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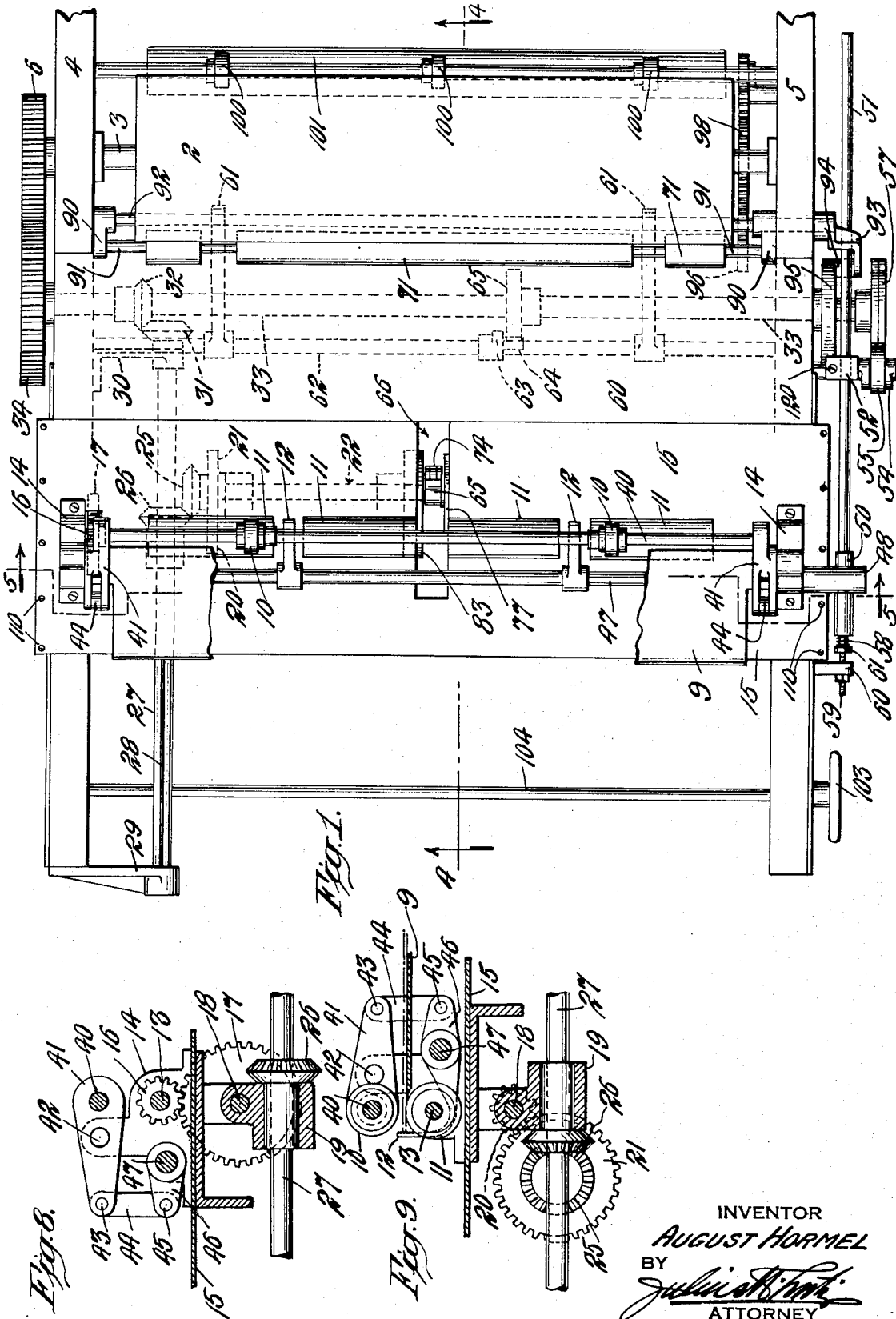
A. HORMEL

