March 26, 1946. W. J. HAESSLER 2,397,258

SHEET FEEDING MECHANISM

Original Filed March 12, 1942 9 Sheets-Sheet 1

Fig. 1.

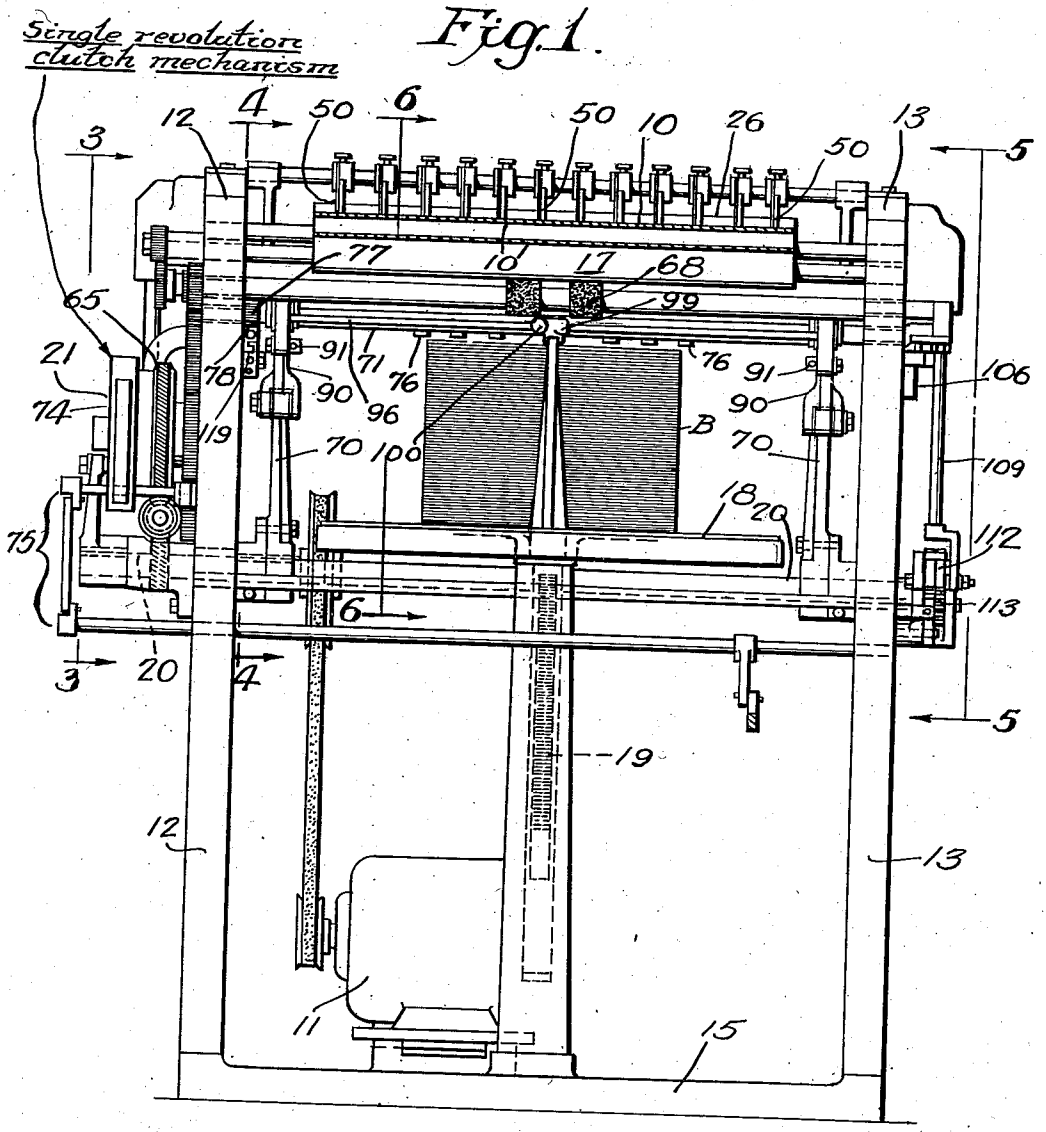

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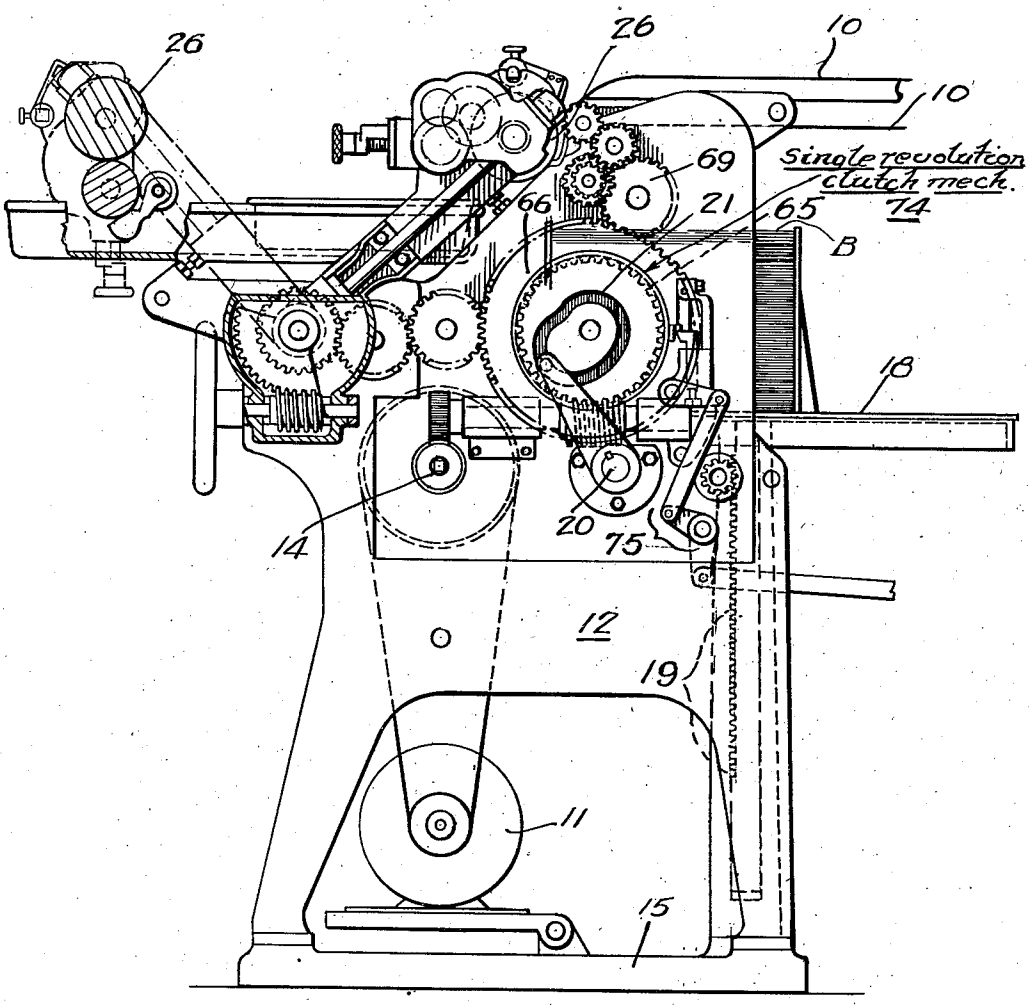
Fig. 2.



