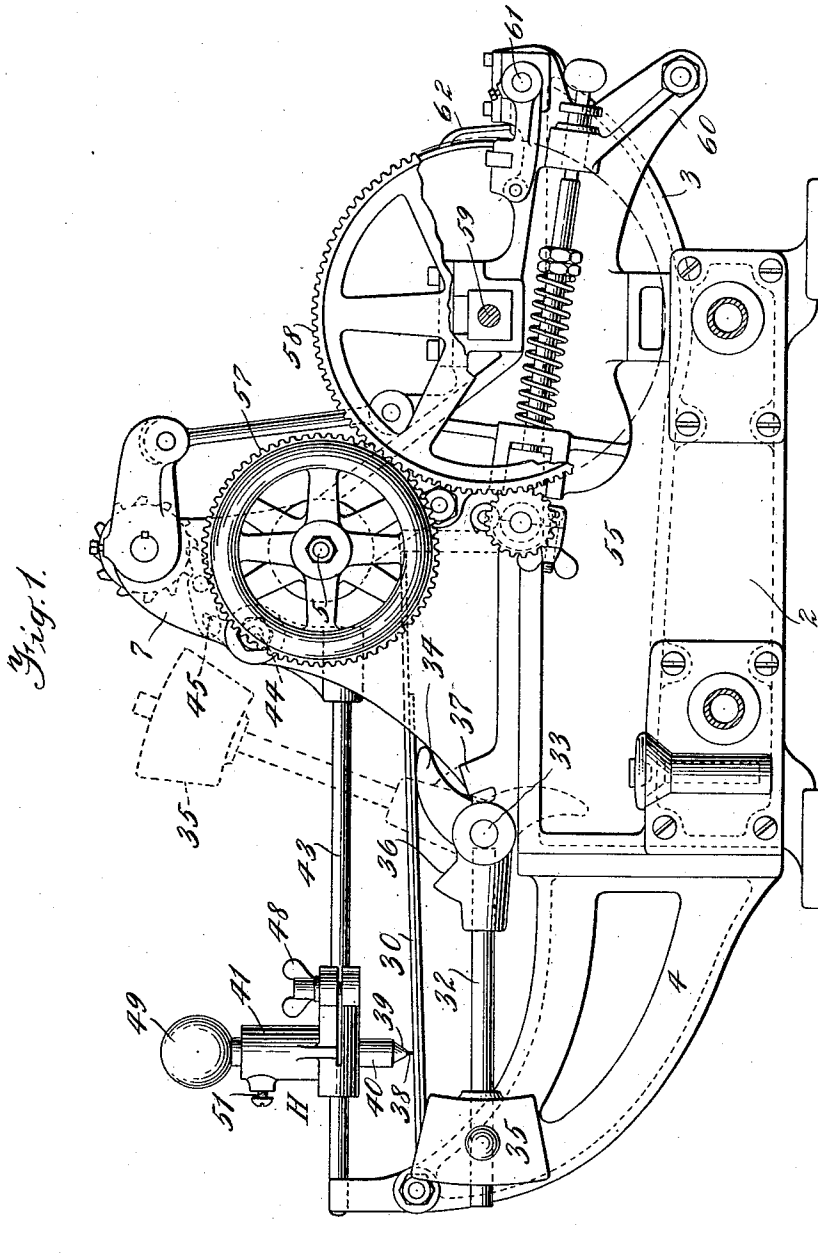


E. M. HAWKINS.
SHEET COATING MACHINE.
APPLICATION FILED DEC. 23, 1911.

1,109,331.

Patented Sept. 1, 1914.