2,114,108

SHEET FEEDING MACHINE

Filed May 28, 1937

3 Sheets-Sheet 1



INVENTOR
AUGUST HORMEL
BY
Julius H. Hark
ATTORNEY

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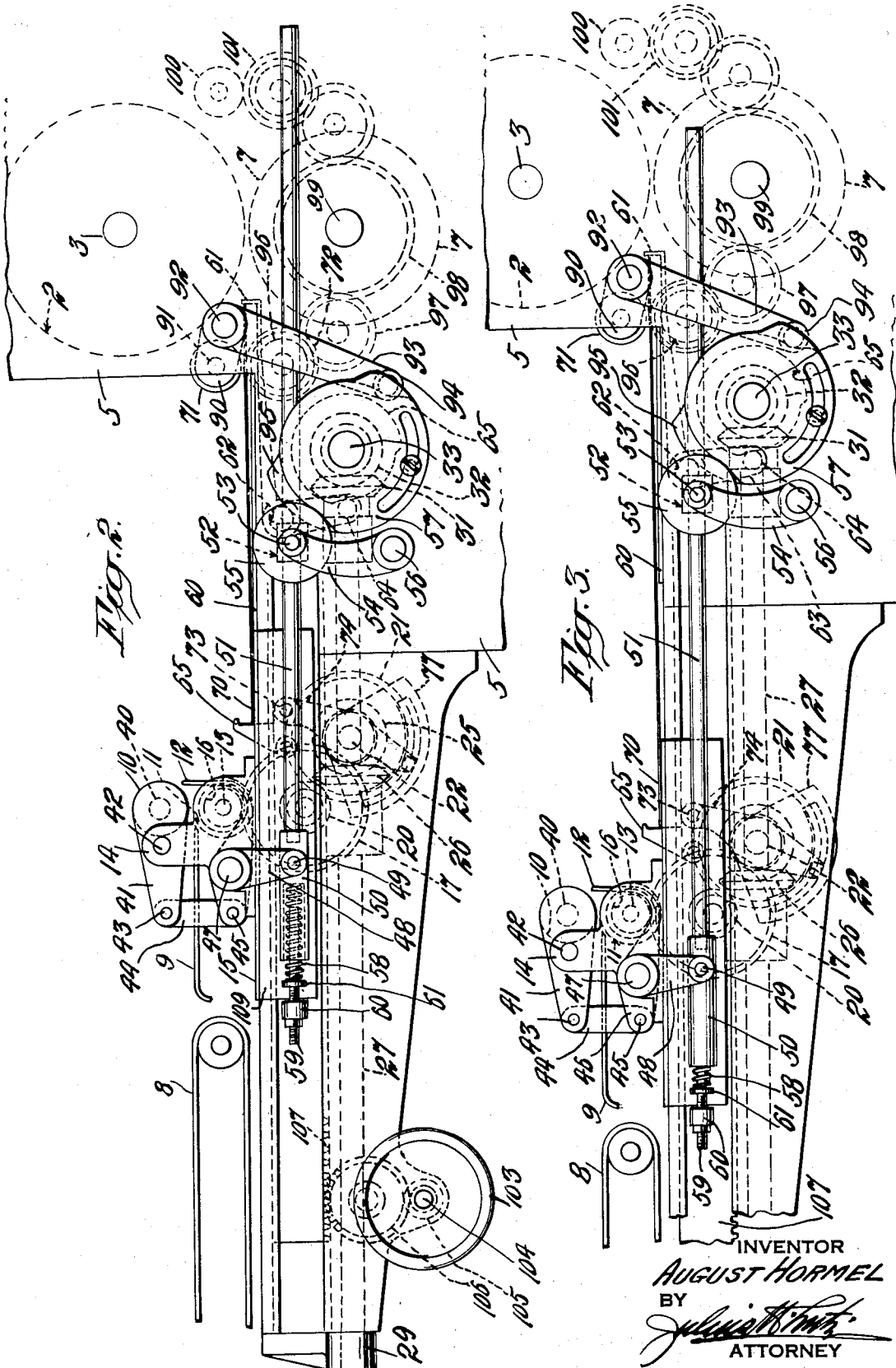
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3 Sheets-Sheet 2



