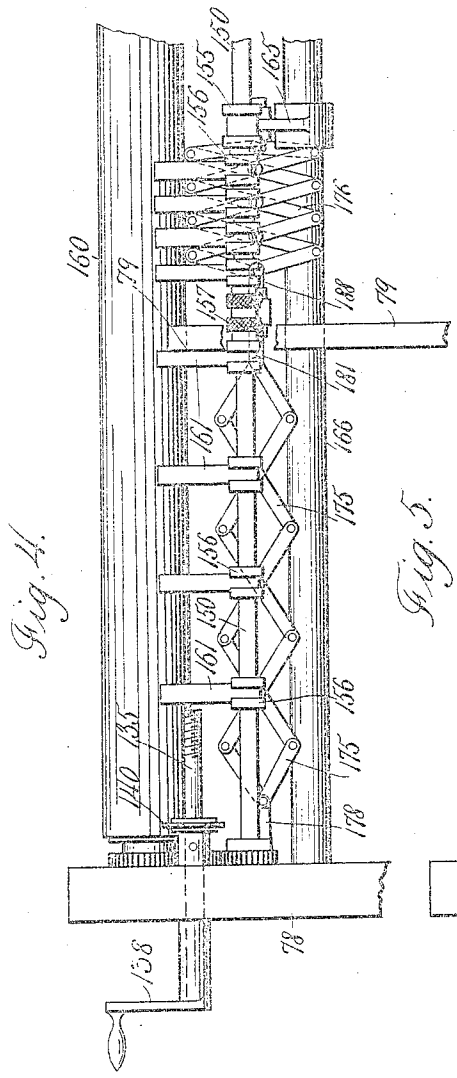

Fig. 4.

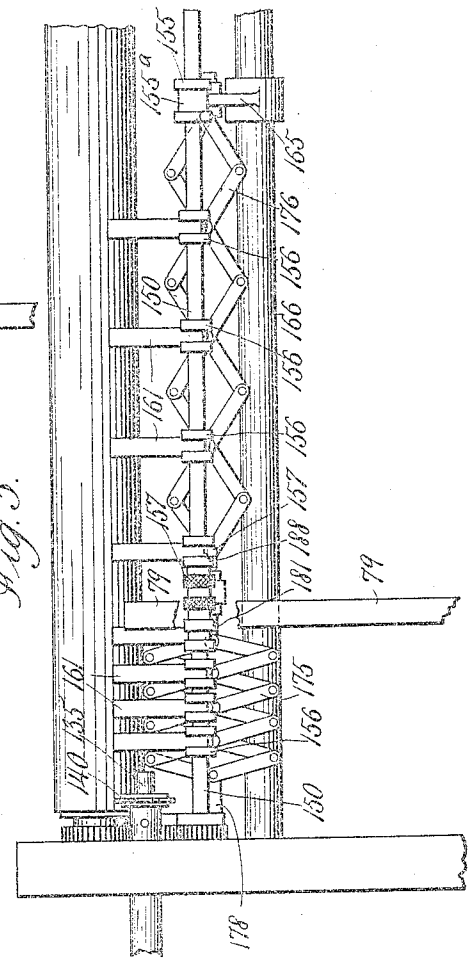

Fig. 5.

Witnesses

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6 SHEETS—SHEET 5.

Fig. 6.

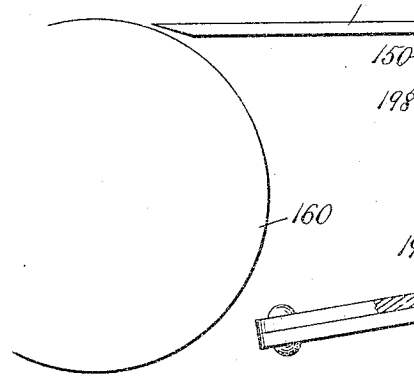
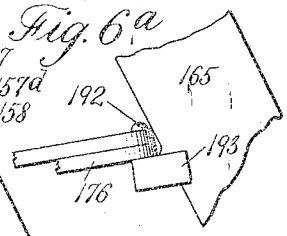


