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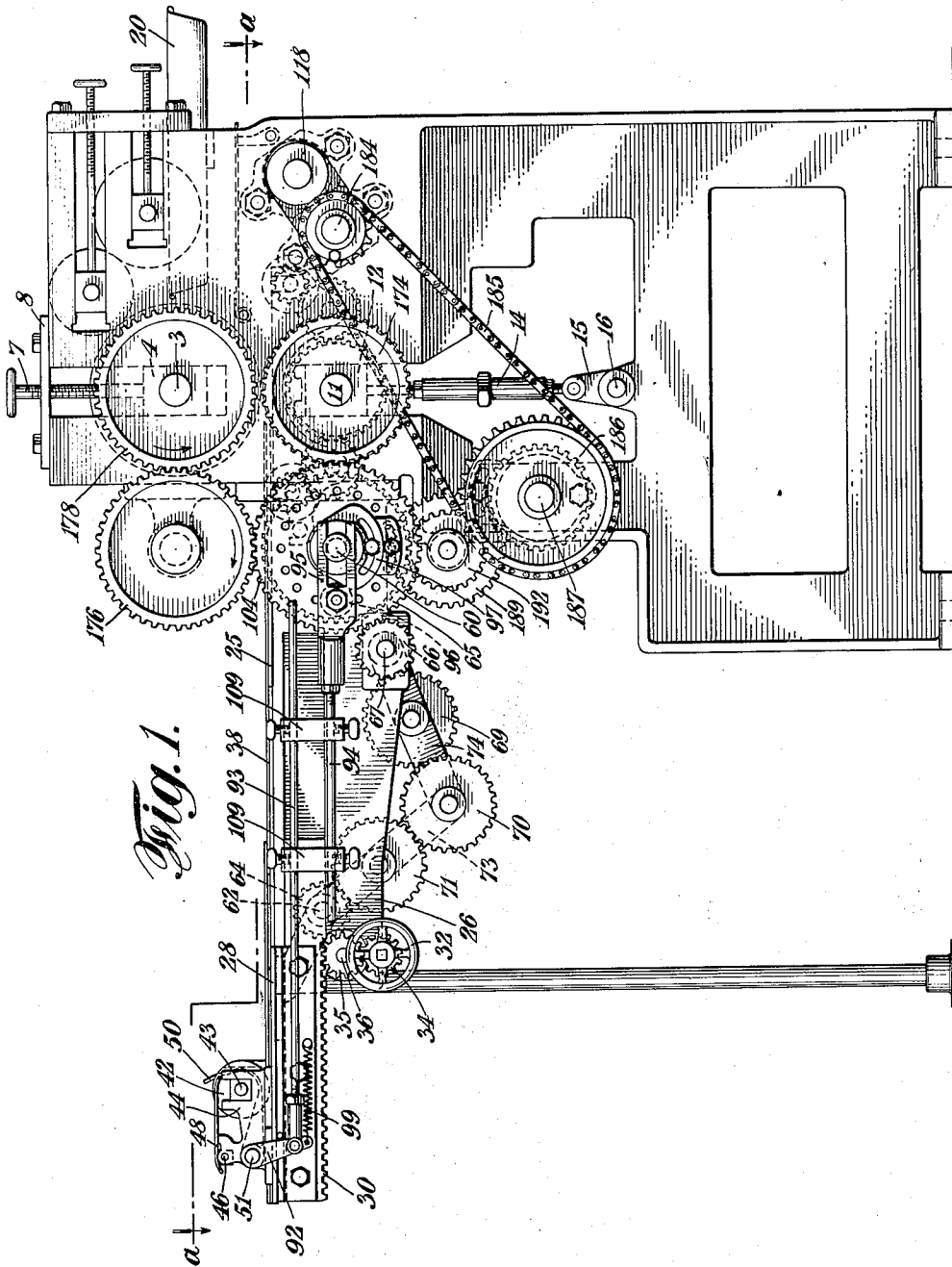
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1,848,856