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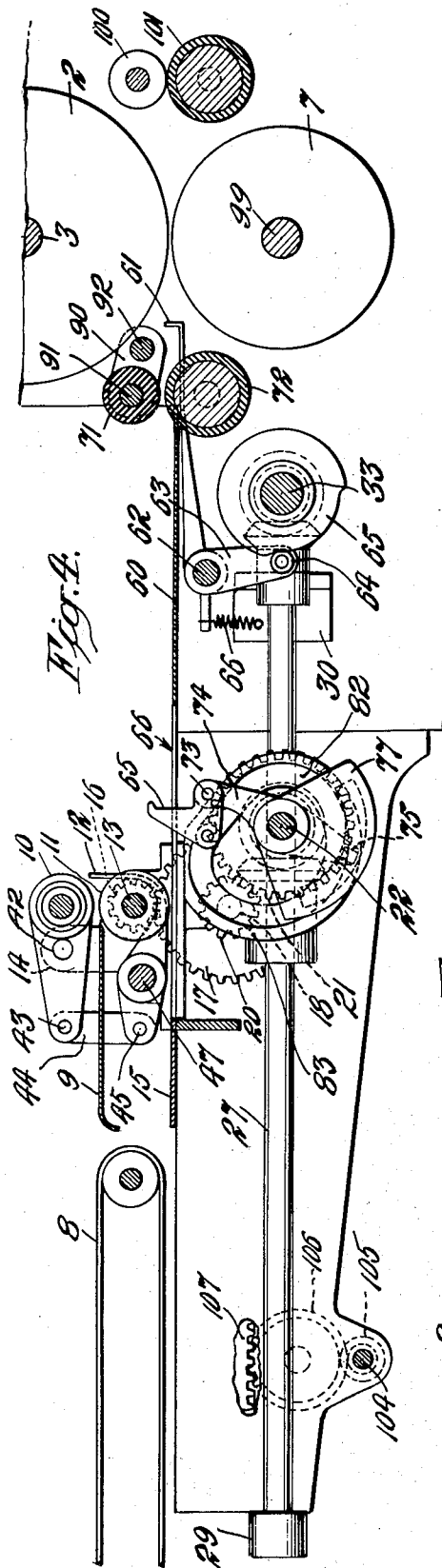
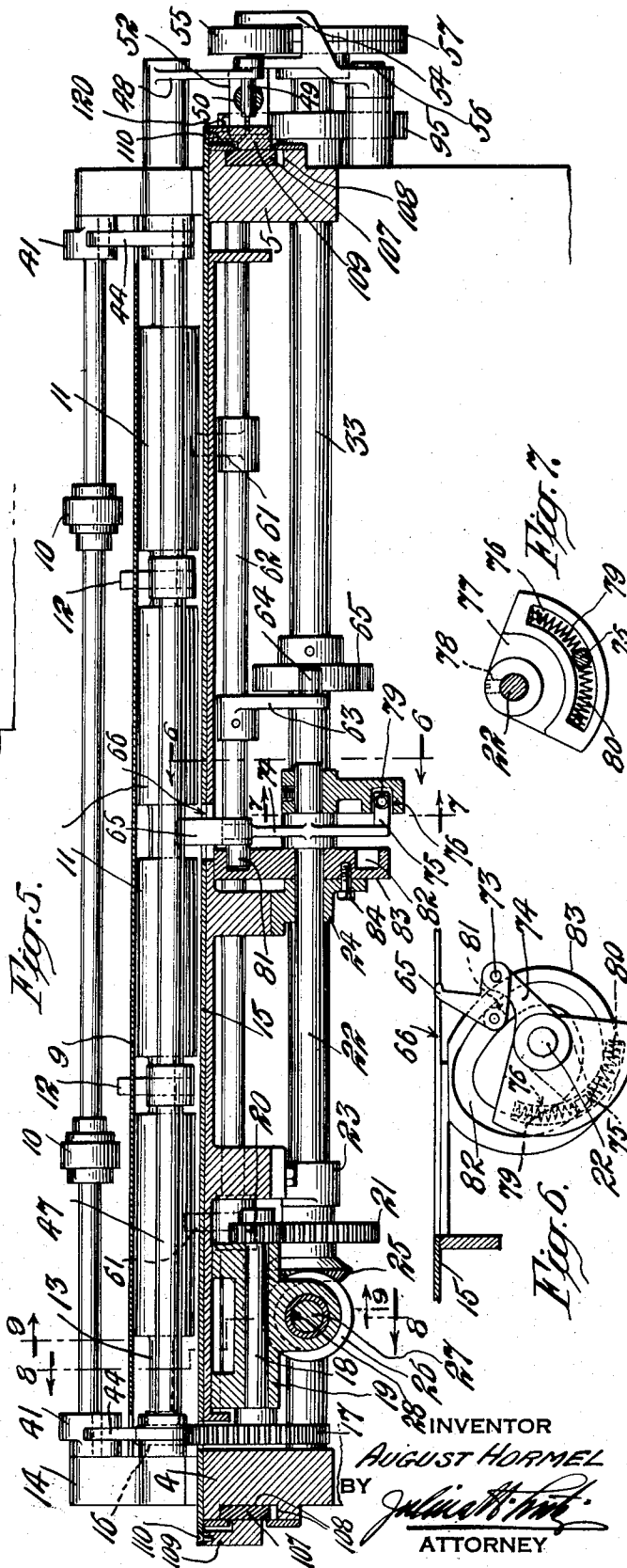
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3 Sheets-Sheet 3