Fig. 6a



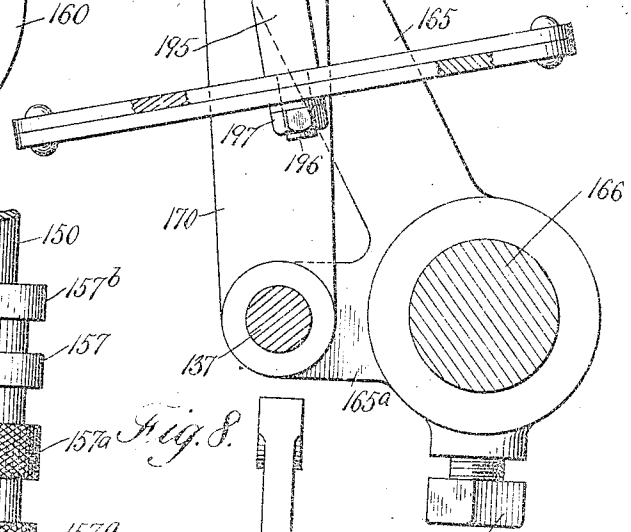


Fig. 7.

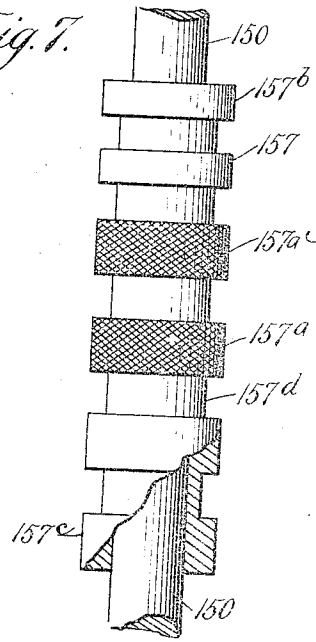
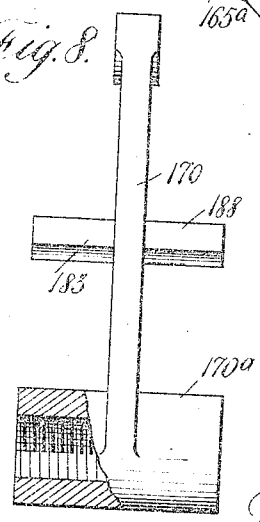


Fig. 8.



Witnesses

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6 SHEETS—SHEET 6.