METAL SHEET FEEDING MECHANISM

Filed June 19, 1930

8 Sheets-Sheet 1



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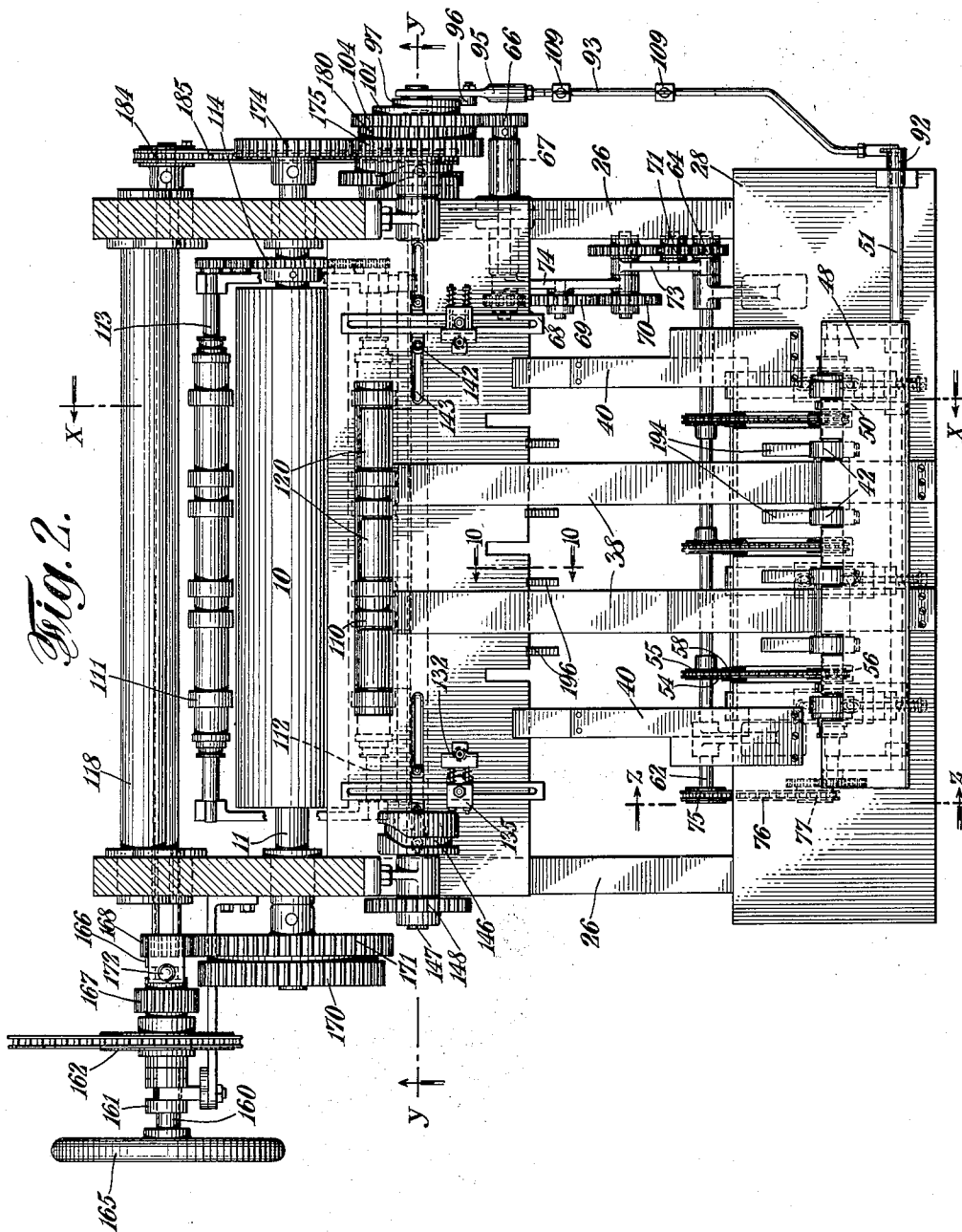
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METAL SHEET FEEDING MECHANISM