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SHEET FEEDING MECHANISM

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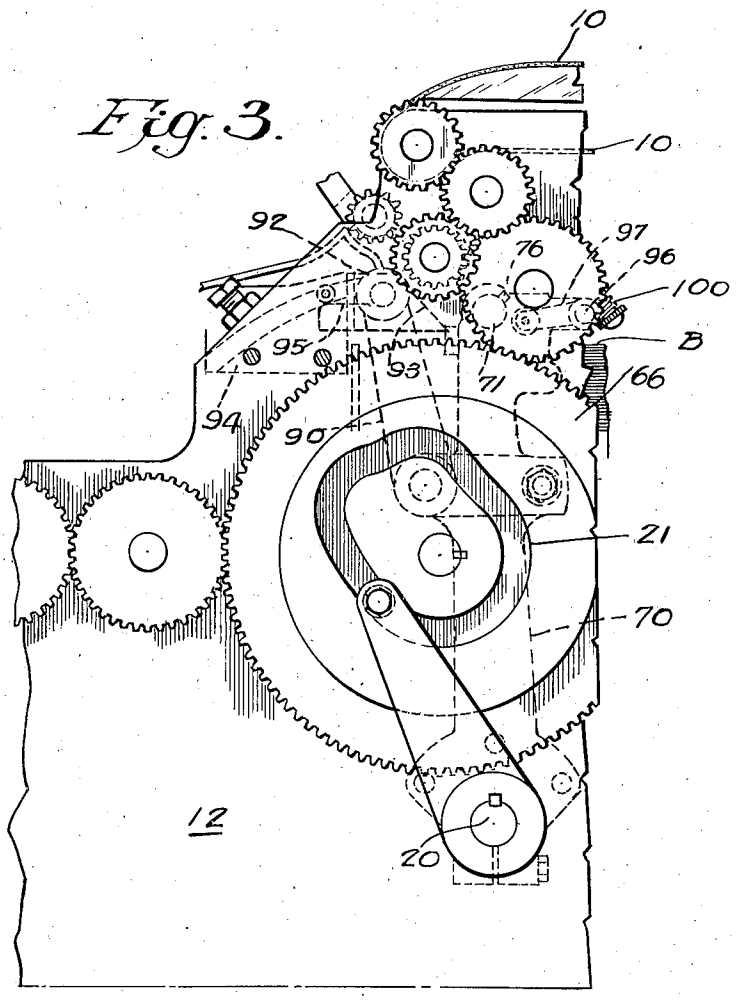
Fig. 3.



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SHEET FEEDING MECHANISM

Original Filed March 12, 1942 9 Sheets-Sheet 4

Fig. 4.

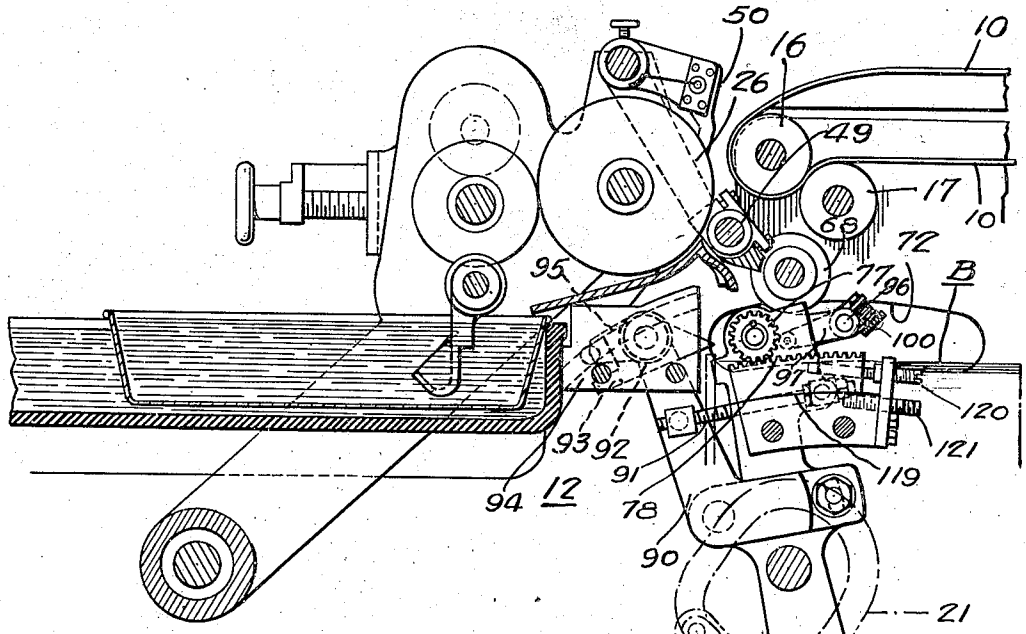


Fig. 18.