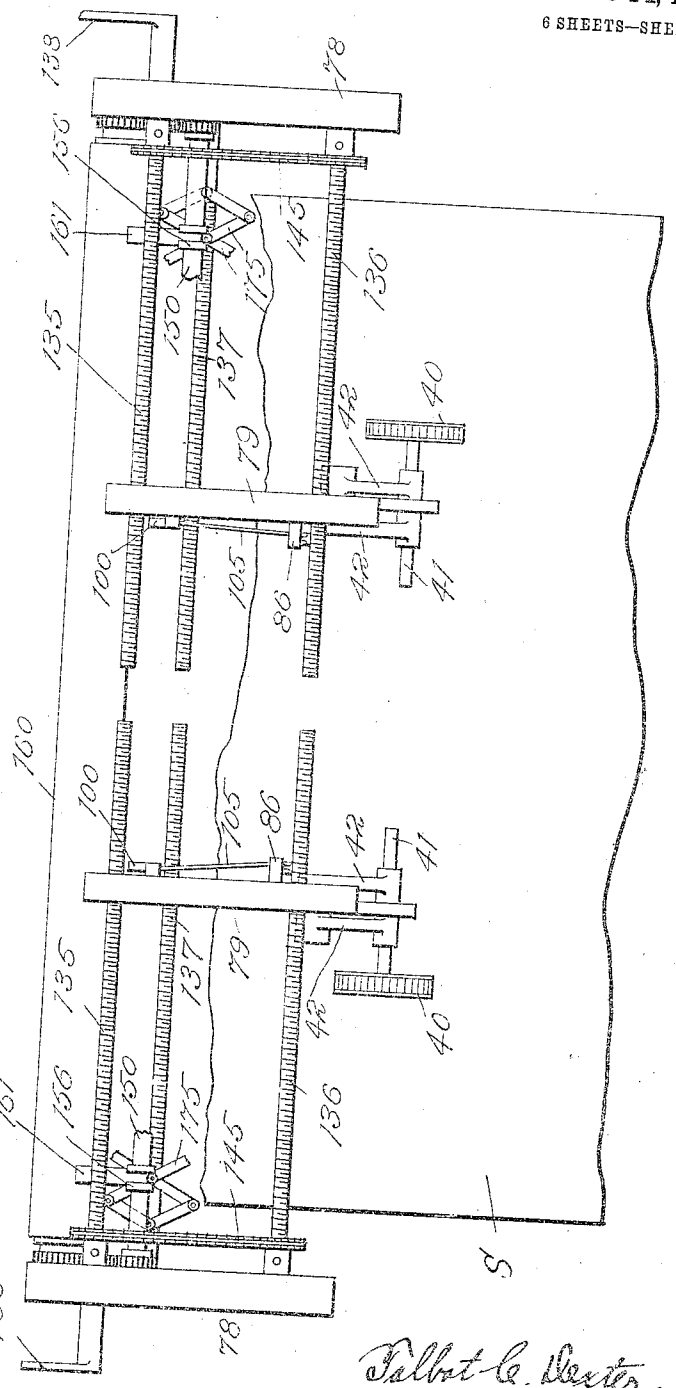

Fig. 9

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UNITED STATES PATENT OFFICE.

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PAPER-FEEDING MACHINE.

961,744. Specification of Letters Patent. Patented June 14, 1910.

Original application filed July 6, 1908, Serial No. 442,114. Divided and this application filed September 9, 1908. Serial No. 452,311.

To all whom it may concern:

Be it known that I, TALBOT C. DEXTER, a citizen of the United States, and a resident of Pearl River, in the county of Rockland and State of New York, have invented certain new and useful Improvements in Paper-Feeding Machines, of which the following is a specification.

My present application is a division of my original application Serial No. 442,114, filed July 6th, 1908, for improvements in paper feeding machines.

My present invention comprises an improved form of mechanism for accurately adjusting the feeding and controlling devices transversely of a paper feeding machine, the invention being not necessarily limited to a combing feeding machine, but being applicable to various forms of sheet feeding machines. This mechanism for adjusting the feeding and controlling devices of the feeding machine, includes a plurality of transversely arranged adjusting screws engaging some of the parts which are to be adjusted, and one or more series (preferably two) of lazy tongs connected with other parts of the feeding devices for causing them to be correspondingly adjusted to suit the adjusted positions of the main elements of the feeding mechanism. This adjusting mechanism is important not only because of the facility with which the operating devices of the machine may be accurately set to meet the requirements of a particular job, but also because of the efficiency of the mechanism in holding the parts in the adjusted position without danger of disarrangement during the operation of the machine. The use of this adjusting mechanism also avoids the necessity of employing numerous small set screws for adjustably holding parts such as the under feed wheels in position, which screws are difficult to get at for adjusting the parts, and are also very objectionable because of their liability to become loose and fall out into the machine with the possibility of seriously injuring some of the parts.

In order that my invention may be fully understood, I will first describe the same with reference to the accompanying drawings, and afterward point out the novelty more particularly in the annexed claims.

In said drawings Figure 1 is a detail side elevation of part of a paper feeding machine showing particularly the adjusting mechanism for the feeding devices. Fig. 2 is a detail plan view of part of the said adjusting mechanism. Fig. 3 is a detail rear elevation of the same. Figs. 4 and 5 are detail plan views of the same mechanism showing different adjusted positions of the parts. Fig. 6 is an enlarged vertical longitudinal sectional view showing particularly the connection of the lazy tongs with the under feed rollers and delivery transfer fingers of the machine. Fig. 6ª is a detail view of part of the same. Fig. 7 is a detail plan view of a central set of under feed rollers, and Fig. 8 is a detail elevation of one of the central adjusting bracket arms. Fig. 9 is a diagrammatic plan view illustrating the arrangement of feeding devices upon opposite sides of the machine.