Filed June 19, 1930

8 Sheets-Sheet 2



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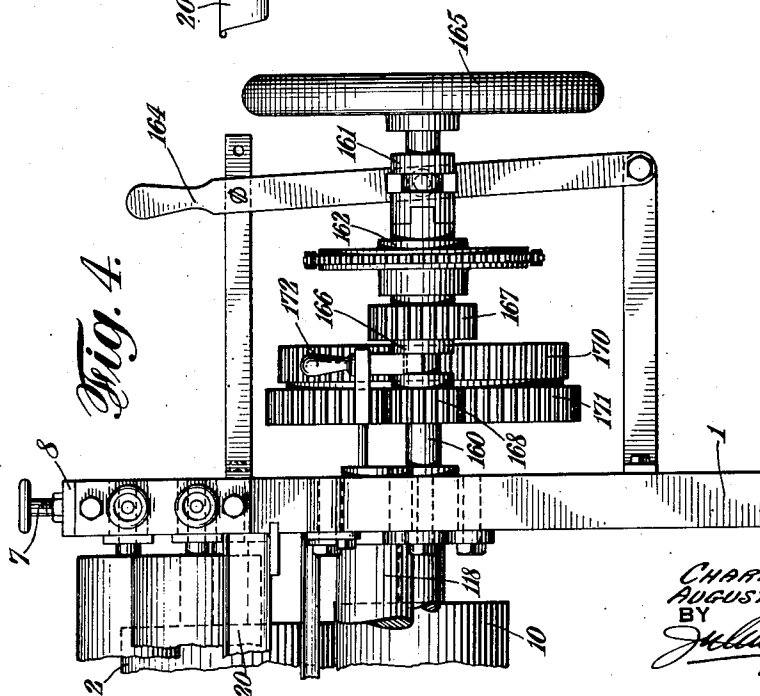
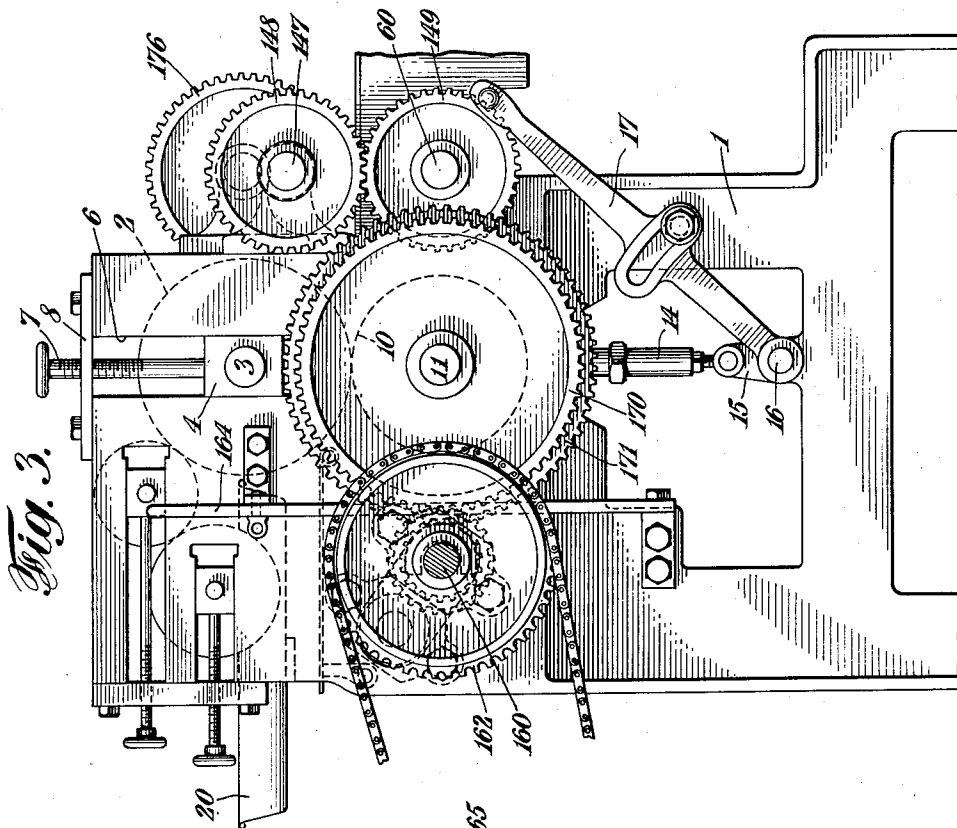
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METAL SHEET FEEDING MECHANISM