INVENTOR
AUGUST HORMEL
BY *Julius H. [Signature]*
ATTORNEY

UNITED STATES PATENT OFFICE

2,114,108

SHEET FEEDING MACHINE

August Hormel, Hoboken, N. J., assignor to National-Standard Company, a corporation of Michigan

Application May 28, 1937, Serial No. 145,230

6 Claims. (Cl. 271—54)

This invention relates to sheet metal feeding mechanisms of the character shown in the patent to Wagner and Hormel, No. 1,848,856, dated March 8th, 1932, wherein the sheets are fed to impression or imprinting mechanisms which apply lacquer or varnish coatings to the sheets, the portions thereof so coated being subsequently used for the formation of cans or containers.

The object of the present invention is to improve the structure of the said Wagner and Hormel patent by providing an improved means for effectively handling and feeding to the impression roller sheets, irregular or varying in size; by providing new and novel means for adjustment of the feeding mechanism by which the various sizes of sheets may be handled and fed, and by the provision of various other improvements herein-after set forth and more particularly pointed out in the claims appended hereto.

In the accompanying drawings, wherein an embodiment of the invention is shown, Fig. 1 is a plan view of the improved sheet-feeding mechanism; Fig. 2 is a side elevation of the same as adjusted to feed sheets of relatively short length; Fig. 3 is a similar view showing the mechanism adjusted to accommodate longer sheets; Fig. 4 is a sectional view on the line 4—4 of Fig. 1, looking in the direction of the arrows; Fig. 5 is a sectional view taken at right angles to that of Fig. 4 and on the line 5—5 of Fig. 1, looking in the direction of the arrows; Fig. 6 is a sectional view on the line 6—6 of Fig. 5, looking in the direction of the arrows; Fig. 7 is a sectional view on the line 7—7 of Fig. 5 looking in the direction of the arrows; Fig. 8 is a sectional view on the line 8—8 of Fig. 5, looking in the direction of the arrows; and Fig. 9 is a sectional view on the line 9—9 of Fig. 5, looking in the direction of the arrows.

The impression roller to which the sheets to be coated or lacquered are fed, is indicated at 2, the same being secured on shaft 3 which is journaled in the side frames 4 and 5 of the machine and carries a gear 6 (Fig. 1) which meshes with a suitable driving gear not shown, for rotating the impression roller in the manner well understood in the art. Located below the impression roller and in vertical alignment therewith is a co-operating platen or bed roller 7 mounted on the shaft 99. The sheets to be printed are fed between the two rollers 2 and 7, from the left, as viewed in Figs. 1 to 4 inclusive.

The sheets to be imprinted are delivered to the feeding mechanism by any suitable conveyor mechanism, such as the belt or chain conveyor

shown at 8 at the left in Figs. 2 and 4. Sheets delivered from said conveyor are received upon a supporting plate 9 and moved between the two entry feed rollers 10 and 11 while the upper two-section roller 10 is in a raised position or spaced away from the lower roller 11, as shown in Figs. 2 and 4. When the sheet enters between the two rollers 10 and 11, its progress in a direction toward the impression roller is halted by means of stops 12 so that at this point the sheet halts with its forward edge against these stops and pauses in that position until the stops are lowered and roller 10 is brought down on the upper surface of the sheet and co-operates with the roller 11 to force it in a direction toward the impression roller 2.