4 SHEETS—SHEET 1.



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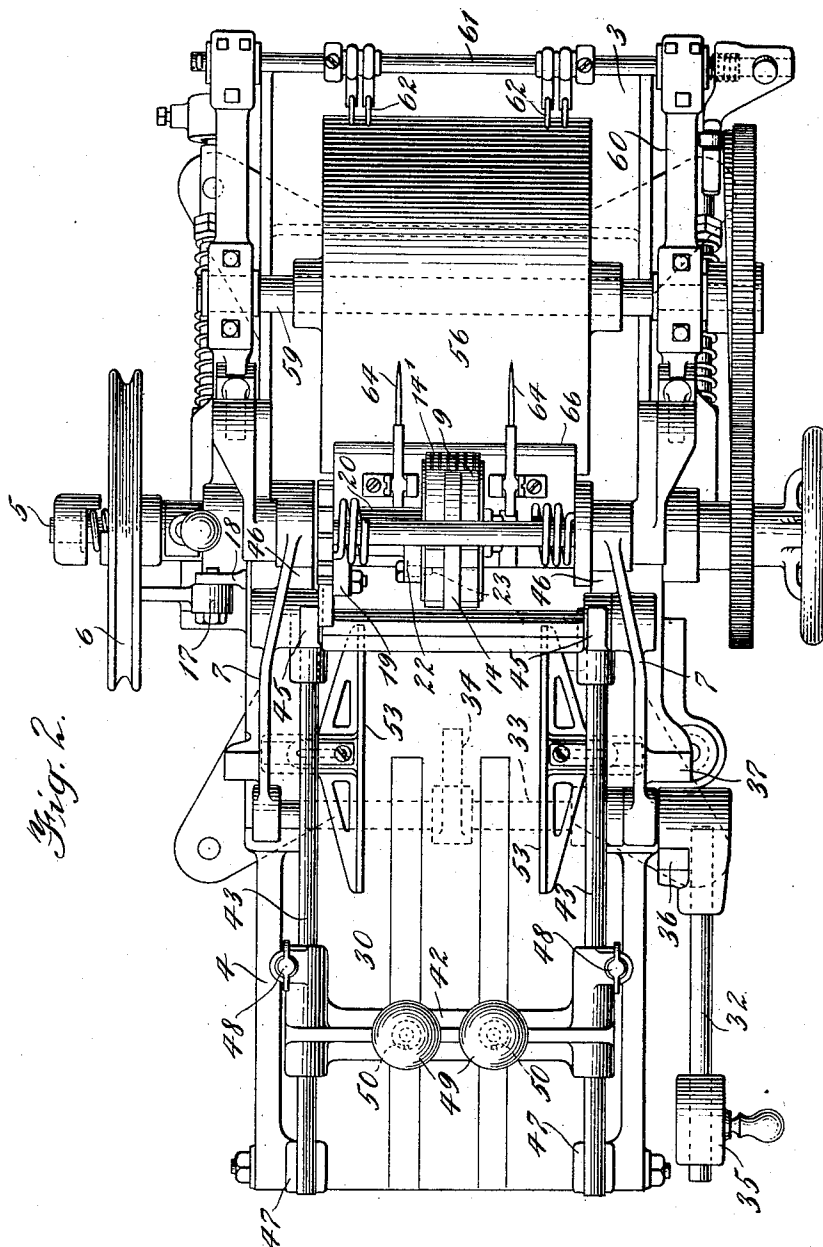
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4 SHEETS—SHEET 2.



