Oct. 5, 1937. G. W. MUDD 2,094,665

STACKER MECHANISM FOR PAPER CUTTING MACHINES

Filed May 29, 1935 4 Sheets-Sheet 1

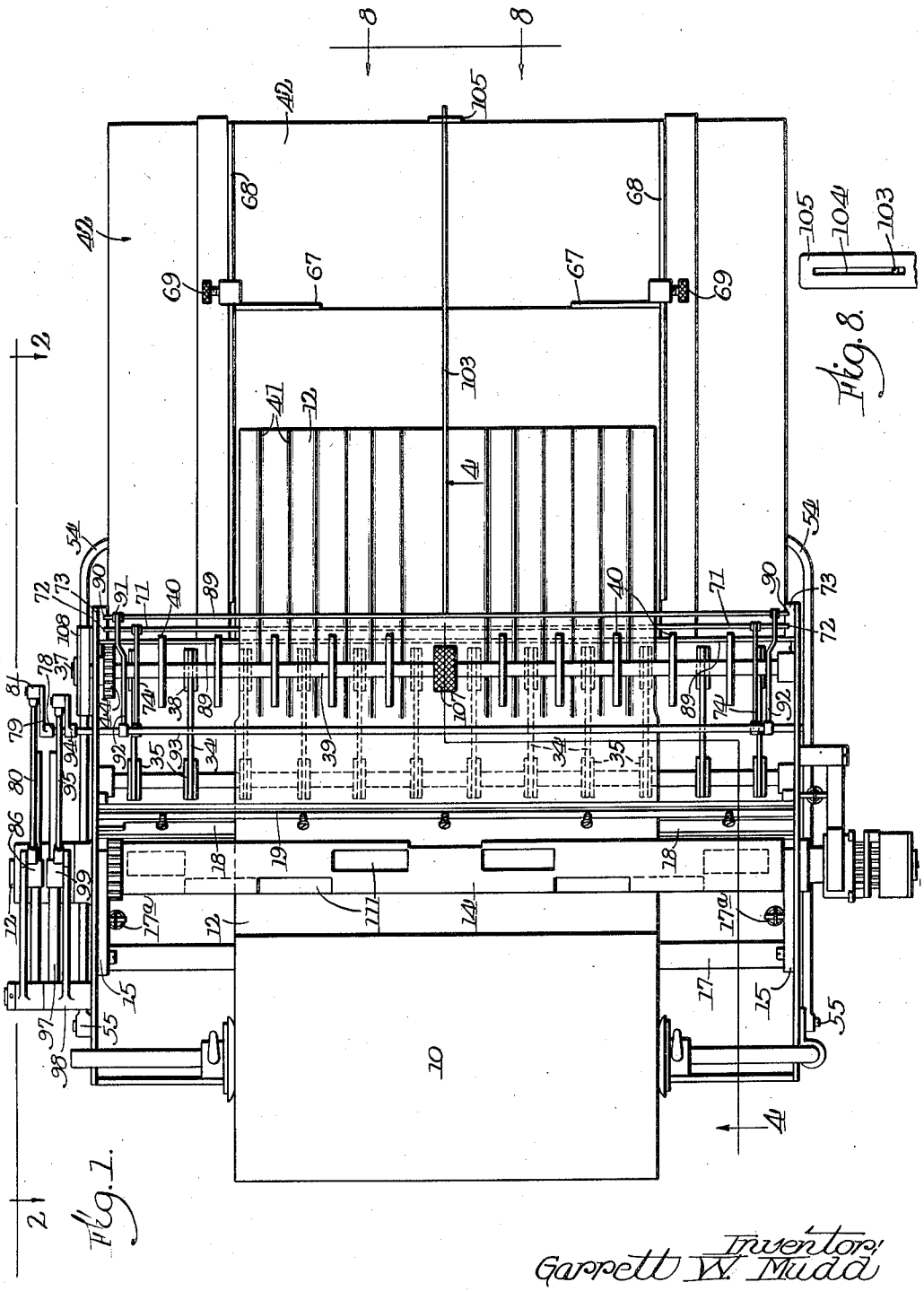


Fig. 1.

Fig. 8.