Roller 11 is mounted on a shaft 13 journaled in brackets 14 secured on a movable base plate 15 supported on the frame of the machine and adjustable thereon as will be hereinafter described. Secured at one of the ends of shaft 13 is a gear 16 (Fig. 8) which meshes with and is driven by a gear 17 secured on a short shaft 18 rotatably mounted in a bearing 19 secured on the under side of the base plate 15. At one end the short shaft 18 carries a pinion 20 which is driven by a gear 21 secured on a shaft 22. Said shaft 22 is journaled in the bearings 23 and 24 located on the under side of the base plate 15. Mounted on shaft 22 is a bevel gear 25 which meshes with a co-operating bevel gear 26 on a shaft 27 extending at right angles to shaft 22. Bevel gear 26 is rotatable in the lower portion of bearing 19, as will be clearly seen in Fig. 5 and it is arranged to be slid back and forth on shaft 27 in company with the rest of the mechanism carried by the base plate 15 according to the desired position of adjustment of this mechanism relative to the impression roller when larger or smaller sheets are being fed to said roller. Accordingly, shaft 27 is provided with a lengthy key-way 28 which permits the sliding movement of bevel gear 26, yet causes said gear to at all times rotate with the shaft regardless of its position thereon.

Shaft 27 is supported at one end in the bearing 29 and at the other end in a similar bearing 30 and at the latter end it carries a bevel gear 31 meshing with a co-operating bevel gear 32 secured on a shaft 33 journaled in the frame members 4 and 5 and carrying a gear 34 meshing with and driven by the gear 6 on shaft 3.

The roller 10 which co-operates with roller 11 in feeding the sheet toward the impression roller, consists of several sections, clearly shown in Figs. 55

1 and 5, rotatable on shaft 40, said shaft being carried at each side of the machine in a lever 41 pivoted at 42 in bracket 14. At its opposite end, lever 41 is pivoted at 43 to the upper end of a link 44, the lower end of the link being pivotally connected at 45 to a lever 46 secured on a rocking shaft 47. The stops 12 are also secured on said shaft 47 as will be clear from Figs. 1 and 9. Shaft 47 is journaled in the bearings 14 and at one end it carries a downwardly extending arm 48 having its lower end pivotally connected at 49 to a sleeve 50 secured on one end of a rod 51 which is reciprocated longitudinally to rock shaft 40 and cause it, through its associated elements heretofore described, to move roller 10 downwardly to co-operate with roller 11 in feeding a sheet toward the impression roller. Such rocking movement of shaft 47, being clockwise as viewed in Fig. 2, will lower the stops 12 out of the way of the sheet being fed to the right by the rollers 10 and 11.

Near the impression roller 2, rod 51 is supported by an adjustable block 52 from which projects a stud shaft 53 mounted in a clevis 54 and carrying a cam roller 55. Clevis 54 is pivoted at 56 at the side of the machine and the roller 55 carried by it rides against a cam 57 secured on the shaft 33. Thus, as shaft 33 is rotated, the cam 57 will, at properly timed intervals, move rod 51 to the left and against the tension of a buffer spring 58 supported on rod 59 mounted in the lug 60 on a side plate 109, said rod being adjustable in the lug and having a collar 61 which, as the rod is adjusted, varies the tension of the spring 58.

After a sheet has passed between the rollers 10 and 11, it falls down on the table 60 and is moved along thereon until its end located nearest to the impression roller 2 is brought against stop members 61 secured on and projecting from a rocking shaft 62 located below the table 60. Said shaft is journaled in the side frames of the machine and carries a cam lever 63 provided with a roller 64 riding against cam 65 secured on shaft 33. The cam roller 64 is held against the face of the cam by the spring 66.