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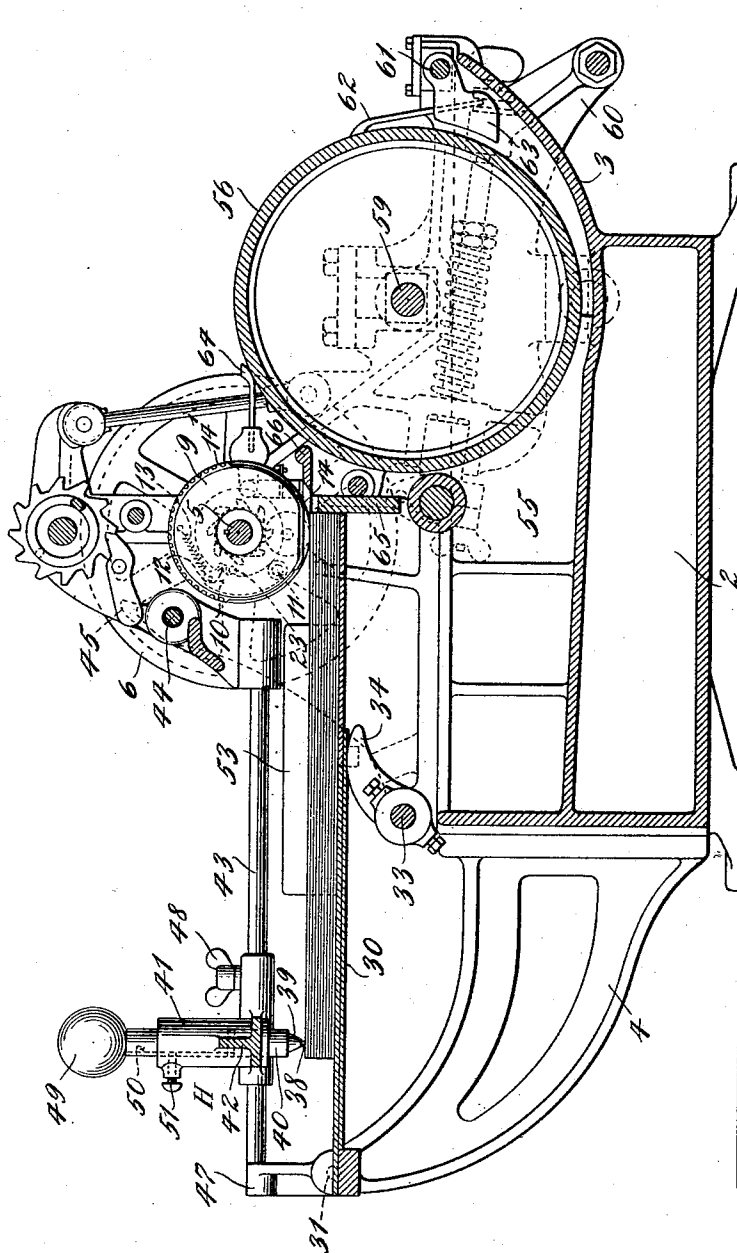
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4 SHEETS-SHEET 3.

Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 5.