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8 Sheets-Sheet 3



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METAL SHEET FEEDING MECHANISM

Filed June 19, 1930

8 Sheets-Sheet 4

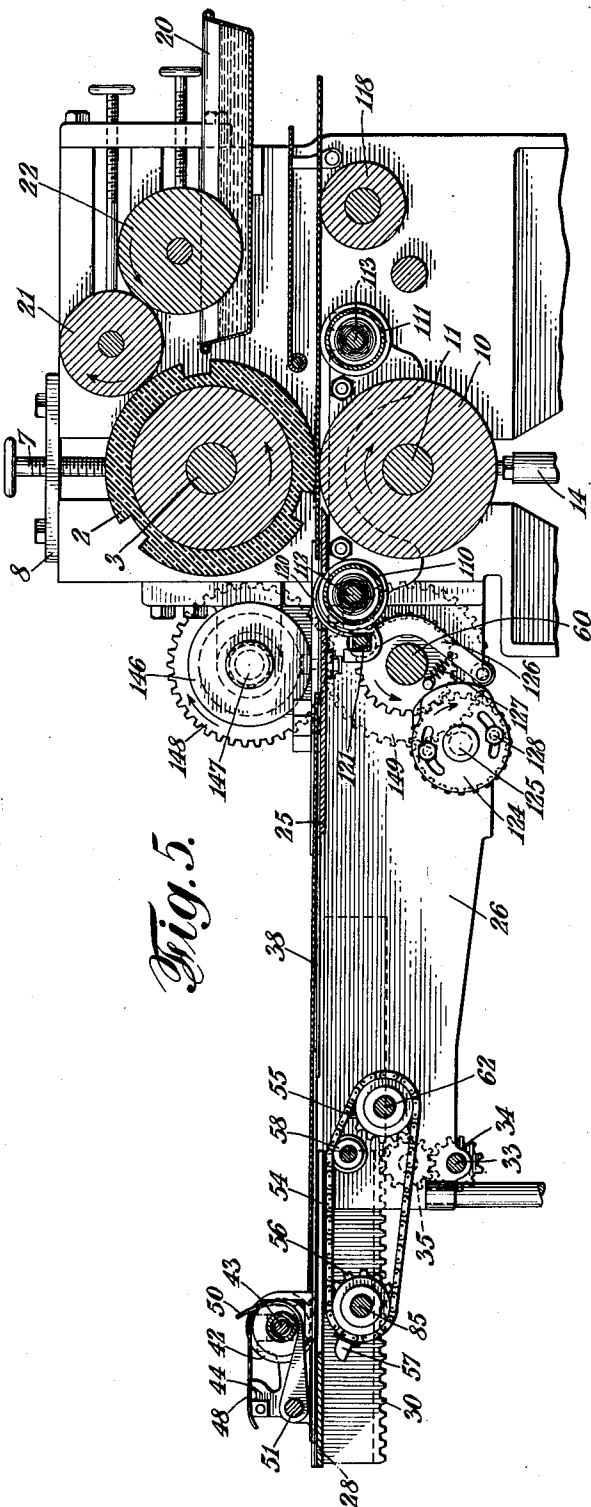


Fig. 5.

Fig. 7.