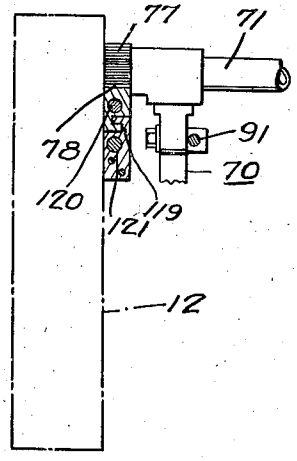
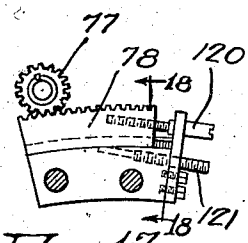


Fig. 17



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SHEET FEEDING MECHANISM

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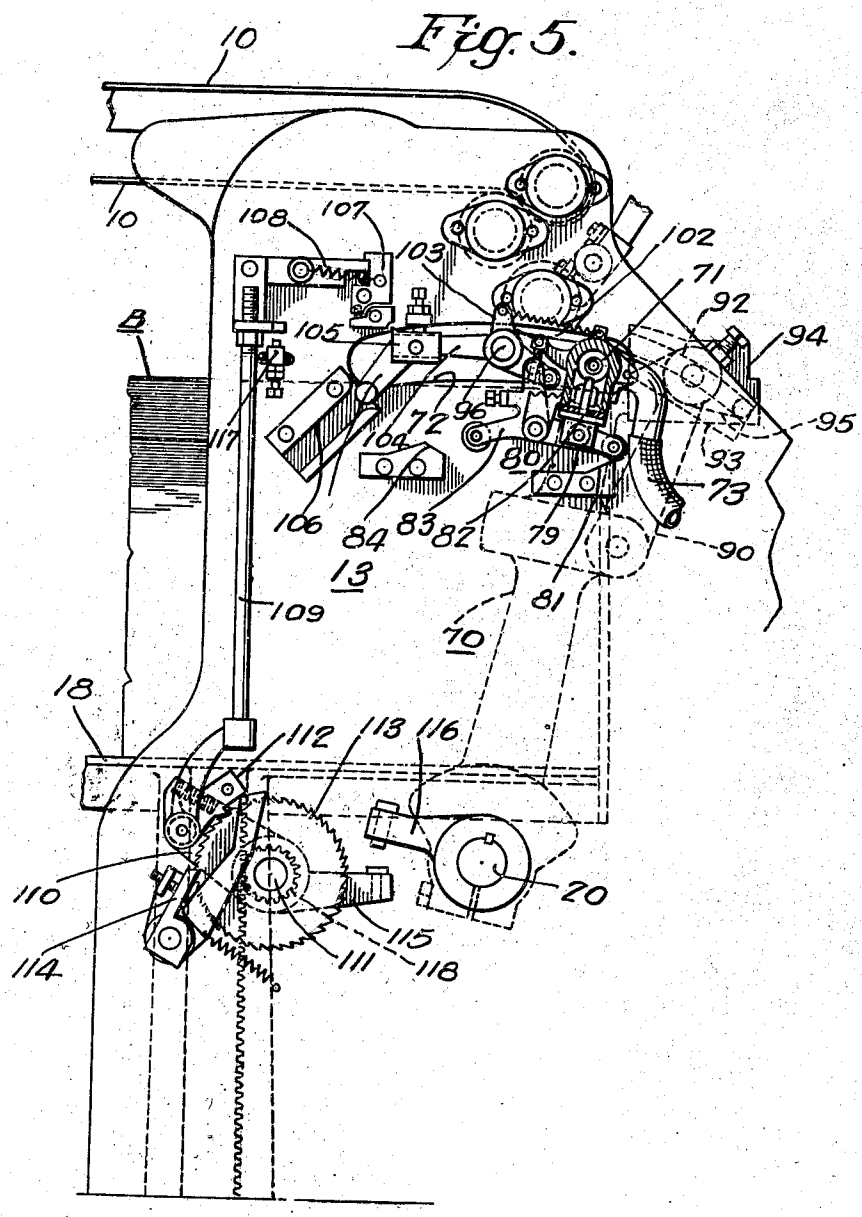
Fig. 5.



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SHEET FEEDING MECHANISM

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Fig. 6.

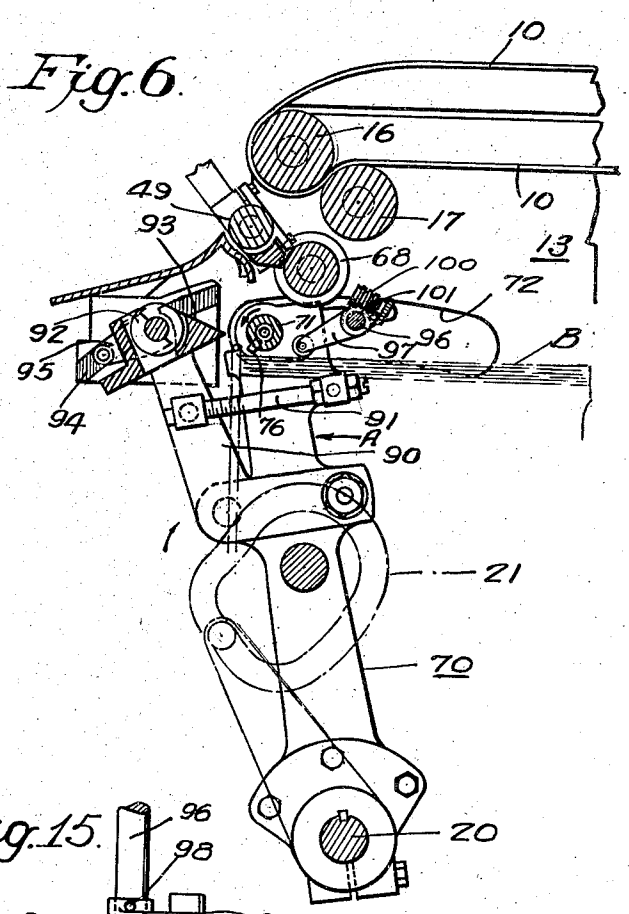


Fig. 15.