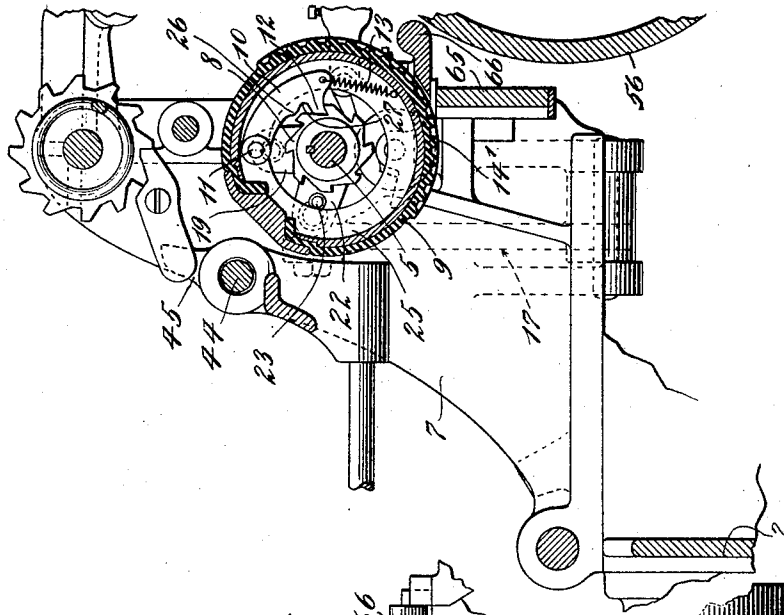
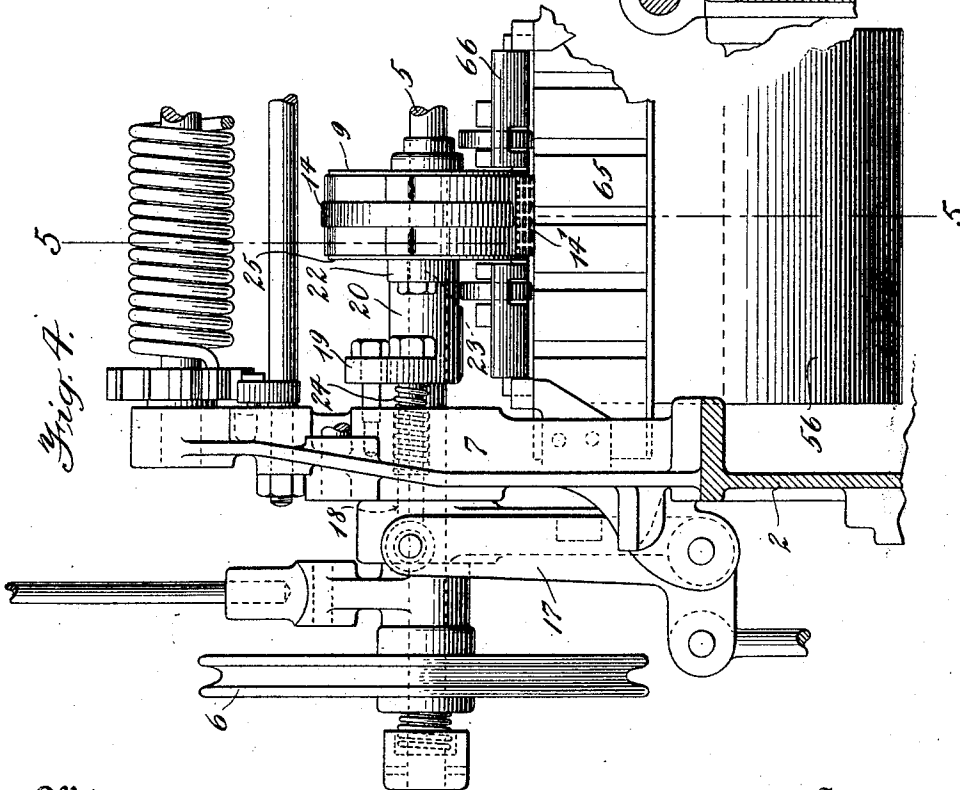


Fig. 4.



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Charles F. Davis

UNITED STATES PATENT OFFICE.

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SHEET-COATING MACHINE.

1,109,331.

Specification of Letters Patent.

Patented Sept. 1, 1914.

Application filed December 23, 1911. Serial No. 667,444.

To all whom it may concern:

Be it known that I, EDGAR M. HAWKINS, citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Sheet-Coating Machines, of which the following is a specification.

This invention relates to a sheet-coating machine and particularly to a sheet-coating machine of the type disclosed in my prior application, Serial No. 641,246, filed July 29, 1911, for coating or gumming sheets, such as labels, wrappers, etc., successively and automatically by power mechanism. A machine of this kind is useful mainly for gumming sheets to be applied one at a time to boxes or other articles, and the present invention is directed primarily to a machine adapted for use in this way, it being an improvement upon the invention disclosed in my aforesaid prior application. In said application there is disclosed a machine adapted to deliver gummed sheets in a manner controllable by the operator who is to paste said sheets on boxes, etc. One important feature of said machine is mechanism under the control of the operator for affording an intermittent feed of sheets to suitable gumming means, and one of the main features of such mechanism is the provision of means for reducing the friction of the feeding means on a sheet at a predetermined point in the operation of the machine so as not to interfere with the delivery of the sheets to the gumming means. Another feature of said machine is the provision of devices for applying pressure to a sheet or bunch of sheets at different points for the purpose of holding the sheets in proper relation with a feed-roll and also for the purpose of assuring the feed of the sheets or labels one at a time to the gumming means. In said machine, however, the various parts controlling the intermittent feeding of individual sheets or labels to the gumming means were such that in practice the apparatus there disclosed was limited to the use of sheets or labels of a certain range of dimensions and it was impossible to make use in said machine of sheets or labels of certain other dimensions.