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STACKER MECHANISM FOR PAPER CUTTING MACHINES

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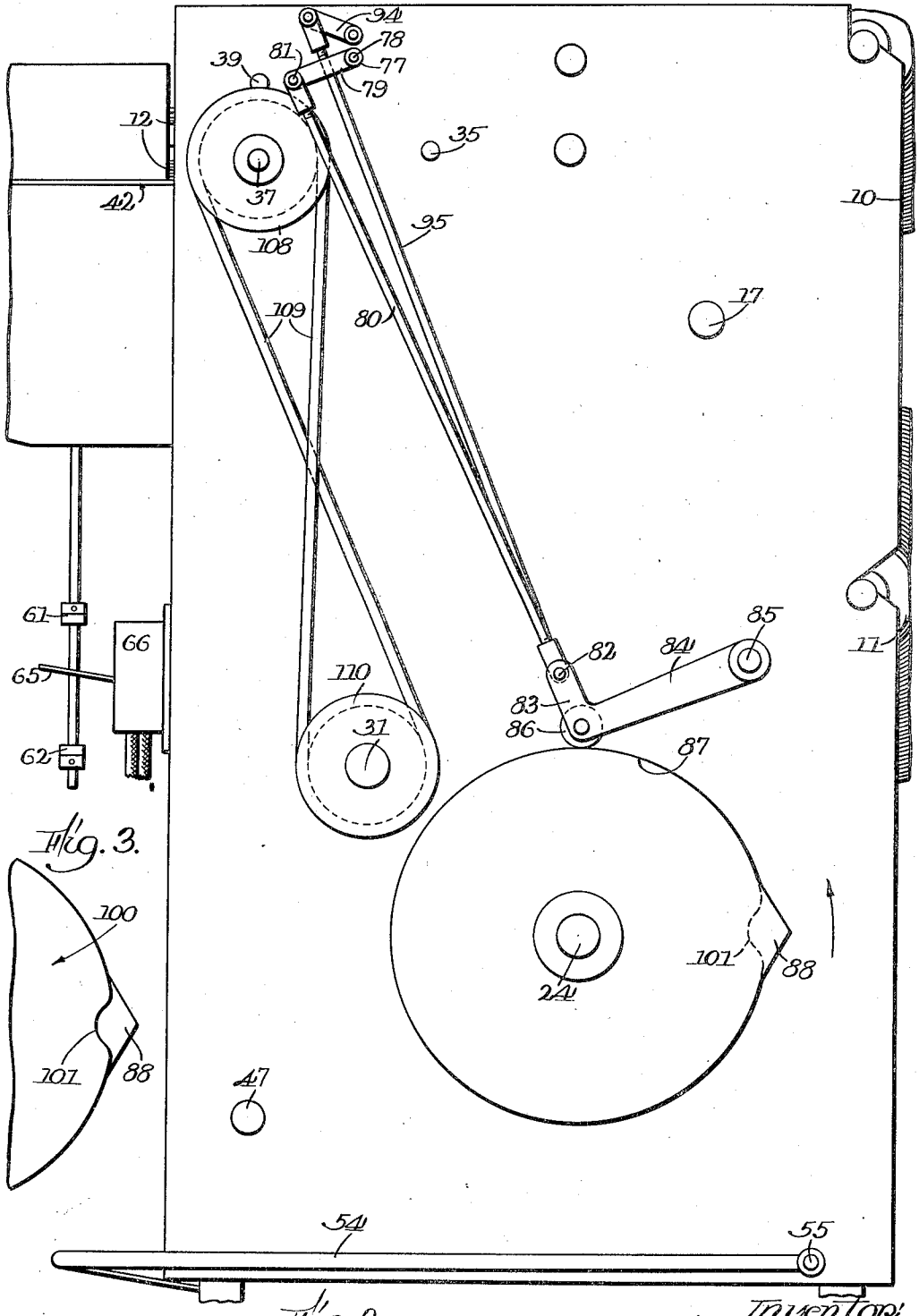


Fig. 3.

Fig. 2.