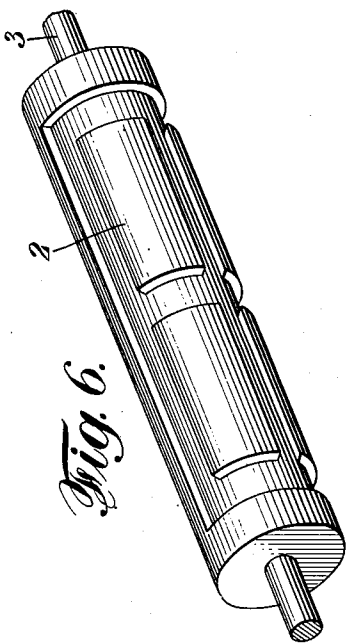
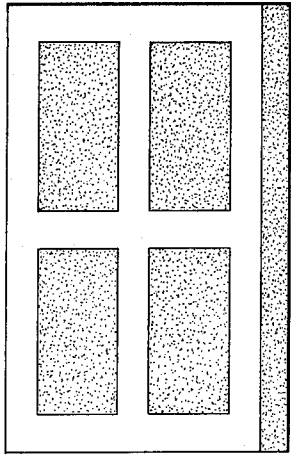


Fig. 6.

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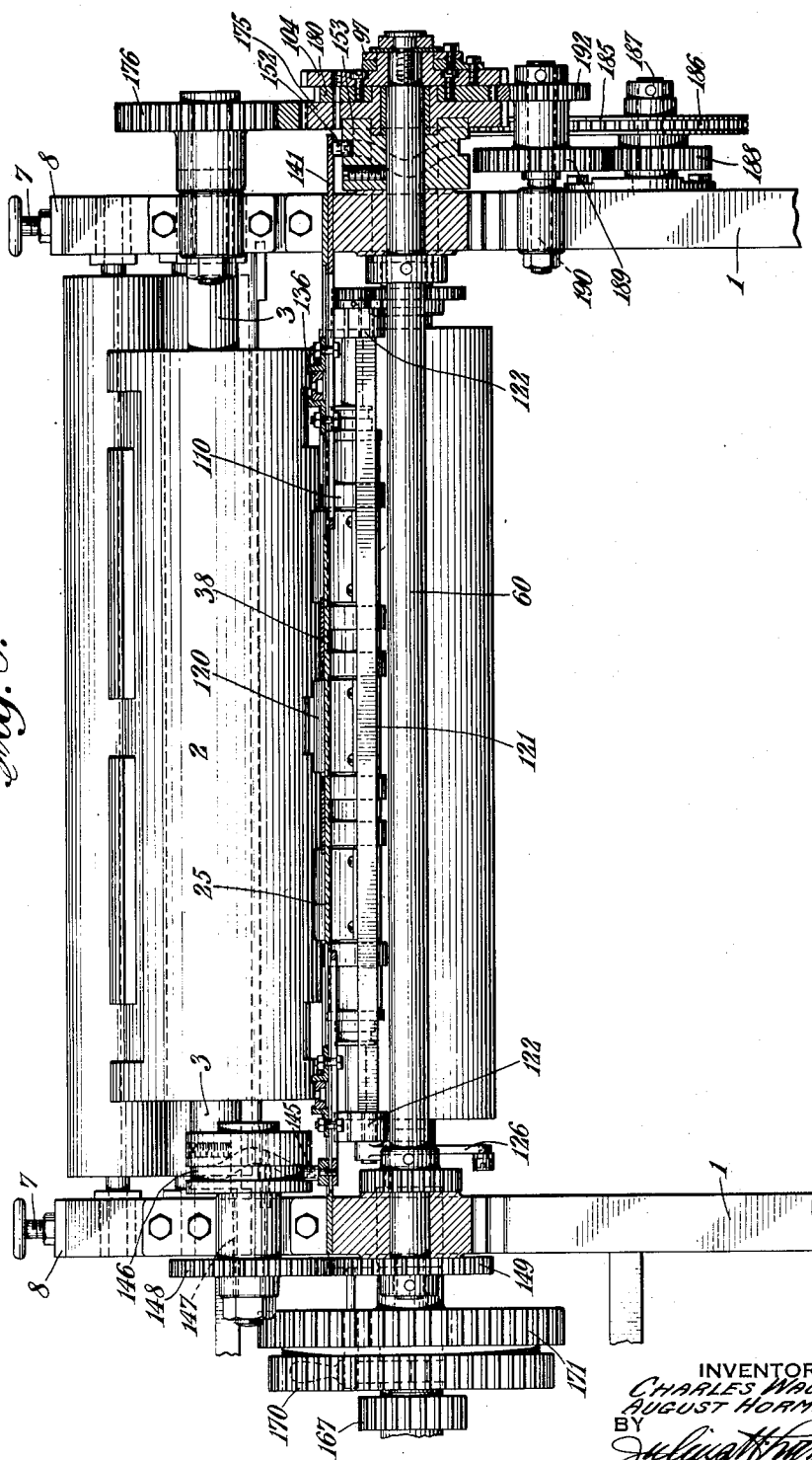
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Fig. 8.