The present invention is directed to means for increasing the range of operation of a machine of the general type disclosed in the

aforesaid application, and particularly to the provision of means for feeding very narrow as well as broad labels and whether longer or shorter than the circumference of the feed-roll constituting the main element of the feed mechanism. These and other features of the invention not hereinbefore referred to will be hereinafter described and claimed, and are illustrated in the accompanying drawings, in which,—

Figure 1 is a side elevation of a sheet-coating machine particularly adapted for use as a label-gumming machine, parts being broken away to illustrate the construction clearly; Fig. 2 is a plan of the same; Fig. 3 is a substantially central, vertical longitudinal section of the same, showing the positions of the parts when the feed-roll is at rest; Fig. 4 is an enlarged sectional rear elevation of a portion of the machine, illustrating particularly the feed-roll and the means for starting and stopping it; Fig. 5 is a vertical longitudinal section of the same, the section being taken in the line 5—5 of Fig. 4, and the feed-roll being shown in operative relation with the driving mechanism.

Similar reference characters designate like parts in all the figures of the drawings.

Nearly all of the fixed and movable parts of the mechanism embodying the present invention are, or may be, substantially the same as the corresponding parts of the machine shown in my aforesaid application. These parts with the exceptions hereinafter noted are as follows: The main frame of the machine is preferably a casting for supporting the moving parts and at the same time containing the glue or other adhesive to be applied to the sheets. The base of this casting also has means for maintaining the glue in a proper liquid condition throughout the operation of the machine. At its forward end the base is extended, as shown at 3, to support the forward operating parts and also to permit the glue-trough or reservoir to extend sufficiently far forward. At its rear end the base has bracket extensions 4, for supporting the operating parts of the mechanism at the rear of the machine.

The principal operating mechanisms are: feeding means for feeding the sheets successively to the gumming means; holding means for maintaining the sheets in proper position for engagement by the feeding

means, but so constructed as to permit the sheets to be fed readily at the proper times; and gumming means to which the sheets are delivered to be gummed.

5 A power-operated feeding means adapted to be brought into operation to feed sheets intermittently is employed, the feeding operation being under the control of an operator at the forward end of the machine in position
10 to remove sheets from the gumming means as fast as they are gummed. The speed of delivery of the sheets is also under the control of the operator. The feeding means is driven from the main shaft 5, as is the gumming means. The shaft 5 is driven by a
15 band-wheel 6 from a source of power (not shown) and is mounted in bearings in the side frames 7 near the longitudinal center of the machine. A ratchet-wheel 8 is splined on the shaft 5. Said shaft and ratchet-wheel
20 are intended to be continuously rotated by the band-wheel 6, to impart movement intermittently to a suitable feed member, such as the feed-roll 9, located substantially at the
25 transverse center of the machine, as is the ratchet-wheel 8. As in my aforesaid application the periphery of the feed-roll is preferably covered with a suitable flexible material, such as rubber, for a sufficient distance
30 to grip the sheets or labels firmly and positively feed them through the machine to the gumming means. This feed-roll may be brought intermittently into engagement with or disengaged from the power mechanism just described for driving it, by suitable
35 coupling means, such as a pawl 10 pivoted at 11 inside the feed-roll and having a tooth 12 adapted to be projected into the path of the teeth of the ratchet-wheel 8 and engaged thereby. A spring 13 normally holds said
40 pawl in position to be clutched by the ratchet-wheel; hence the feed-roll is normally clutched to the shaft 5 and rotates therewith.

45 The feed member shown is combined with means for holding a sheet in operative relation therewith. In the machine of my prior application the construction is such that this feed member is movable into and
50 out of contact with each sheet of a pile or bunch of sheets carried by suitable sheet-holding means, but in the present case the feed member or feed-roll is normally continuously in contact with a sheet. In this
55 case, as in the other, means is employed for feeding sheets successively from a pile or bunch, and the friction between the feed-roll and the sheet is reduced at a predetermined point in the operation of the machine, to wit: when a sheet or label reaches
60 and is engaged by the gumming means. The reduction of friction at the point of contact of the feed-roll and the sheet takes place intermittently and in the present machine is
65 due wholly to the construction of the feed-