Paper feeding machines of the type shown in my original application Serial No. 442,114, above referred to, to which my present improvements have been applied, include two distinct sheet feeding and separating mechanisms, namely, first the means for gradually forwarding and fanning out a bank of sheets by passing them from a supply table to a feed table, and presenting them in reversed position upon the feed table; and second, a final separating and feeding mechanism which successively detaches single sheets from the fanned out bank or pile and passes the individual sheets to delivery mechanism, which forwards the sheets to the machine which is to operate upon them.

With reference to means for effecting the lateral adjustment of the sheet separating devices and controlling and delivery devices in a feeding machine of the type under discussion, it will be borne in mind that in machines of this general type, and particularly in those machines which have been designed by me, the sheet separating and feeding devices are mounted upon auxiliary frames or saddles hung within the main frame upon transverse tie bars so that in the adjustment of these feeding devices these auxiliary frames or saddles are moved laterally upon their supporting bars. This adjustment has usually been accomplished by hand, the frames or saddles being held in

the desired adjusted position by set screws or bolts. In addition to the main separating and feeding devices, the sheet delivery drop rollers and coöperating under feed rollers, have also had to be adjusted laterally to suit the machine to the requirements of sheets of different sizes. These delivery devices have also in the past usually been adjusted by hand and held in adjusted position by set screws. It will also be observed that in machines of this type it is usual to provide two sets of separating and feeding devices to operate upon large sheets at opposite sides of a central line, so that it becomes necessary at times to adjust two sets of devices with relation to the central line or middle of the pile which is to be fed.

The improvements of my present invention relate to means for conveniently and accurately adjusting and securing the various operative parts of a feeding machine transversely of the machine, which adjusting means are also valuable as affording a safe means for holding the parts in the desired adjusted position.

I have thought it unnecessary to specifically illustrate all the details of a feeding machine of the type under discussion, but would refer to my application Serial No. 436,637, filed June 4th, 1908, as showing a good example of this type of machine for which my present improvements have been particularly designed.

In the accompanying drawings 79 is one of a pair of auxiliary frame pieces or saddles which support the main operative parts of the feeding machine, including the sheet combing and feeding wheels and the sheet actuated tripping devices. Two of these frame pieces or saddles 79 carrying duplicate parts are arranged in my machine as shown in Fig. 9 of the drawings. These parts are specifically shown and described in my above named application Serial No. 436,637, and the frame pieces and parts of the feeding devices so far as shown in the drawings in my present case, correspond with the same parts in said application.

S is the feed table, 40 the combing wheels, 41 short shafts, 42 rock-arms in which shafts 41 are journaled, 86 a latch tripping arm, 100 the sheet tripping finger, and 105 the rod connecting arm 86 and finger 100.

Journaled in each of the main side frames of the feeding machine adjacent to the top, are the two laterally extending adjusting screws 135 and 136. Each of these screws 135, 136 extends inwardly and passes through a threaded opening in one of the auxiliary frame pieces or saddles 79, so that when the screws are rotated the engaged auxiliary frame or saddle 79 will be moved transversely of the machine to one side or the other, depending upon the direction in which the screws are rotating. It will, of course, be understood that the screws projecting from one of the main side frames 78 engage the auxiliary frame or saddle nearest that side frame, and the same is true of the adjusting screws which are journaled in the opposite side frame of the machine.

Journaled in each of the main side frames 78 beneath the plane of feed of the sheets, is an adjusting screw 137, which is for the purpose of adjusting the under feed rollers and transfer delivery fingers, in the manner presently to be explained. It will be understood that there are two screw shafts 137, one projecting inwardly from each of the main side frames of the machine.

At each side of the machine, just inside of the main side frame 78, the screw shafts 135, 136 and 137 have keyed to them small sprocket wheels 140, 141 and 142, and journaled on a stud 144 on the inner face of each of the main side frames 78 in a fourth sprocket wheel 143. An endless sprocket chain 145 passes around and engages each set of sprocket wheels 140, 141, 142 and 143, so as to cause all the screw shafts 135, 136 and 137 at one side of the machine to rotate in unison. Secured to the outer end of each screw shaft 135, is a hand crank 138, by the rotation of which all of the screws can be operated in either direction for adjusting the operative parts of the machine either inwardly or outwardly.