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STACKER MECHANISM FOR PAPER CUTTING MACHINES

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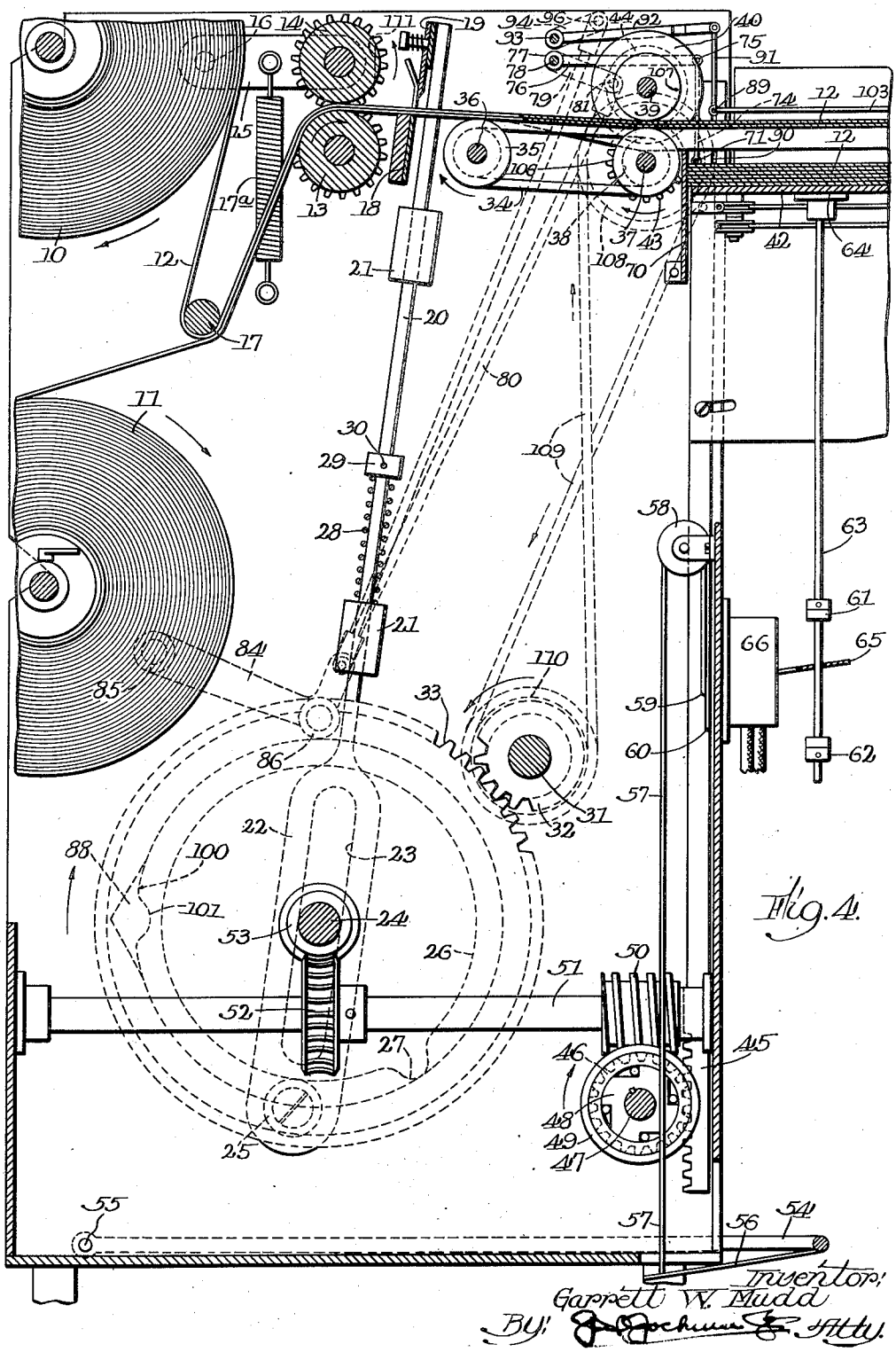


Fig. 4.

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STACKER MECHANISM FOR PAPER CUTTING MACHINES

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Fig. 5.

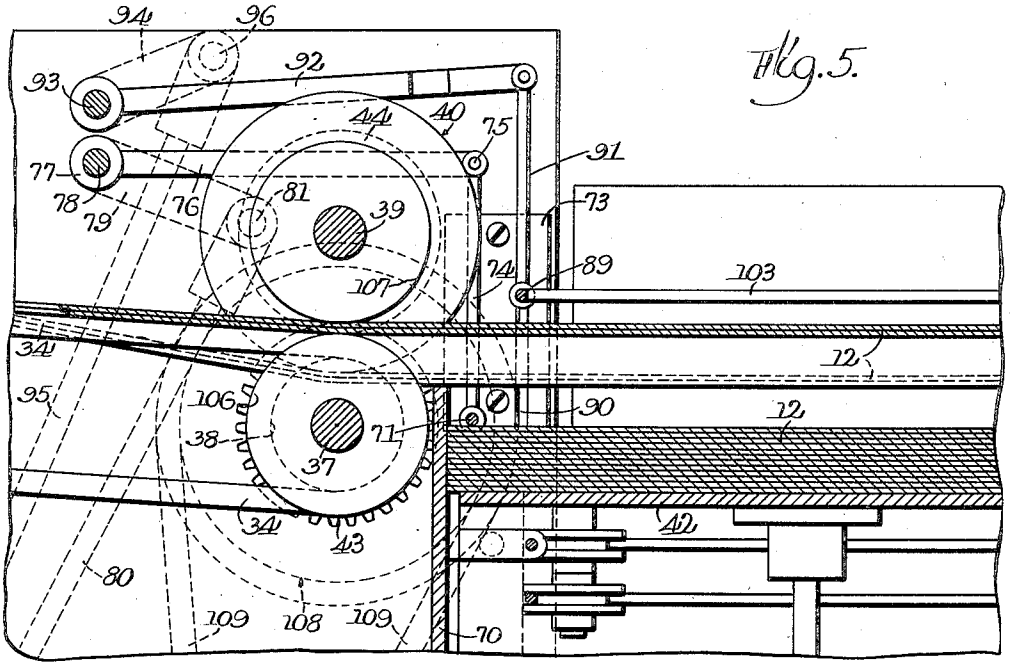


Fig. 6.