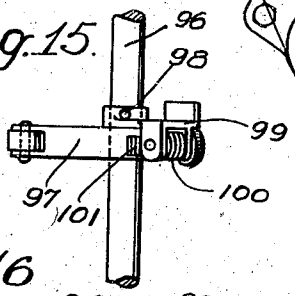
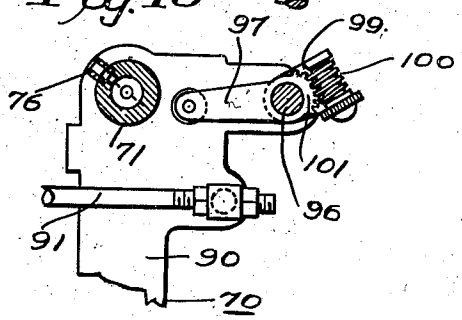


Fig. 16



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SHEET FEEDING MECHANISM

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Fig. 7.

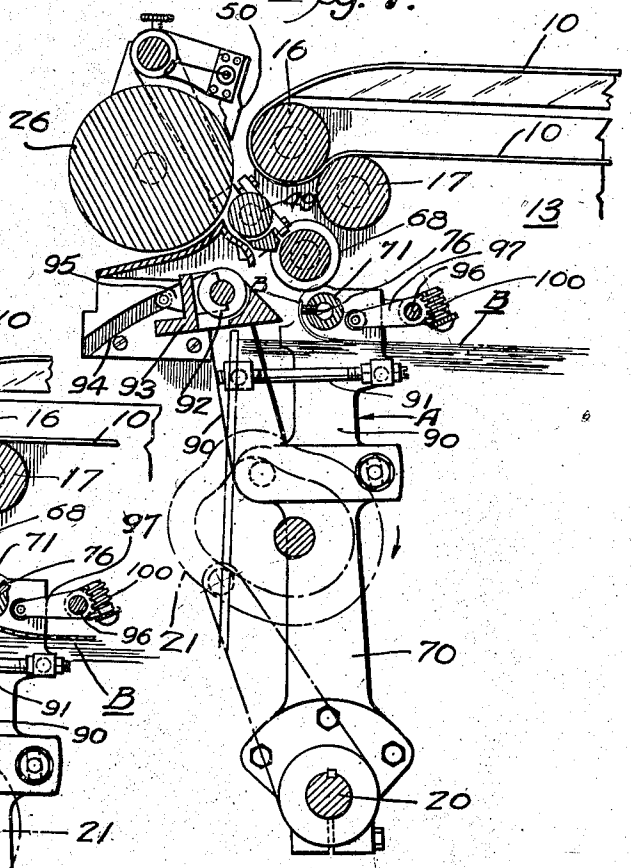

Fig. 8

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SHEET FEEDING MECHANISM

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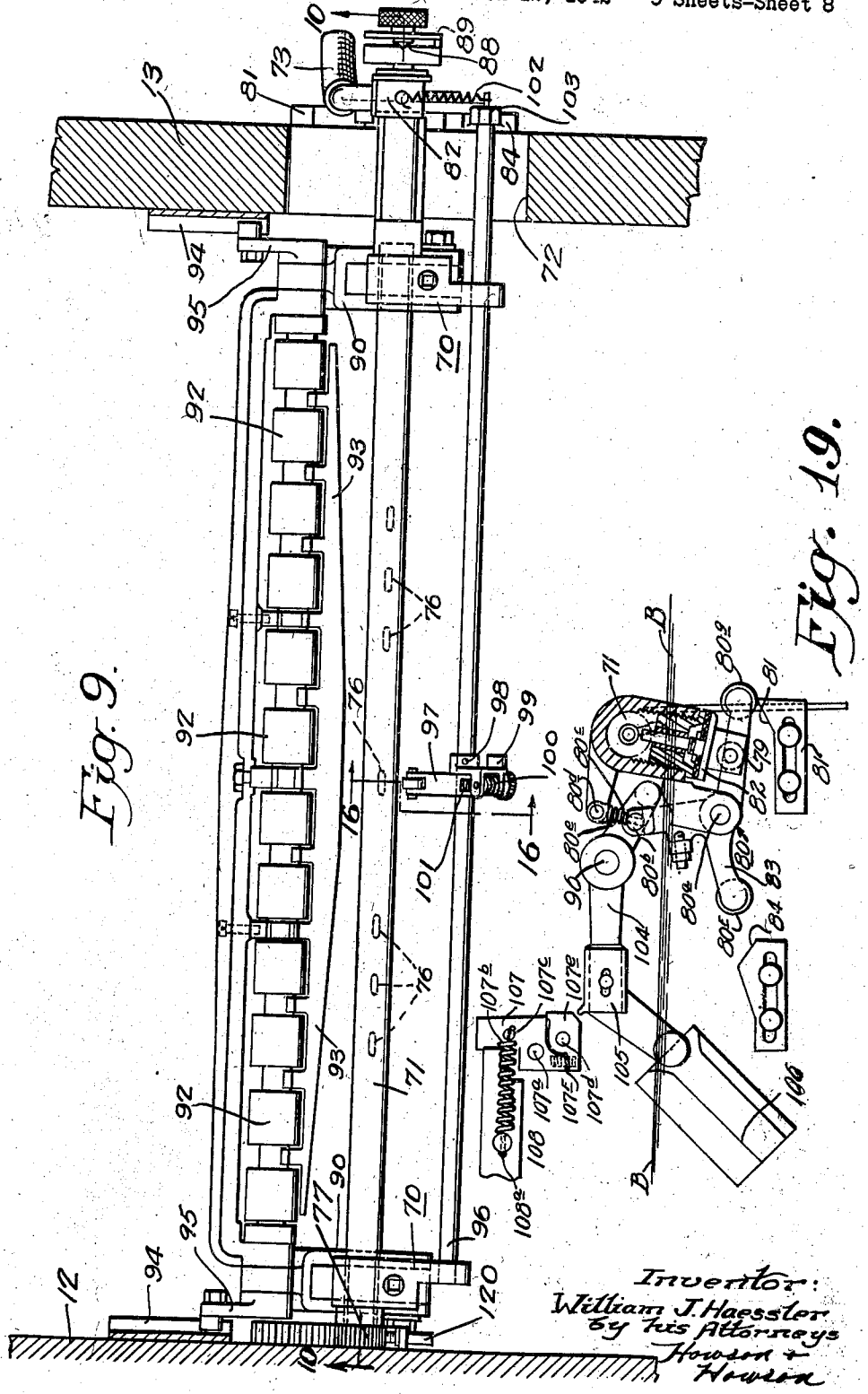

Fig. 9.