As explained above, two of the adjusting screws at each side of the machine engage one of the auxiliary frames or saddles for adjusting said frames or saddles and the parts carried thereby. The third adjusting screw 137 of each set is for the purpose of correspondingly adjusting the under feed rollers and transfer fingers of the sheet delivery mechanism in the manner which I will now explain.

150 is the constantly driven shaft of the delivery mechanism. This shaft is suitably journaled in the side frames of the machine and suitable intermediate brackets (not shown) and is driven by gearing from the main driving shaft of the machine in a manner well understood. This constantly driven shaft 150 carries a plurality of under feed rollers arranged in two adjustable series upon opposite sides of the central line of the machine, said feed rollers being splined to the shaft so as to rotate therewith, but permit their free adjustment transversely of the machine. Each adjustable series of under feed rollers is of the same construction and arrangement both as to their mounting and method of adjustment, so that a specific explanation of one series will be understood to apply equally to the other series.

As shown particularly in Figs. 4 and 5, which figures illustrate a complete series extending one half the width of the feeding

machine, it will be observed that a double or annularly flanged feed roller 155 (fixed as to lateral adjustment by means presently to be explained), is arranged at the inner end of the series of feed rollers at one side of the machine, said feed roller 155 being splined to the constantly rotating shaft 150. It will also be observed that arranged between the feed roller 155 and the side frame of the machine, are similar double or annularly grooved feed rollers 156, and an elongated plural faced annularly grooved feed roller 157, said elongated plural faced roller being arranged upon the shaft 150 between two sets of the rollers 156, there being by preference three of the rollers 156 on either side of the elongated roller 157. This elongated roller 157 is best shown in Fig. 14 of the drawings, from which it will be observed that there are two central milled wheels 157^a, and two plain faced double or annularly grooved wheels 157^b and 157^c, all of said wheels constituting the elongated roller 157, and being integral with or rigidly secured to a common elongated hub or sleeve 157^d, which is splined to the constantly rotating shaft 150 by spline 158 as shown particularly in Fig. 13 of the drawings. The purpose of milling the portions 157^a of the elongated under feed roller is for coöperation with the ordinary delivery drop rollers which operate in peripheral contact therewith. I have not shown in my present application the arrangement of drop rollers, since they may be mounted and operated in any suitable manner well understood in the art, such for instance as illustrated in my above named application Serial No. 436,637.

160 is the delivery drum around which the sheet conveying tapes operate for conveying the delivered sheets to the machine arranged to receive them.

161 represents the sheet transfer fingers which lead from the delivery under feed rollers 156 and 157 to the delivery drum 160, in a manner well understood. The preferred mounting of these transfer fingers 161 will be hereinafter explained.

The rotating under feed roller 155 is held in its position against displacement laterally of the machine by means of a bracket arm 165, which is mounted upon one of the main stay bars 166 of the machine, said bracket 165 being held in the desired adjusted position upon the stay bar 166 by means of a set bolt 167. This bracket arm 165 extends at a slight angle from the stay bar 166 and has its upper end formed with a curved recess or notch to engage freely the annular groove 155^a of the double feed roller 155, so as to retain the roller 155 in the desired position and at the same time permit it to rotate freely with the shaft 150. The bracket 165 is also formed with a forwardly projecting bearing lug 165^a in which is journaled the inner end of the adjusting screw 137, and by which said screw is supported in proper alinement for performing its work.

Arranged between the bracket arm 165 and the side frame of the machine is a vertically extending arm or plate 170 formed with an elongated interiorly bored and threaded hub portion 170^a, through which the adjusting screw 137 is threaded. The upper end of this arm 170 is recessed and shaped to fit partly around the sleeve portion 157^d of elongated roller 157 in the annular groove separating the two milled wheel portions 157^a of said elongated roller. By this means the rotation of the adjusting screw will cause the arm 170 to travel laterally and move the elongated roller 157 upon its shaft 150.