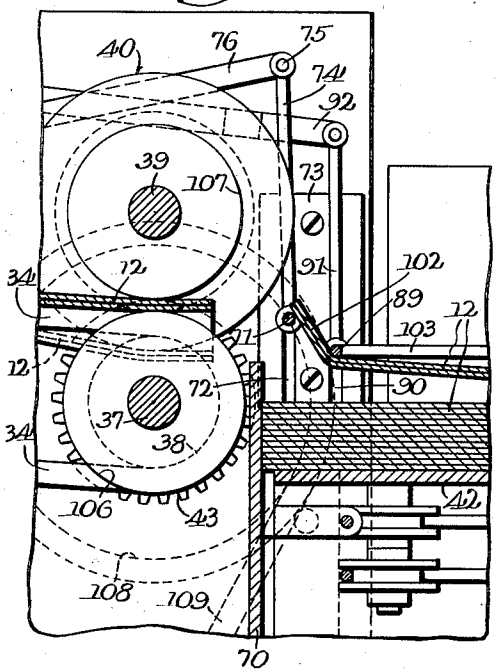
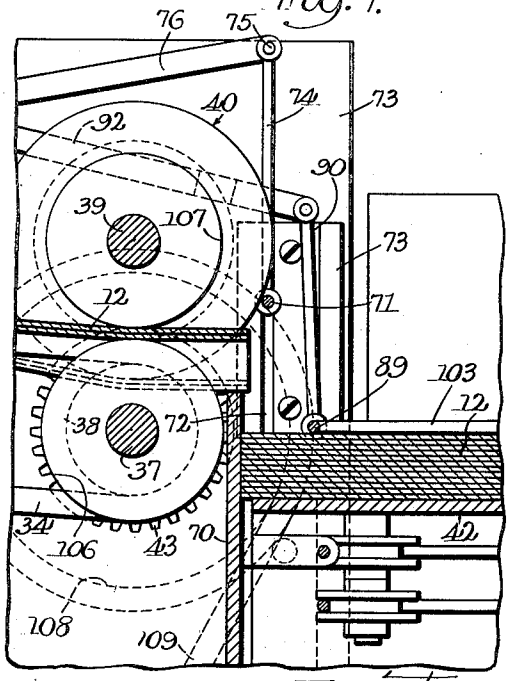


Fig. 7.



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UNITED STATES PATENT OFFICE

2,094,665

STACKER MECHANISM FOR PAPER CUTTING MACHINES

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Application May 29, 1935, Serial No. 24,071

4 Claims. (Cl. 271—86)

In my co-pending application, Serial Number 728,369, filed May 31, 1934, there is shown and described a machine for cutting very thin, and otherwise hard to handle, paper, such as what is commonly known to the general public as "Cellophane."

The present invention is particularly adapted, though not necessarily limited in its use, in connection with the type of machine described in the aforesaid application, and relates more particularly to a mechanism for receiving the sheets as they are cut from a roll or supply and piling the cut sheets upon a receiving table or platform, and one of the objects of the invention is to provide in a machine of this character, improved means for turning down the curled edge of the sheet, which usually results from the cutting operation, and for holding the sheets flat upon the piling or stacking platform or table.

A further object is to provide improved means for preventing injury or damage to the sheets as the result of a portion of the feeding mechanism continuing to operate when another portion of such feeding mechanism is rendered inactive for an interval of time in the operation of the machine, during which interval the cutting mechanism is in operation to sever the sheets.

A further object is to provide improved means for relieving or removing from the sheets, before the sheets are delivered to or deposited upon the receiving table or platform, puckers or wrinkles formed in the sheets by the operation of the feeding mechanism thereon.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention and in which

Figure 1 is a top plan view of a mechanism of this character constructed in accordance with the principles of this invention and showing a portion of a cutting mechanism co-operating therewith.

Figure 2 is a view taken on line 2—2, Figure 1, on an enlarged scale.

Figure 3 is a detail view in elevation of a portion of the cam shown in Figure 2, and taken from the opposite side of the cam.

Figure 4 is a vertical sectional view taken on line 4—4, Figure 1, on an enlarged scale.

Figures 5, 6, and 7 are views in vertical section of the receiving table or platform and the mechanism which cooperates therewith and showing the parts in different positions.

Figure 8 is a view in elevation of a detail as taken on line 8—8, Figure 1.