Fig. 19.

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SHEET FEEDING MECHANISM

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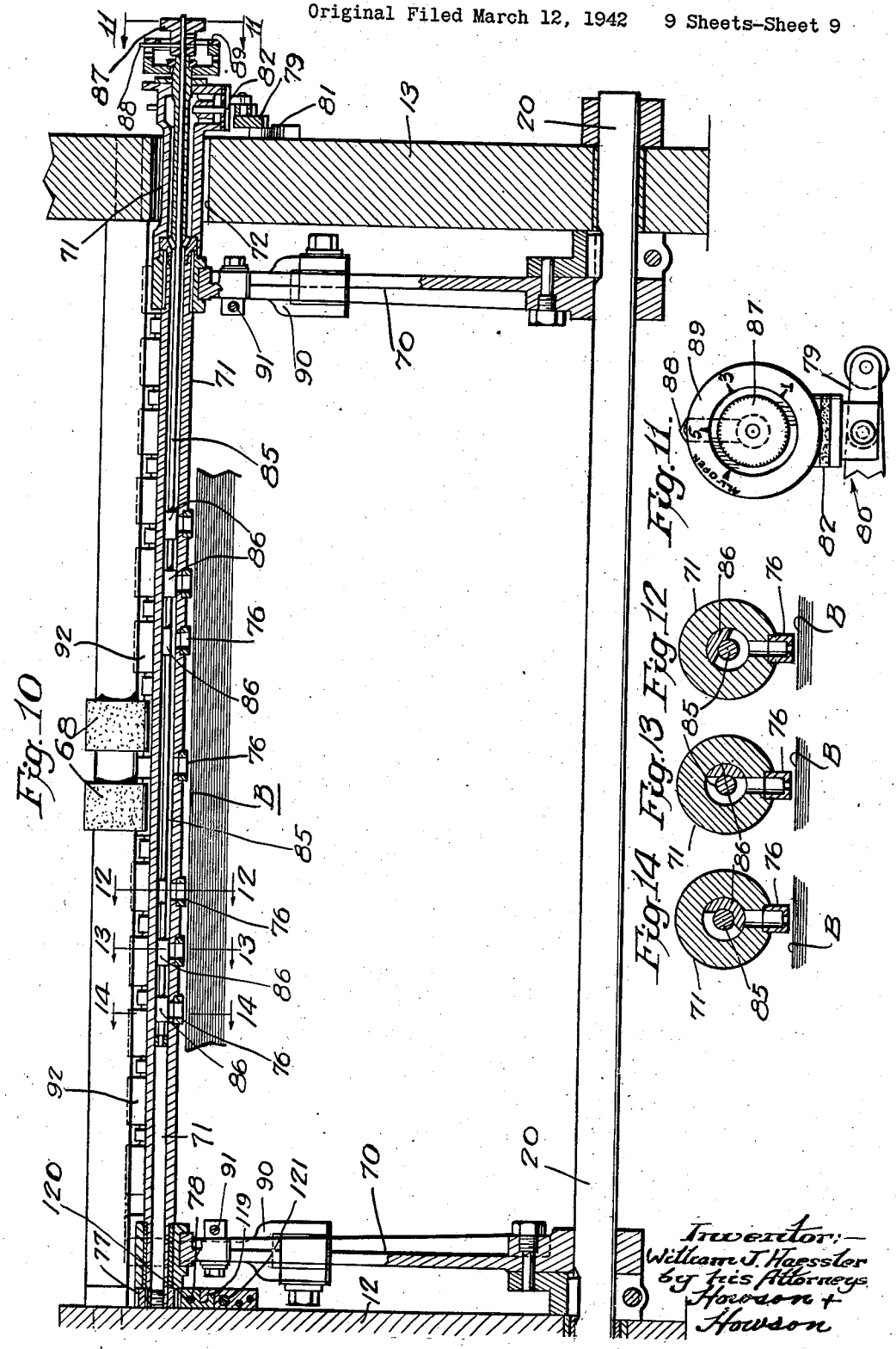

Patented Mar. 26, 1946 2,397,258

UNITED STATES PATENT OFFICE

2,397,258

SHEET FEEDING MECHANISM

William J. Haessler, Philadelphia, Pa., assignor to High Production Machine Co., Inc., Philadelphia, Pa., a corporation of Pennsylvania

Original application March 12, 1942, Serial No. 434,431. Divided and this application December 23, 1944, Serial No. 569,555

10 Claims. (Cl. 271—27)

This invention relates to sheet feeding mechanisms and more particularly to a sheet feeding mechanism for supplying sheets to gluing machines of the type shown in my copending application, Serial No. 434,431, filed March 12, 1942, for Automatic glue applying machines, allowed July 19, 1944, of which this application is a division, said copending application having matured into Patent No. 2,368,759 on February 6, 1945.

In machines of this character, it is required that the sheets be very accurately and positively fed, and an important object of the present invention is the provision of a feeding mechanism meeting these requirements and which, at the same time, may be relatively cheaply manufactured and will be durable and efficient in service.

Another object of the invention is the provision of a novel and improved means for supplying the blanks to be glued to the gluing roll, including a vacuum pick-up having associated therewith means whereby the extent through which vacuum is applied to the wrappers or the like may be regulated and distributed across the width of the same.