Arranged between the arm 170 and the side frame of the machine is a series of lazy tong levers 175, and arranged between said arm 170 and the bracket 163, is another series of lazy tong levers 176. The outer end of the lazy tong levers 175 is pivotally connected at 177 with a bracket plate or link 178 secured at 179 to the inner face of the side frame of the machine. The opposite end of the lazy tong levers 175 is pivotally connected at 180 with a link 181 which is in turn pivotally connected at 182 to a flange or lug 183 projecting laterally from one face of the arm 170; whereas the outer end of the lazy tong levers 176 is pivotally connected at 185 with a link 186, which is in turn pivotally connected at 187 with a flange or lug 188 formed integral with and projecting from the opposite face of the arm 170, and the extreme inner end of the lazy tong levers 176 is pivotally connected at 190 with a link 171, which is in turn pivotally connected at 192 with a lug or flange 193, formed integral with and projecting from the bracket arm 165.

Projecting upwardly from the central pivot of each pair of lazy tong levers 175 and 176 is a post or arm 195, such as shown in Fig. 13 of the drawings. These posts 195 are mounted upon the central pivot pins 196 of the lazy tong levers, the levers being secured upon said pivot pins by means of nuts 197. Each of the posts 195 is formed with a rearwardly opening yoke 198 in its upper end which partially encircles the hub or reduced portion of one of the feed rollers 156, or in other words rests easily within the annular groove formed in each of said feed rollers. Each of the yoke portions 198 of said posts has one of the sheet transfer fingers 167 secured to it as indicated at 199 in Fig. 13.

It will be observed from this construction that simultaneously with the adjustment of the auxiliary frames or saddles 79 through the action of the adjusting screws 135 and 136, the series of under feed rollers 156, 157

and sheet transfer fingers 161, will be simultaneously and correspondingly adjusted. By a comparison of the positions of these last named parts as shown in Figs. 11 and 12, it will be observed that in one extreme position of adjustment, the under feed rollers and transfer fingers will be presented in close order adjacent to the center of the machine, whereas in the other position said parts will be presented in close order adjacent to the side of the machine.

In adjusting the operating parts of a feeding machine in accordance with my invention, it will be understood that the parts upon opposite sides of the machine are separately adjusted, but that it is only necessary to operate a single crank at each side of the machine to accomplish the desired result. When the parts have been adjusted to the desired positions, the adjusting screws will remain in exactly the position in which they are left without any possibility of being accidentally moved, so that there is no danger of the disarrangement of the adjustments from the vibrations of the machine or from other causes, since it is necessary to positively rotate the series of adjusting screws to effect a change in the positions of the parts referred to. By this means the objectionable use of removable set screws is avoided, which is of great importance in machinery of this kind, since it obviates the great difficulty incident to the independent adjustment of many small parts, and also avoids the possibility of such removable screws becoming dislodged and falling into parts of the machine with resulting damages.

I claim:

1. In a paper feeding machine, the combination of a main frame, a support for sheets, two auxiliary frames or saddles mounted within said main frame above the sheet support, sheet feeding devices mounted upon each of said auxiliary frames or saddles, and independent adjusting screws journaled in the main frame and engaging said auxiliary frames or saddles respectively for adjusting them independently transversely of the machine.

2. In a paper feeding machine, the combination of a main frame, a sheet support, two auxiliary frames or saddles mounted within the main frame above the sheet support, sheet feeding devices carried by each of said auxiliary frames or saddles, two sets of adjusting screws journaled in said main frame and extending transversely and one set engaging each of said auxiliary frames or saddles, and means for operating said screws for adjusting said auxiliary frames or saddles transversely of the machine.

3. In a paper feeding machine, the combination of a main frame, a sheet support, sheet feeding and controlling devices adjustably mounted in said main frame, sheet delivery rollers adjustable transversely of the machine, a plurality of transversely arranged adjusting screws journaled in said main frame, gearing between said screws arranged to operate them in unison, and means engaged by said screws connected with said feeding and controlling devices and delivery rollers, whereby all of said parts may be simultaneously adjusted.

4. In a paper feeding machine, the combination of a plurality of sheet moving instruments, a series of lazy tong levers having independent connections with said sheet moving instruments, and means for operating said lazy tong levers.