Referring more particularly to the drawings, the numerals 10 and 11 designate two supplies or reels of the paper or material 12 which is to be severed into sheets and stacked or piled.

In the present form of the invention these supplies are shown to be in the form of rolls suitably mounted.

The numeral 13 designates a feed roll and the numeral 14 designates a co-operating feed roll, which latter is journaled in arms 15 supported as at 16 to a suitable support, springs 17a being provided which tend to move the roll 14 towards and in engagement with the roll 13, so that the rolls will co-operate to feed the material, and between which rolls the material passes, being guided to the rolls over a suitable guide 17.

The numeral 18 designates a stationary cutter with which a cutter 19 co-operates, and the cutter 19 is mounted upon a reciprocating member 20 which passes through suitable guides 21 to impart a reciprocating movement to the knife or cutter 19.

The member 20 is preferably enlarged at its lower end as at 22 and is provided with a slot 23, through which a shaft 24 passes, and secured to the portion 22 of the member 20 is a roller 25 with which a cam 26 that is secured to a shaft 24, co-operates. The cam 26 is provided with a raised portion 27 adapted to contact the roller 25 and thereby move the member 20 with the knife 19 in one direction and against the stress of a spring 28. The spring 28 encompasses a portion of the member 20 and one end of the spring abuts one of the guides 21, while the other end of the spring abuts a collar 29 adjustably secured to the member 20 by means of a fastening device 30.

It will therefore be seen that inasmuch as the material 12 passes between the rolls 13 and 14 and between the knives or cutters 18 and 19, and when the member 20 is moved in one direction by the cam 26, the supply will be severed and as soon as the high portion 27 of the cam passes out of contact with the roller 25, the spring 28 will move the knife or cutter 19 in the opposite direction.

Motion is imparted to the shaft 24 from a drive shaft 31, which latter receives its motion from any suitable source of power (not shown). Secured to the shaft 31 for rotation therewith is a gear 32, which meshes with a gear 33 that is secured to the shaft 24, and as the cam 26 is also secured to the shaft 24, the latter when rotated will actuate the cutter 19.

After the sheets have been cut by the cutter they are delivered to a series of endless conveyors 34 laterally spaced from each other and which conveyors pass over pulleys 35 secured to a shaft 36.

Another shaft 37 arranged parallel with the shaft 36 has secured to it a series of laterally

spaced pulleys 38 over which the endless conveyors 34 respectively pass.

Arranged above the shaft 37 is a shaft 39 which has secured to it for rotation therewith a series of discs 40 that are laterally spaced from each other and are so arranged that the discs 40 will stand intermediate adjacent pulleys 38 and spaced laterally from each of the pulleys. The discs 40 and the pulleys 38 are of such diameters that the adjacent peripheral portions will overlap and thereby cause the sheets 12 to be corrugated as at 41 in the general direction of the line of travel of the sheets so as to impart a certain amount of rigidity to the sheets to facilitate the delivery of the sheets on to a receiving table or platform 42.

Intermeshing gears 43—44 are provided on the shafts 37—39 to cause the discs 40 and the pulleys 38 to be simultaneously rotated and to impart motion to the endless conveyors 34.

The table or platform 42 is given a lowering movement in any suitable manner such as by means of a rack 45, the teeth of which mesh with a gear 46 that is secured to a shaft 47 by means of a clutch mechanism 48. A worm gear 49 forms a part of the clutch mechanism, and with this worm gear 49 a worm 50 meshes, the worm 50 being secured to a shaft 51 for rotation therewith.

A worm gear 52 is also secured to the shaft 51 for rotation therewith, and with this worm gear 52 a gear 53 secured to the shaft 24 for rotation therewith, meshes.

Thus it will be seen that when the shaft 24 is rotated, motion will be imparted therefrom to the shaft 51, thence to the gear 49 which meshes with the rack 45, and this will impart a lowering movement to the table or platform 42.

The platform may be raised in any suitable manner by means of a treadle 54 pivotally mounted as at 55, which depresses a member 56 to which a cable 57 is secured, the cable passing over a pulley 58 and then being secured as at 59 to a member 60 carried by the rack 45.

When it is desired to raise the platform after it has been lowered, the treadle 54 is depressed, causing the cable 57 to raise the platform. During the lowering movement the actuating motor (not shown) is controlled by means of stops 61—62 adjustably secured to a rod 63 that is secured as at 64 to the platform or support 42. This rod 63 passes through an actuating member 65 of a switch device 66 that controls the operation of the motor.

All of the above referred to parts constitute a portion of the subject matter of the aforesaid application and are only explained with the present invention in order that a full and clear understanding of the cooperation of the present device with the aforesaid mechanism may be had.