A still further object of the invention is the provision of means whereby the vacuum pick-up may be regulated as to the point of application of vacuum thereto so that the time of pick-up and release of the sheet may be closely regulated.

A still further object is the provision of means whereby the idler feed roll with associated feed plate can be adjusted so that the idler feed roll will come into blank clamping engagement with the main feed roller without changing the position of the suction pick-up roller in relation to the leading edge of the blank, and without changing the time when the suction is applied and broken or the adjustment of the feeler and trip mechanism, which controls the height of the stock of blanks.

A still further object is the provision of means whereby the height of an associated stack of wrappers or the like may be closely regulated to thus insure proper operation of the vacuum pick-up means.

These and other objects I attain by the construction shown in the accompanying drawings wherein, for the purpose of illustration, I have shown a preferred embodiment of my invention and wherein:

Fig. 1 is a rear elevation of a gluing machine embodying a sheet feeding mechanism constructed in accordance with my invention;

Fig. 2 is a side elevation thereof, portions of the casing being removed or broken away;

Fig. 3 is a fragmentary section on line 3—3 of Fig. 1;

Fig. 4 is a section on line 4—4 of Fig. 1;

Fig. 5 is a section on line 5—5 of Fig. 1;

Fig. 6 is a section on line 6—6 of Fig. 1;

Figs. 7 and 8 are sections similar to that of Fig. 6 but showing additional positions of the mechanism;

Fig. 9 is a fragmentary planned view of blank feeding mechanism;

Fig. 10 is a section on line 10—10 of Fig. 9;

Figs. 11, 12, 13 and 14 are sections on lines 11—11, 12—12, 13—13 and 14—14, respectively, of Fig. 10;

Fig. 15 is a fragmentary plan view illustrating the construction of the paper feeler;

Fig. 16 is a section on line 16—16 of Fig. 9;

Fig. 17 is an elevational view of the pneumatic feed roller adjustment; and

Fig. 18 is a section on line 18—18 of Fig. 17.

Fig. 19 is an enlarged elevation partially in section of the valve control mechanism and its associated parts.

Referring now more particularly to the drawings, the machine illustrated operates as a feeder of glued blanks to a wrapping machine (not herein shown) supplying glued blanks to the wrapping machine by a conveyer belt 10. The machine comprises a base 15 mounting a suitable drive motor 11 from which base arise frame elements 12 and 13 in which are mounted for rotation a main drive shaft 14, a blank feeding roll 68, and conveyer driving rolls 16 and 17 for conveyer 10. At the rear or discharge end of the machine the frames support a vertically movable blank support 18, vertical movement of which is provided through racks 19, control of which is through mechanism hereinafter fully described. The actual feeding of the blank is controlled by an oscillatory shaft 20 mounted in frame elements 12 and 13, an actuating cam 21 and associated mechanisms hereinafter described.

Operation of the blank feeding mechanism, with the exception of main feeding roll 68 which is driven from gear 66 through idler 69, is controlled by cam 21 actuating rock shaft 20. Rock shaft 20 has secured thereto a pair of arms 70, the upper ends of which rotatably support a vacuum pick-up tube 71, an end of which projects through a slot 72 in the frame member 13 and is flexibly connected, as at 73, with a source of suction. Cam 21 is connected on demand to gear 65 through a single revolution clutch mechanism

74 tripping of which is effected through a link-and-lever mechanism operated from the wrapping machine and indicated generally at 75. In Fig. 2 the cam is illustrated in what may be termed the rest position, at which it is halted upon completion of each revolution of clutch 74, the corresponding position of the associated mechanism being shown in Figs. 4 and 6. In this position of the mechanism the suction nozzles 76 of vacuum tube 71 are arranged above and directed downwardly toward the stack of blanks B from which individual blanks are to be fed to the glue-applying mechanism, being held in this position by engagement of a pinion 77 on tube 71 with a rack 78 secured to the frame member 12.

Initial movement of the cam shifts the tube 71 in the direction of the arrow marked "A" in Fig. 6. This movement brings the mechanism to the position shown in Fig. 6, and brings one arm 79 of toggle mechanism, generally designated at 80, into engagement with the cam 81, trips the toggle mechanism causing closure of a valve 82 normally open to the atmosphere thereby instituting suction in the vacuum tube 71 causing same to pick up the top blank of the pile and elevate the forward edge thereof. The succeeding movement of the cam reverses the direction of operation rotating the tube to cause the same to elevate, through nozzles 76, the top blank of the pile. When the mechanism arrives in the position as shown in Fig. 7, the second cam 84 trips the toggle and opens valve 82 breaking the vacuum to release the blank and allows the leading edge of the blank to fall upon the plate 93. The continued reverse movement of the mechanism causes the plate 93 to enter the leading edge of the blank between the feed rollers completing the feeding of the blank. The final movement of the cam restores the tube 71 to the rest position illustrated in Fig. 4.

The toggle mechanism 80 comprises an inverted T shaped lever pivoted at 80A to the casing of valve 82. The vertical stem of this lever mounts a pivot 80B through which is slidably directed a pivoted rod 80C likewise pivoted to the valve casing as at 80D. A spring 80E surrounds rod 80C and has bearing at its ends against the pivots 80B and 80D. The ends of the horizontal arms of this lever mount rollers 80F and 80G for coaction respectively with cams 81 and 84.

The toggle mechanism per se comprises the vertical arm of the inverted T shaped lever, the rod 80C and spring 80E. It will be obvious that this spring will be placed under increased stress when the T shaped lever rocks, as the pivots 80A, 80B and 80D approach alignment and after the movement of the lever causes the pivot 80B to pass beyond the alignment point, this spring will cause the valve to snap rapidly to its open or closed position.

The tube 71 includes a constantly open central nozzle and a plurality of nozzles arranged at either side thereof which are controlled by a valve mechanism comprising a small rod 85 extending longitudinally of the bore of tube 71 and equipped with segmental valve elements 86 for controlling the nozzles. As more clearly seen from a comparison of Figs. 12, 13 and 14, these valve elements are so constructed that one, two or three of the side nozzles of the tube may be opened as desired. The end of the rod is projected through one end of tube 71 and equipped with an operating knob 87 having a pointer 88 coacting with a dial 89 serving as an indication as to which of the nozzles is effective.