roll. This feed-roll is illustrated as having at 14 a surface forming substantially a continuation of the rubber surface 14' before referred to and having a different coefficient of friction from that of the rubber surface. 70 These two surfaces are preferably continuous and make up the entire peripheral surface of the feed-roll. The two sections of this feed-roll surface constitute elements of a feed-controlling means, one section, which 75 has a comparatively high co-efficient of friction being intended to feed each sheet positively through the machine to the gumming means so long as said sheet is in contact with that section, while the other section, which has a comparatively low coefficient of friction, is intended to permit of a ready slippage between the same and the sheet when in contact with each other. This feed-roll surface 14' having the lower co-efficient of friction is intended to be brought 85 to the position shown in Fig. 3 each time a sheet is fed forward far enough to bring it into proper cooperative relation with the gumming means. At this time the feed-roll 90 will be stopped in its idle position and the face 14, which will usually be a polished metallic surface, as for example of brass, will receive the pressure previously borne by the rubber surface of the feed-roll. This 95 transfer of pressure from the surface having the higher co-efficient of friction to that having the lower co-efficient of friction takes place substantially at the time that the feed-roll is automatically stopped. The friction 100 of rest between the metallic surface 14 and the uppermost sheet of the pile of sheets will then be comparatively slight and will be readily overcome by the pull of the gumming roll upon the forward end of the sheet, 105 and hence whatever may be the length of the sheet it will be positively drawn through the machine by the gumming roll after the feed-roll has been automatically stopped.

The means here shown for starting and 110 stopping the feed-roll, being the same as that of my aforesaid application, comprises a treadle-operated shifting-lever 17, pivotally connected at its upper end to a slide or pin 18, secured at its inner end to a radial 115 ear or lug 19, of a sleeve 20, mounted to slide freely on the shaft 5, while the shaft turns freely therein. This sleeve is suitably held against rotation by means on the frame-work. It also has a second ear or lug 120 22 with a pin 23 in fixed relation therewith for cooperation with the pawl 10. Normally a coiled spring 24 forces the sleeve 20 and the pin 23 inward into the plane of rotation of the feed-roll, which is open at the end adjacent to the pin 23, it being illustrated as 125 having an annular end-plate 25 with a large central opening. The major portion of the inner edge of the pawl 10 when out of action is defined by the same circle that defines the 130

opening in the plate 25. The pin 23 lies just within this circle and moves into and out of the opening in the plate 25 in a path that clears all of the operating parts except those portions of the pawl 10 with which it is intended to coöperate. The pawl has a rise 26, followed by a compression or locking notch 27, immediately adjacent to the tooth of the pawl. Normally when the foot of the operator is released from the operating treadle (not shown) the pin 23 will be forced into the opening in the end of the feed-roll and, as said feed-roll turns, the inner edge of the plate 25 will pass around said pin without interference until the pawl 10 comes into position for operation, when said pawl will strike the pin and be forced out to the position shown in Fig. 3, said pin riding over the projection 26 and into the locking recess 27 at the proper point in the travel of the pawl. The projection 26 prevents back-lash and assures the locking of the feed-roll in the position shown in Fig. 3, with the face 14 of the feed-roll in contact with a sheet.

By means of the devices just described the feed-roll can be stopped substantially instantaneously and locked in the predetermined position without affecting the operation of the shaft 5 or of other parts controlled by said shaft.

In connection with the devices just described for feeding sheets to the gumming means, sheet-holding means similar to that of my aforesaid application will be employed. The sheet-holder proper is indicated at 30, and is pivoted at 31 in bearings at the upper, rear ends of the brackets 4. At these upper ends it has an arc of movement sufficient to accommodate a pile of sheets of suitable thickness. Feed pressure is exerted against the sheet-holder at one side thereof to hold the uppermost sheet of the pile in contact with the feed-roll, the means shown for this purpose being a counter-weighted cam-lever 32, fastened to a rock-shaft 33, mounted in suitable bearings on the frame-work and having a cam-arm 34, on which the sheet-holder rests. The feed pressure exerted may be varied by means of the adjustable weight 35, mounted to slide on the long arm of the lever and to be fastened at any desired point thereon. Said cam-lever is swung to the position shown by the dotted line in Fig. 1 whenever a bunch of sheets is to be placed on the sheet-holder. The upward movement of this cam-lever is limited, as by means of stops 36 and 37, one on the lever and the other on the frame-work. In addition to these devices for exerting pressure on the sheet-holder and sheets to bring the latter into proper relation with the feed-roll, means similar to that of my aforesaid application is employed for exerting opposing pressure