It has been found that in handling very thin paper of this character the edge of the sheet has a tendency to curl up after it has been severed by the cutter, which interferes with the proper stacking and piling of the same upon the table or platform 42.

In order therefore to overcome this objection and to hold the edge of the paper flat and down upon the pile upon the table or platform 42, the following mechanism has been provided.

Arranged at the forward end of the platform or support 42, are stops 67 which are adjustably secured to side rails 68 by means of fastening screws 69 and constitute abutments against which the forward edge of the sheets 12 strike.

An upright stationary member 70 is secured at the inner end of the table or support 42, as shown more clearly in Figure 4, and between these stops 67 and 70 the sheets 12 will be deposited to be piled or superposed on support 42.

The numeral 71 designates a bar or rod which extends entirely across the platform or support 42, which is adapted to be moved vertically and the ends of the rod project into and move in guides 72 in uprights 73. Pivotally connected by one end to the rod 71, preferably adjacent the ends of the rod, are links 74, and these links in turn are pivotally connected at their other ends as at 75 to links 76. The links 76 are in turn secured as at 77 to a rock shaft 78, and on one end of the shaft 78 is arranged a crank arm 79 to which a rod 80 is pivotally connected as at 81. The other end of the rod 80 is pivotally connected as at 82 to an extension 83 of an arm 84 that is pivotally mounted as at 85 to a fixed support. A roller 86 is carried by the arm 84 and this roller 86 engages the periphery of a rotatable member 87 that is secured to the shaft 24 for rotation therewith, and the member 87 is provided with a high portion 88 that is adapted to contact the roller 86 to rock the member 84 about its pivot 85 and through the medium of the rod 80 rock the shaft 78 to raise the member 71, for a purpose to be hereinafter set forth, and after the roller 86 passes off of the high portion 88 of the cam or member 87, the bar or rod 71 will engage and rest upon the edge of the pile of sheets 12 upon the table or platform 42.

A rod or bar 89, similar to the bar or rod 71, also extends across the platform or support 42 and is arranged parallel to the bar 71, the ends of the bar 89 being adapted to move in guides 90 in the uprights 73. Pivotally connected to the bar 89, preferably adjacent its ends, are links 91 and the free ends of the links 91 are connected by arms 92 to a rock shaft 93. A crank arm 94 is provided on one end of the rock shaft 93, and a rod 95 is pivotally connected as at 96 to the arm 94, by one end, and is also pivotally connected to a member 97, which in turn is pivotally supported as at 98. A roller 99 is carried by the member 97 and rests and moves against the periphery of a cam member 100, which is secured to the shaft 24 for rotation therewith. This member or cam 100 is provided with a recess 101 in its periphery, of a sufficient size to admit the roller 99.

The member or cam 100 is of such a size and construction as to reciprocate the bar or rod 89 in the guideways 90 in the members 73, and the two cam members 87 and 100 are so arranged that the two bars or rods 71 and 89 will be moved vertically in opposite directions. That is to say, when one is raised the other will be lowered and vice versa.

The rods or members 71 and 89 are preferably arranged adjacent the inner end of the support or platform 42 and preferably adjacent the stationary member 70, the bar or rod 71 being arranged in closed proximity to the inner end of the sheets 12 upon the platform 42 than the bar 89, and both rods are arranged in proximity to the discs 40 and the pulleys 38.

The normal position of the rods 71—89 with respect to each other is as shown in Figure 5. That is to say, the rod 89 will be elevated above the rod 71 and the latter will rest against the sheets 12 on the support 42 and in proximity to the inner end thereof. When the sheet is severed by the cutter 19 and it is delivered on to the table or support 42 it will pass between the rods 71

and 89, and when the sheet is delivered on to the pile, the inner edge of the sheet will rest upon the bar or rod 71.

It has been found that there is a tendency of the edge of the sheet which has been cut, to curl after being cut and this curling prevents the proper stacking or packing of the sheets on the table or support.

After the sheet has been delivered to the support and when the edge thereof is resting upon the bar or rod 71, and during the cycle of operation of the machine, in timed relation, the cam members 87 and 100 will move the bars or rods 71—89 from the position shown in Figure 5 to the position shown in Figure 6, causing the inner end 102 to be bent upwardly between the bars or rods 71—89; and as the rod 71 is further elevated and the rod 79 further lowered, the edge of the portion 102 of the sheets 12 will pass out of engagement with the bar or rod 71 and beneath the same, being moved downwardly by the bar or rod 89 until the bars or rods 71—89 reach the position shown in Figure 7.

The bar 71 will then be lowered and the bar 89 will be raised to the position shown in Figure 5, so that the bar or rod 71 will engage the pile of sheets 12 and hold the same down.