The mechanism for feeding the sheet to bring its edge against the stop members 61 is best shown in Figs. 4 to 7 inclusive. Said mechanism includes a finger 65 which operates through the slot 66 in the base plate 15 and contacts with the adjacent edge of the sheet 70 (Fig. 2) then lying on said plate and on the supporting table 60 and forces the sheet to the right and between a pair of feed rollers 71 and 72 to a position of rest against the stop members 61. Finger 65 is pivoted at 73 to one end of a lever 74 which is loosely supported on shaft 22. At its opposite end lever 74 is provided with a lateral extension 75 which enters an arcuate groove 76 formed in a quadrant 77 secured fast on the shaft 22 by means of the set screw 78. Movement of the lateral end portion 75 of lever 74 is resiliently resisted in one direction by means of the compression spring 79 located in the groove 76 and movement of said portion of the lever in the opposite direction is resisted by a similar spring 80 also located in the groove 76. Finger 65 carries a cam roller 81 which travels in the groove 82 of a fixed cam 83 secured by the screws 84 to the bearing 24, as shown in Fig. 5. As shaft 22 is rotated it carries the quadrant with it, said quadrant rotating the lever 74 through the engagement thereof by the springs 79 and 80. The contour of cam groove 82 is such as to cause

finger 65 to move horizontally for a short distance to force the sheet 70 engaged by it to the right as shown in Fig. 2, until the edge of the sheet nearest to the impression roller is brought against the stop members 61 and then descend. Upon the sheet having its edge brought against the stop members 61 resistance is brought to bear against finger 65 and it is swung backward against the tension of spring 80 until it is moved downwardly below the edge of the sheet against which it is engaged. This is particularly advantageous in the case of sheets of irregular sizes where a sheet would be likely to become jammed between stops 61 and the finger 65 if the finger were unable to clear the edge of the sheet because of the length of the sheet.

When the sheet reaches a position with its edge against the stops 61, it will be noted that a portion of the sheet has been inserted between the feed rollers 71 and 72, this having occurred while the upper roller 71 was in its raised position and away from the lower roller 72 as shown in Fig. 4. Said upper roller 71 consists of several sections mounted on a shaft 91 supported in arms 90 secured on a rock shaft 92 mounted in the side frames of the machine. At one end the rock shaft 92 is provided with the cam lever 93 carrying a roller 94 riding against the edge of the cam 95 secured on the shaft 33.

Lower feed roller 72, or that which co-operates with the feed roller 71 is a driven roller and carries a gear 96 driven from a gear 97 meshing with a gear 98 on the shaft 99 on which the platen or bed roller 7 is mounted.

Briefly, the operation of the improved feeding mechanism is as follows:

A sheet of metal to be coated or lacquered, is fed from conveyor 8 to the supporting plate 9 with its end portion disposed between the rollers 10 and 11 and its adjacent edge located against the stops 12. This positioning of the sheet occurs while roller 10 is in its raised position and also while the stops 12 are in their operative or raised position to thereby limit the movement of the sheet toward the impression roller. Now cam 57, operative against the roller 55, causes rod 51 to be moved to the left, said rod, through its connection with rock shaft 47 by means of the arm 48, causes the shaft 48 to be rocked clockwise as viewed in Fig. 2. This causes the stops 12 to be lowered and at the same time brings roller 10 downwardly and into contact with the upper face of the sheet. Rollers 10 and 11 now force the sheet between them toward the impression roller. The sheet, after passing between rollers 10 and 11, falls down upon table 60 and on the cooperating base plate 15, and the finger 65 now moves upwardly through slot 66 and impinges against the edge of the sheet located over said slot and forces the sheet toward the right until its edge farthest from that engaged by the finger, is brought against the stop members 61 which are at that time in their raised or operative position. At this time also, roller 71 is in its raised position so that the sheet is readily inserted between it and its co-operating driven feed roller 72. Now, through the action of cam 65, shaft 62 is rocked and the stop members 61 are lowered. Cam 95 causes shaft 92 to be rocked and roller 71 is lowered to co-operate with roller 72 to move the sheet and feed it between the impression roller 2 and the platen or base roller 7 to receive the coating. Rollers 100 and 101 feed the coated sheet away from the impression and platen rollers.

The mechanism herein described is so arranged that sheets of various sizes can easily be handled by the feeding mechanism thus enabling large sheets as well as small sheets to be efficiently handled. The feeding means, comprising primarily the feed rollers 10 and 11 and the feeding finger 65 and associated operating mechanism for these elements, are accordingly mounted on a single support, namely, the base plate 15 which is arranged to be moved to and from the impression roller according to the size of the sheet being fed thereto. Examples of this are shown in Figs. 2 and 3 where, in Fig. 2, the rollers 10 and 11 and finger 65 are located relatively closely to the impression roller as the sheets being fed thereto are in this particular adjustment of the mechanism, small in size. In Fig. 3 the larger sheets are being handled and accordingly, the rollers 10 and 11 and the feeding finger 65 are spaced at a greater distance from the impression roller.