Pivotally supported upon arms 70 is a pair of brackets 90 adjustment of these brackets about the pivots thereof being effected as by means of control rods 91. Rotatably mounted in the upper ends of brackets 90 is an idler feeding roll 92 and pivotally supported from the shaft of this roll is a feed plate 93. In order that the forward edge of the feed plate upon which a feed blank initially engages may be maintained at a common horizontal level despite the arcuate movement imparted to the feed roll, cams 94 are secured to the standards 12 and 13 and the feed plate is equipped with arms 95 having rollers engaged in grooves in these cams.

In order that the upper surface of the pile of blanks B may be maintained at the proper level for coaction with the vacuum pick-up tube 71, the upper ends of the arms 70 rotatably mount a feeler shaft 96 about which a centrally located feeler 97 is mounted for rotation. Secured to the shaft, as at 98, is a bracket 99 bearing a hand-operated worm 100 coacting with a segment 101 on the feeler 97. A spring 102 extending between the housing of valve 82 and an arm 103 on shaft 96 urges rotation of shaft 96 in a direction to cause the feeler to engage the upper surface of the blank stack B. Projecting rearwardly from the shaft is an arm 104 bearing a trip 105 and having its terminal adapted for coaction with an inclined cam 106 which, after a predetermined rearward movement of the paper-feeding mechanism, causes the arm 104 to depress and thus elevate the feeler from the stack. This same depression releases the trip 105 from engagement with a pawl 107 which controls the feed of the blanks upwardly provided the same shall have been engaged by the trip. If the level of the blank stack is sufficiently low, spring 102 will cause an elevation of the trip to a point such that it will engage the lower end of the pawl, thereby releasing the same from its engagement with one end of a lever 108. The opposite end of lever 108 is pivotally connected to a depending rod 109, the lower end of which is connected to an oscillatory pawl carrier 110 pivoted about shaft 111 and bearing a pawl 112 coacting with a ratchet wheel 113 secured to shaft 111. This ratchet wheel has likewise associated therewith a holding pawl 114. The tail 115 of the ratchet carrier 110 extends toward rock shaft 20 and into the path of movement of a tappet arm 116 secured thereto. When lever 108 is released by pawl 107, the ratchet carrier drops until its movement is checked through an adjustable stop 117. Upon the next rearward movement of arms 70, the tappet 116 will engage with the tail of the lever advancing the shaft 111 through one rotative step and, accordingly, elevating racks 19 which are engaged by pinions 118 on shaft 111.

The pawl 107 is pivoted at 107A to the main frame of the machine. It is normally maintained in an engagement with the end of lever 108 through a spring 107B connected between the pivot 108A of lever 108 and a stud 107C on pawl 107. Pivoted to the pawl 107 as at 107D is a control block 107E normally maintaining the position shown in Fig. 5 by a spring 107F. This control block is engaged by trip 105 and if the stack is sufficiently elevated, will oscillate about the pivot 107D without releasing pawl 107 from lever 108. If, however, the stack is sufficiently depressed and trip 105 correspondingly elevated, the engagement between this trip and control

block 107E will effect disengagement of the pawl.

Attention is directed to the fact that contact of the feeler finger with the stack occurs at the moment of alignment of the vacuum mechanism therewith, thus insuring an accurate determination of the stack level at the time when determination of this level is most essential. It will be noted that by use of a mechanism of the character just described, it is not necessary that any real pressure be applied to the stack, the actual pressure exerted on the stack by the feeler finger being of an order of a few ounces.

Assuming that the parts are in the position illustrated in Figs. 2, 4, and 6 and that the single revolution clutch 74 is tripped, the blank-feeding mechanism first moves forwardly toward the gluing mechanism thus engaging arm 79 of the vacuum control mechanism with cam 81 (Fig. 5) and bringing the vacuum pick-up tube into operation, the nozzles of this tube at this time being substantially vertically directed and extending downwardly to the upper surface of the blank stack. Continued operation of the cam 21 causes a rearward movement of the blank feeding mechanism accompanied by a rotation of the tube 71 in the direction of the arrows of Figs. 7 and 8. This motion results in the blank being picked up and elevated into engagement with the main feeding roller 68, following which the idler feed roller 92 clamps the blank to the main feeding roller and causes it to be fed between gluing roll 26 and guide roll 49. The paper feeding mechanism then returns to its normal position illustrated in Figs. 2 and 4. The glued blank is doctored from the gluing roll by blades 50 and is removed by conveyer 10.

In some cases it may become desirable to regulate the angle at which the suction nozzles come into effective engagement with the blank. This may be accomplished by making rack 78 adjustable upon a curved track 119. Longitudinal adjustment is attained through screw 120, and adjustment retained through a wedging screw 121.

Since the structure illustrated is, obviously, capable of considerable modification without departing from the spirit of the invention, I do not wish to be understood as limiting myself thereto except as hereinafter claimed.

I claim:

1. In apparatus of the type described, means to feed blanks comprising a blank support having means to maintain the uppermost blank of a blank stack thereon at a substantially constant level, a driven blank feeding roll, an idler blank feeding roll adapted to come into blank clamping engagement with said driven roll, an oscillatory support for the idler feed roll, a rotatable vacuum pick-up device moving with said idler feed roll and oscillatable about its axis to elevate the entering edge of a blank for engagement between said driven and idler feed rolls, means to oscillate said support, and means operative through oscillation of the support including a valve carried by the support for controlling the vacuum in the vacuum pick-up device.

2. In apparatus of the type described, means to feed blanks comprising a blank support having means to maintain the uppermost blank of a blank stack thereon at a substantially constant level, a driven blank feeding roll, an idler blank feeding roll adapted to come into blank clamping engagement with said driven roll, an oscillatory support for the idler feed roll, a rotatable vacuum pick-up device moving with said idler feed roll and oscillatable about its axis to elevate the entering edge of a blank for engagement between said driven and idler feed rolls, means to oscillate said support, means operative through oscillation of the support for controlling the vacuum in the vacuum pick-up device comprising a valve carried by the support, a snap action toggle mechanism controlling opening and closing of the valve, and cam means engaged with the toggle mechanism by oscillation of the support to thereby operate said valve.