on the sheets to keep them in proper position for feeding and assuring their being fed from the pile one at a time only. This opposing pressure is exerted downwardly at the rear end of the sheets and in opposition to the upward feed pressure at the forward end of the sheet, the holding means employed being designated generally by H. An important feature of it is the provision of suitable means for exerting pressure on a small area or areas only of the sheet, the construction found best for the purpose being one in which needle-pointed holding devices are used, the needle point or points being so set as to engage the sheet very close to the rear end thereof—say within one-eighth or three-sixteenths of an inch of the rear edge. When so held each sheet when drawn forward by the feeding means has a short, fine slit cut in it by the needle point of each holding device, which slit is so narrow as to do no harm, as it is not noticeable when the sheet is applied to a box or other article. The means employed exerts a constant pressure on the upper, rear end of the pile of sheets, but its position lengthwise of the line of travel of the sheets may be varied at will in order that it may coöperate properly with sheets of various lengths. Two needle-points, 38, are shown as held in chucks 39, mounted in a sleeve 40, adjustable in a vertical bearing 41, in a cross-head 42, mounted to slide on a pair of slide-rods 43 forming parts of a pivot-frame or needle-carriage, the pivot point of which is in a rock-shaft 44 mounted in bearings on the frame-work and having stops 45 coöperative with fixed stops 46 on the frame-work to limit the upward movement of said frame about its axis in the rock-shaft 44. The rods 43 rest in half-bearings 47 rising from the rear bracket-arms 4. Clamp-screws 48 are secured to the cross-head 42 and the parts secured thereby in any desired position lengthwise of the needle-carriage. The needle-pointed holding devices may be raised by grasping their weighted heads 49 and turning them about 90°, bayonet-slots being shown at 50 in the sleeves 40 for this purpose. These devices are elevated whenever it becomes necessary to refill the sheet-holder, stops being shown at 51 for holding said devices in this elevated position. Suitable guides, such as 53, are also employed at opposite sides of a bunch of sheets for locating the sheets sidewise. These guides or gages may be of any suitable kind and adjusted in any well-known manner (see Fig. 2). By means of them very narrow strips may be properly located in the central line of feed of the machine, that is, in alinement with the feed-roll, and hence the feed-roll will coöperate properly with sheets of all widths from the widest to the narrowest within the capacity of the machine.

The gumming means employed embodies as its main element a trough or reservoir 55 for glue or other adhesive, and a glue-roll or gumming-roll 56. The gumming-roll co-operates with and is located close to the feed-roll. It is preferably continuously rotated from the main shaft by means of spur-gears, 57 and 58, secured respectively to the main shaft 5 and to a shaft 59 carrying the gumming-roll. This gumming-roll is mounted in a swinging frame 60, having its axis of movement in the shaft 5. At its forward ends the frame 60 supports a longitudinally-movable shaft 61, carrying pick-off fingers 62, weighted at 63 to maintain them in contact with the surface of the glue-roll so as to assure the removal of the gummed sheets. Corresponding weighted presser-fingers are shown at 64, for holding down on the glue-roll sheets emerging from the feeding means. The sheets are positioned at their forward ends by a stop 65 and move in a path above the latter and beneath the plate 66 into contact with the gummed surface of the gumming-roll by which each sheet is carried upward and under the fingers 64.