This operation will be continued until all of the sheets have been piled upon the support or platform 42, the latter being lowered to receive the sheets.

Connected to the bar or rod 89 and at any point intermediate the ends thereof is a rod 103 which extends lengthwise of the support or platform 42 and at right angles to the bar or rod 89. The free extremity of the bar 103 passes through a slot 104 in an upstanding projection 105 secured to a machine frame, and serves to hold by the pressure of its weight the body of the sheets in position.

As before stated, the sheets 12 are temporarily corrugated before they are delivered on to the support or table 42, but when they reach the table or support or the top of the pile, the sheet will aright itself and will fall flat upon the pile.

Secured respective to the shafts 37 and 39 for rotation therewith, are friction creating rollers 106—107 which may be of any desired length, and any number of these rollers may be provided. It has been found, however, that one on each of the shafts will be sufficient and they may be located at any point on the shaft so that they will be disposed one above the other with their peripheries spaced only for a sufficient distance to permit the sheets 12 to pass between the rolls.

These rolls may be constructed of any suitable material preferably resilient material, such as rubber, and their peripheries may be smooth or serrated, so as to grip the sheets as they pass between the rolls and advance and deliver the sheets after they have been severed by the cutters 18—19.

The two shafts 37 and 39, as before stated, are geared together by means of the gears 43—44, and motion is imparted to these shafts preferably by means of a pulley 108 secured to one of the shafts, preferably the shaft 37, over which an endless belt 109 passes. The belt also passes over a pulley 110 secured to the shaft 31 for rotation therewith, so that when the shaft 31 is rotated, the shafts 37—39 will also be rotated, causing the rotation of the rollers 106—107 as well as the endless conveyors 34.

Reference is here made to Patent No. 2,045,064 for a description of a driving means for rolls 13 and 14 whereby these rolls are intermittently rotated so as not to be in action while the paper is being severed by cutter 19.

Inasmuch as the shafts 37 and 39 will be continuously rotated, being actuated from the driving shaft 31 which is continuously operated, and as the rolls 13 and 14 are intermittently rotated so as to interrupt the feeding of the material between the rolls 13 and 14 during the interval in which the sheets are severed from the supply by the reciprocating cutter 19 co-operating with the cutter 18, it will be manifest that the sheets or material will be placed under tension between the rollers 106 and 107 and the rolls 13 and 14, with the result that the material between these co-operating rolls, before the sheets are severed, will be slightly puckered or wrinkled. Therefore, in order to provide a means to compensate such puckering or wrinkling and to allow the sheets to straighten themselves out before they pass between the rollers 106 and 107, one of the rolls 13—14 is provided with a series of cut away or flat peripheral portions 111, constituting relief spaces or escapement areas, and which cut away portions may be arranged at any point throughout the length of the roll 14 and may be of any desired length and width, and are also arranged circumferentially about the roller and spaced laterally from each other as shown more clearly in Figure 1 of the drawings. The slight puckering or wrinkling of the paper is due to the unequal strain placed thereon by the central feed rollers 106 and 107 and the corrugating means at the sides of these rollers, previously described as discs 40 and pulleys 38.

As soon as the flat or cut away portions 111 assume positions above the sheet, it will be manifest that pressure will not be exerted upon the sheets by these portions, and as the flat portions are not only arranged circumferentially but spirally about the roll, it will be manifest that the wrinkles or puckers or uneven portions of the sheet will be straightened out.

During the interval of time that the rolls 13 and 14 are interrupted in their movement or during the interval between the intermittent steps of rotation of these rolls, and as the rollers 106 and 107 are continuously rotating, and in order to provide a means for preventing the rollers 106—107 from damaging or tearing the sheets, the belt 109 which is also continuously driven from the shaft 31 through the pulley 110, will slip about the pulley 108, the shafts 37 and 39 through the medium of the rollers 106—107 being held against rotation by the friction exerted by the rollers 106—107 upon the sheets 12 and the holding of the material by the rolls 13 and 14, before the sheets are severed by the cutter.

Immediately upon the severance of the sheet from the supply by the cutter 19, the shafts 37 and 39 together with the rollers 106—107 will be rotated by the belt 109 and the sheets will be ejected or delivered on to the piling platform or table 42.

Obviously, all of the parts will be so connected that they will operate in timed relation with respect to each other.

It is thought that the operation of the device will be clearly understood from the foregoing description, but briefly stated it is as follows.

Motion is imparted from any suitable source of power to the shaft 31, which constitutes the main driving shaft, and the shaft 24 is operated from the shaft 31 through the medium of the intermediate gears. The rolls 13—14 are inter-

mittently rotated in any suitable manner, but preferably by means of the mechanism described in my above referred to co-pending application.