5. In a paper feeding machine, the combination of two series of sheet moving instruments, two series of lazy tong levers having independent connections with said sheet moving instruments, and means for operating said lazy tong levers.

6. In a paper feeding machine, the combination of a series of transversely adjustable feed rollers, transversely arranged lazy tongs having an independent connection with each of said feed rollers, and means for operating said lazy tongs.

7. In a paper feeding machine, the combination of two series of transversely adjustable feed rollers, two transversely arranged lazy tongs, each of which has an independent connection with each feed roller of one series, and means for operating said lazy tongs.

8. In a paper feeding machine, the combination of a series of transversely adjustable feed rollers, transversely arranged lazy tongs having an independent connection with each of said feed rollers, and a transversely extending adjusting screw.

9. In a paper feeding machine, the combination of two series of transversely adjustable feed rollers, two transversely arranged lazy tongs, each of which has an independent connection with each feed roller of one series, and independent means for operating each lazy tong.

10. In a paper feeding machine, the combination of two series of transversely adjustable feed rollers, two transversely arranged lazy tongs, each of which has an independent connection with each feed roller of one series, and two independent adjusting screws for independently operating said lazy tongs.

11. In a paper feeding machine, the combination of suitable feeding devices adjustable transversely of the machine, with a series of transversely adjustable feed rollers, transversely arranged lazy tongs having an independent connection with each of said feed rollers, and means for operating said lazy tongs.

12. In a paper feeding machine, the com-

bination of suitable feeding devices adjustable transversely of the machine, with a series of transversely adjustable feed rollers, transversely arranged lazy tongs having an independent connection with each of said feed rollers, and a transversely extending adjusting screw for operating said lazy tongs.

13. In a paper feeding machine, the combination of suitable feeding devices adjustable transversely of the machine, with a series of transversely adjustable feed rollers, transversely arranged lazy tongs having an independent connection with each of said feed rollers, and connected means for adjusting said feeding devices and said lazy tongs.

14. In a paper feeding machine, the combination of suitable feeding devices adjustable transversely of the machine, with a series of transversely adjustable feed rollers, transversely arranged lazy tongs having an independent connection with each of said feed rollers, adjusting screws engaging said feeding devices and lazy tongs, and means operatively connecting said screws to cause them to operate in unison.

15. In a paper feeding machine, the combination of suitable feeding devices adjustable transversely of the machine, with a series of transversely adjustable feed rollers, transversely arranged lazy tongs having an independent connection with each of said feed rollers, adjusting screws engaging said feeding devices and lazy tongs, sprocket wheels upon said screws, a sprocket chain engaging said sprocket wheels, and suitable operating means.

16. In a paper feeding machine, the combination of two sheet feeding devices adjustable independently transversely of the machine, two series of transversely adjustable feed rollers, two transversely arranged lazy tongs, each of which has an independent connection with each feed roller of one series, and an independent mechanism at each side of the machine for adjusting one feeding device and one lazy tong.

17. In a paper feeding machine, the combination of a driving shaft, a series of annularly grooved feed rollers splined upon said shaft, a series of lazy tong levers arranged transversely of the machine beneath said shaft, arms projecting from said lazy tong levers into engagement with the grooves of said rollers, and means for adjusting said lazy tong levers, substantially as set forth.

18. In a paper feeding machine, the combination of a driving shaft, a series of annularly grooved feed rollers splined upon said shaft, a series of lazy tong levers arranged transversely of the machine beneath said shaft, arms projecting from the pivots of said lazy tong levers into engagement with the grooves of said rollers, sheet transfer fingers mounted upon said arms adjacent to said rollers and projecting in the plane of feed, and means for adjusting said lazy tong levers, substantially as set forth.

19. In a paper feeding machine, the combination of a driving shaft, a series of annularly grooved feed rollers splined upon said shaft, two lazy tongs arranged end to end transversely of the machine beneath said shaft, and having their opposite ends connected to the machine frame, an adjusting arm having the adjacent ends of said two lazy tongs attached to it, arms projecting from the pivots of said lazy tongs into engagement with the grooves of said rollers, and an adjusting screw engaging said adjusting arm, substantially as set forth.

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