3. In apparatus of the type described, means to feed blanks comprising a blank support, a driven blank feeding roll, an idler blank feeding roll adapted to come into blank clamping engagement with said driven roll, an oscillatory support for the idler feed roll, a vacuum pick-up device moving with said idler feed roll and oscillatable about its axis to elevate the entering edge of a blank for engagement between said driven and idler feed rolls, means to oscillate said idler feed roll and vacuum pick-up device, means operative through oscillation of the vacuum pick-up device for controlling the vacuum therein, a bar supported for oscillation upon said oscillatory support, a finger adjustably fixed on said bar and engaging the uppermost blank of a stack on said blank support, means to yieldably oscillate said bar to bring said finger in engagement with said stack at the time vacuum is formed in said pick-up device, and means controlled by the angular position of the bar about its axis controlling the vertical position of the blank support.

4. In apparatus of the type described, means to feed blanks comprising a blank support having means to maintain the uppermost blank of a blank stack thereon at a substantially constant level, a driven blank feeding roll, an idler blank feeding roll adapted to come into blank clamping engagement with said driven roll, an oscillatory support for the idler feed roll, a rotatable vacuum pick-up device moving with said idler feed roll and oscillatable about its axis to elevate the entering edge of a blank for engagement between said driven and idler feed rolls, means to oscillate said support, and means including a valve carried by and operative through oscillation of the support for controlling oscillation of the pick-up device on said support and the vacuum in the vacuum pick-up device.

5. In apparatus of the type described, means to feed blanks comprising a blank support having means to maintain the uppermost blank of a blank stack thereon at a substantially constant level, a driven blank feeding roll, an idler blank feeding roll adapted to come into blank clamping engagement with said driven roll, an oscillatory support for the idler feed roll, a sheet guide pivoted on said oscillatory support and associated with idler roll, means to maintain the edge of the guide at a fixed level during oscillation of the support and a rotatable vacuum pick-up device moving with said idler feed roll and oscillatable about its axis to elevate the entering edge of a blank for engagement between said driven roll and sheet guide.

6. In apparatus of the type described, means to feed blanks comprising a blank support having means to maintain the uppermost blank of a blank stack thereon at a substantially constant level, a driven blank feeding roll, an idler blank feeding roll adapted to come into blank clamping engagement with said driven roll, an oscillatory support for the idler feed roll, a rotatable vacuum pick-up device rotatable about an axis fixed with relation to the idler to elevate the entering edge

of a blank for engagement between said driven and idler feed rolls, means to bodily oscillate said support, means to oscillate the vacuum pick-up device about its own axis comprising a rack relatively stationary as regard the vacuum pick-up device, a pinion on the vacuum pick-up device engaging said rack, and means operative through oscillation of the support for controlling the vacuum in the vacuum pick-up device including a valve carried by the support.

7. In apparatus of the type described, means to feed blanks comprising a blank support having means to maintain the uppermost blank of a blank stack thereon at a substantially constant level, a driven blank feeding roll, an idler blank feeding roll adapted to come into blank clamping engagement with said driven roll, an oscillatory support for the idler feed roll, a rotatable vacuum pick-up device mounted upon a fixed axis on said support and oscillatable about its axis to elevate the entering edge of a blank for engagement between said driven and idler feed rolls, means to bodily oscillate said idler feed roll and vacuum pick-up device, means to oscillate the vacuum pick-up device about its own axis comprising a rack relatively stationary as regards the vacuum pick-up device, a pinion on the vacuum pick-up device engaging said rack, means to longitudinally adjust said rack, and a valve bodily oscillating with the vacuum pick-up device for controlling the vacuum in the vacuum pick-up device.

8. In apparatus of the type described, means to feed blanks comprising a blank support, a driven blank feeding roll, an idler blank feeding roll adapted to come into blank clamping engagement with said driven roll, an oscillatory support for the idler feed roll, a vacuum pick-up device moving with said idler feed roll and oscillatable about its axis to elevate the entering edge of a blank for engagement between said driven and idler feed rolls, means to oscillate said idler feed roll and vacuum pick-up device, means operative through oscillation of the vacuum pick-up device for controlling the vacuum therein, a bar supported for oscillation upon said oscillatory support, a finger adjustably fixed on said bar and engaging the uppermost blank of a stack on said blank support, means to yieldably oscillate said bar in timed relation to the operation of the vacuum pick-up device to bring said finger lightly in engagement with said stack during that period of operation during which the vacuum pick-up device is positioned for engagement with a blank, and means controlled by the angular position of the bar about its axis controlling the vertical position of the blank support.

9. In apparatus of the type described, means to feed blanks comprising a blank support having means to maintain the uppermost blank of a blank stack thereon at a substantially constant level, a driven blank feeding roll, an idler blank feeding roll adapted to come into blank clamping engagement with said driven roll, an oscillatory support for the idler feed roll, a rotatable vacuum pick-up device moving with said idler feed roll and oscillatable about its axis to elevate the entering edge of a blank for engagement between said driven and idler feed rolls, means to oscillate said support, means operative through oscillation of the support for controlling the vacuum in the vacuum pick-up device, and means to relatively adjust the driven and idler feed rolls without disturbing the position of the vacuum pick-up device.

10. In apparatus of the type described, means to feed blanks comprising a blank support having means to maintain the uppermost blank of a blank stack thereon at a substantially constant level, a driven blank feeding roll, an idler blank feeding roll adapted to come into blank clamping engagement with said driven roll, an oscillatory support, an adjustable mounting for the idler feed roll on said support, a rotatable vacuum pick-up device mounted in fixed bearings on said support and oscillatable about its axis to elevate the entering edge of a blank for engagement between said driven and idler feed rolls, means to oscillate said support, and means operative through oscillation of the support for controlling the vacuum in the vacuum pick-up device.

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