The shafts 37 and 39, together with the rollers 106—107 are continuously rotated through the medium of the belt 109 passing over the pulley 110 on the constantly driven shaft 31.

The receiving platform or table 42 is lowered as the sheets 12 are piled thereupon, by means of the driving connection between the shaft 24 and the gear 46 with the intermediate clutch mechanism 48, the gear 47 meshing with the rack 45.

The material is passed between the rolls 13 and 14, between the cutters 18 and 19, and between the rollers 106—107, as well as between the other co-operating corrugating devices respectively secured to the shafts 37 and 39. The material is fed to the rollers 106—107 by means of the endless conveyors 34.

Assuming the parts to be in the position shown in Figure 4, the rollers 106—107 will be rotating while the rolls 13 and 14 will be at rest. During this interval of rest the cutter 19 will be actuated to sever the material into the sheets 12. One end of the severed sheet being disposed between the rollers 106—107, a tension will be created upon the material before it is cut into sheets. After the sheets have been cut, the rollers 106—107 will deliver the same on to the table or platform 42 between the bars or rods 71—89.

After the sheets have fallen upon the table or platform, one edge of the recently severed sheets will rest upon the bar or rod 71. These bars or rods 71—89 will then be given a vertical movement in opposite directions, causing the bar or rod 71 to be elevated, while the bar or rod 89 is lowered into the position shown in Figure 6. This movement of these bars or rods will continue until they have passed each other, causing the edge of the sheets 12 to be bent upwardly as at 102, shown in Figure 6. When the bar or rod 71 passes out of contact with the edge of the sheets, the bar or rod 89 together with the rod 103 will be lowered to rest upon the top of the pile and thereby hold the sheets down for a short period of time, as shown in Figure 7.

The vertical movements of the rods 71 and 89 will then be reversed and they will move from the position shown in Figure 7 back to the position shown in Figure 5, until the bar or rod 71 engages and rests upon the pile adjacent the inner edge thereof, and the bar or rod 89 will be raised to its uppermost position above the bar or rod 71 so as to permit the sheets to be delivered to the support or table 42 therebetween, as shown more clearly in Figure 4.

After the severed sheets have been deposited upon the pile, the table or platform 42 will be lowered to receive additional sheets.

When the table or platform 42 has reached the limit of its lowering movement, it may be raised again to the limit of its upward movement by the actuation of the treadle 54, and through the medium of the cable 57.

As the table or platform 42 reaches the limit of its lowermost movement, the collar 61 on the rod 63 will engage and actuate the switch handle 65 to stop the motor, but when the table or platform 42 is raised and as it reaches the limit of its uppermost movement, the collar 62 on the rod 63 will engage the switch handle 65 and move it in the opposite direction and thereby complete the current through the motor to start the latter.

While the preferred form of the invention has been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of the invention.

What is claimed as new is:—

1. In combination, a receiving table, means for delivering sheets to the table, a pair of members extending across the table in directions transverse to the direction of feeding movement of the sheet to the table and between which members the sheet is delivered to the table, means for moving said members past each other with the sheet therebetween and in directions transverse to the direction of feeding movement of the sheets, said members being disposed adjacent one edge of the sheets on the table, an extension on one of said members extending over and adapted to engage and rest against another portion of the pile, and guiding means for the end of such extension.

2. In a stacking mechanism of the character described for stacking sheets of comparatively thin material, a receiving support, means for delivering to the support the sheets to be stacked, means operating upon the sheets for bending or deflecting an edge of the sheet to flatten out the same and cause it to lie flat upon the pile on the support, the last recited means embodying laterally extending and longitudinally spaced members between which the edge of the sheets are projected, and means for vertically moving said members past each other with the edge of the sheet therebetween.

3. In a stacking mechanism of the character described for stacking sheets of comparatively thin material, a receiving support, means for delivering to the support the sheets to be stacked, means operating upon the sheets for bending or deflecting an edge of the sheet to flatten out the same and cause it to lie flat upon the pile on the support, the last recited means embodying laterally extending and longitudinally spaced members between which the edge of the sheets are projected, and means for vertically moving said members past each other with the edge of the sheet therebetween, a portion of the last recited means also operating to remove one of said members from beneath the sheet on the pile.

4. In a stacking mechanism of the character described for stacking sheets of comparatively thin material, a receiving support, means for delivering to the support the sheets to be stacked, means operating upon the sheets for bending or deflecting an edge of the sheet to flatten out the same and cause it to lie flat upon the pile on the support, the last recited means embodying laterally extending and longitudinally spaced members between which the edge of the sheets are projected, and means for vertically moving said members past each other with the edge of the sheet therebetween, a portion of the last recited means also operating to remove one of said members from beneath the sheet on the pile, said members successively engaging and resting upon the top of the pile to hold down the sheets.

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