This positioning of the feeding elements relative to one another is attained by manipulation of a hand wheel 103 in Fig. 2. Said wheel is secured on shaft 104 which is rotatably mounted in the side frames of the machine, and the shaft carries pinions 105, each of which meshes with a gear 106 that in turn meshes with a rack 107 movable in a groove 108 in each of the side frames of the machine. Each rack is attached to a side plate 109 secured at the ends of the base plate 15 by the screws 110 (see Figs. 1 and 5). It will be obvious that when the hand wheel 103 is rotated, base plate 15 carrying rollers 10 and 11 and finger 65 and the operating parts for these elements may be moved to any desired position to or from the impression roller according to the size of the sheet to be fed. Shaft 27 permits this adjustment and while it is being made block 52 is loosened on rod 51 so that the rod can be drawn through it to the required extent. When the proper positioning of the feeding elements with respect to the impression roller has been attained, block 52 is again secured on rod 51 by the tightening of the screw 120. (Fig. 1.)

What I claim is:

1. In a metal sheet feeding mechanism of the character described, entry feed rollers, a support upon which a sheet fed by said rollers is delivered, stop means for limiting the movement of the sheet on said support, means for moving said sheet to bring one of its edges into contact with said stop means, said sheet-moving means comprising a rotating finger for edge engagement with the sheet to move said sheet into engagement with the stop means and then descend below the sheet, and a resilient mounting for said finger to cause the finger to be forced to an inoperative position upon the sheet being moved by it coming into contact with the stop means.

2. In a metal sheet feeding mechanism, an impression roller to which sheets to be coated are fed, feeding means for moving the sheets toward said impression roller, said feeding means including a rotating resiliently mounted finger for engaging an edge of the sheet being fed and moving it toward the impression roller, stop means adjacent the impression roller, and means for

mounting the finger to cause said finger to be forced backward against its resilient pressure and become disengaged from its engagement with the edge of the sheet.

3. In a metal sheet feeding mechanism of the character described, an impression roller to which sheets to be coated are fed, stop means adjacent said roller for limiting the movement of the fed sheets toward the roller, a rotating shaft, a member secured on said shaft and rotated with it, a lever loose on said shaft and having a part engaging said member, spring means for holding the lever in engagement with the member and causing said lever to be rotated with the shaft, said spring means permitting resilient movement of the lever relative to the member, a sheet-engaging finger secured on the lever, and cam means for guiding the movement of said finger.

4. In a metal sheet feeding mechanism of the character described, an impression roller to which sheets to be coated are fed, stop means adjacent said impression roller, a supporting table carrying feeding means for feeding sheets toward the impression roller, said feeding means including a pair of feed rollers and means for bringing the rollers into operative or inoperative positions, said feeding means including also a rotating finger for edge engagement with a sheet after it has passed through the feed rollers to force said sheet toward the impression roller, a resilient mounting for said finger to cause the finger to be forced into an inoperative position upon the sheet being moved by it coming into contact with said stop means, and means for adjustably positioning the supporting table and the feeding means carried by it at selected distances from the impression roller.

5. A machine of the character described having an impression roller, sheet feeding mechanism including a pair of feed rollers and releasable stop means associated therewith, a feed finger located between the feed rollers and the impression roller, cam means for moving said finger to cause it to engage the edge of a sheet and feed it toward the impression roller, a resilient mounting for said finger permitting the finger to be forced backward against resilient pressure and become disengaged from its engagement with the edge of the sheet when the opposite edge of the sheet impinges against an abutment, and means for positioning the feed rollers and finger at selected distances from the impression roller.

6. In a metal sheet feeding mechanism, an impression roller to which sheets to be coated are fed, feeding means for moving the sheets toward said impression roller, said feeding means including a resiliently mounted finger for engaging an edge of the sheet being fed and moving it toward the impression roller, said feeding means including means for moving the finger horizontally for a predetermined distance and then moving it downwardly, stop means adjacent the impression roller, and means for mounting the finger to cause said finger to be forced backward against its resilient pressure and become disengaged from its engagement with the edge of the sheet.

AUGUST HORMEL.