From the foregoing it will be seen that my improved feeding means embodies a feed-rod that permits proper feeding of sheets or labels either of less length or of greater length than the circumference of the feed-roll, and this is not the case with the feed-roll shown in my aforesaid application, the use of which unaided by outside means, is limited to sheets or labels of substantially the same length as the circumference of the feed member. It will also be seen that narrow sheets or labels—that is, sheets or labels of even less width than that of the feed-roll, co-act with said feed-roll in substantially the same manner as wide sheets or labels, and this also is not the case in the mechanism of the aforesaid application in which the construction was such that in order to be fed through the machine properly, the sheets or labels had to be at least wide enough to be engaged by certain idler rolls to which the feed pressure was transferred on the stopping of the machine. In the present case the feed pressure is always borne by the feed-roll and is transferred first to one and then to the other of its surfaces at different points in the operation of the machine, as and for the purpose hereinbefore described.

The action of the feed roll of the present machine, in so far as its surface 14 is concerned, may be briefly described as follows: When the feed roll is turning with its surface 14 in contact with the uppermost sheet of the bunch, the friction of said surface against the sheet is insufficient to overcome the grip of the holding needles upon the sheet; and when the feed roll has come to

a stop after the feeding of a long sheet to a position with its front end engaged by the gumming roll and its rear end extending back of the feed roll, the pull of the gumming roll upon the sheet will be so much greater than the friction of rest between the metallic surface 14 and the stationary bunch of sheets between which the rear end of the uppermost sheet is located that this friction of rest will be readily overcome and the sheet permitted to be drawn through by the action of the gumming roll.

What I claim is:—

1. In a machine of the character described, a rotary power-operated feed-controlling device embodying successive circumferential sheet-engaging surfaces having different coefficients of friction and one or the other of which is normally in contact with a sheet and one of which is operative for feeding a sheet to the machine and the other of which permits said sheet to readily slip relatively thereto, actuating means to rotate said feed roll, and automatic means operable when the surface of less co-efficient of friction is in contact with the sheet to disconnect the actuating means from the feed roll and thereby stop said roll.

2. In a machine of the character described, a rotary power-operated feed-controlling device embodying successive circumferential sheet-engaging surfaces having different coefficients of friction and one or the other of which is normally in contact with a sheet and one of which is operative for feeding a sheet to the machine and the other of which permits said sheet to readily slip relatively thereto, actuating means to rotate said feed roll, and automatic means operable when the surface of less co-efficient of friction is in contact with the sheet to disconnect the actuating means from the feed roll and thereby stop said roll, said means adapted to positively hold said feed roll against further rotation.

3. In a machine of the character described, a rotary power-operated feed-controlling device embodying successive circumferential sheet-engaging surfaces having different coefficients of friction and one or the other of which is normally in contact with a sheet and one of which is operative for feeding a sheet to the machine and the other of which permits said sheet to readily slip relatively thereto, actuating means to rotate said feed roll, and automatic means operable when the surface of less co-efficient of friction is in contact with the sheet to disconnect the actuating means from the feed roll and thereby stop said roll, said means adapted to positively hold said feed roll against further rotation, but operable to release the feed roll and reestablish the connection between the same and the actuating means.

4. In a machine of the character described,

a rotary power-operated feed-controlling device embodying successive circumferential sheet-engaging surfaces having different coefficients of friction and one or the other of which is normally in contact with a sheet and one of which is operative for feeding a sheet to the machine and the other of which permits said sheet to readily slip relatively thereto, actuating means to rotate said feed roll, and automatic means operable when the surface of less co-efficient of friction is in contact with the sheet to disconnect the actuating means from the feed roll and thereby stop said roll, said means adapted to positively hold said feed roll against further rotation, and said means being under the control of the operator to release said feed roll and reestablish the connection between the same and the actuating means.

5. In a machine of the character described,

a rotary power-operated feed roll, the whole peripheral surface of which is movable in a path that intersects the path of travel of the sheet being fed and is made up of two sections, one of which is operative for feeding a sheet to the machine and the other of which permits said sheet to slip relatively thereto, actuating means to rotate said feed roll, and automatic means operable when the last-named section is in contact with the sheet to disconnect the actuating means from the feed roll and thereby stop said roll.

Signed at Rochester, in the county of Monroe, and State of New York, this 11th day of December, A. D. 1911.

EDGAR M. HAWKINS.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."