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8 Sheets-Sheet 6

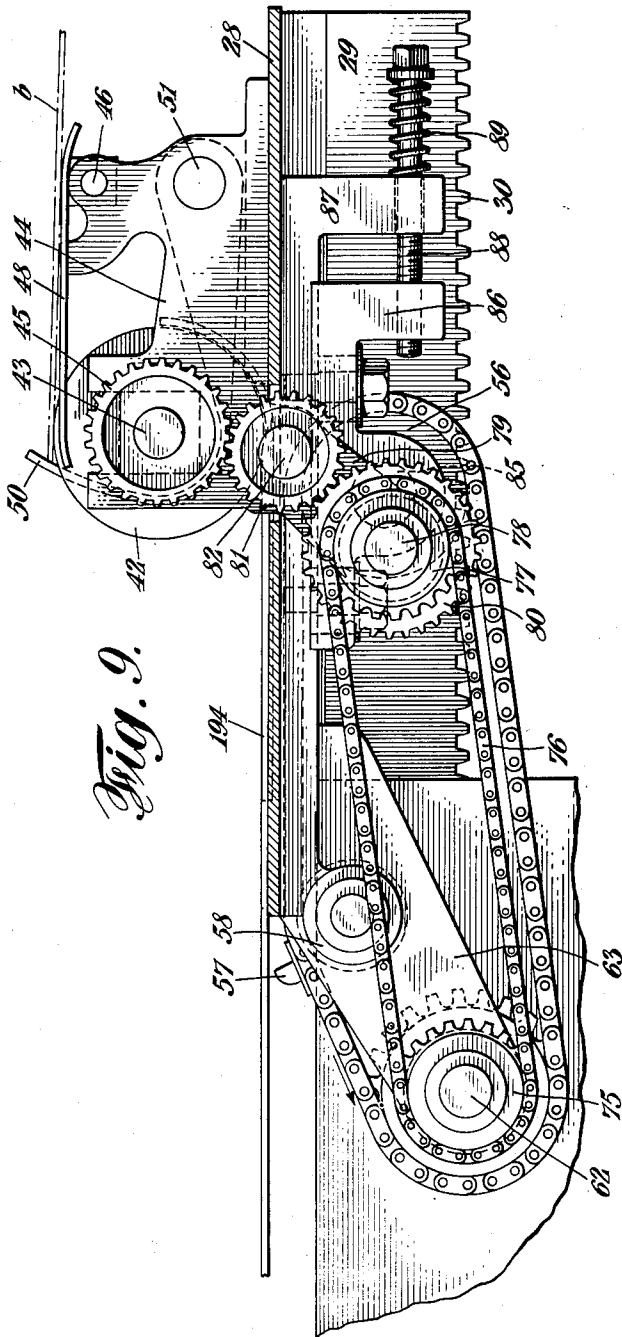


Fig. 9.

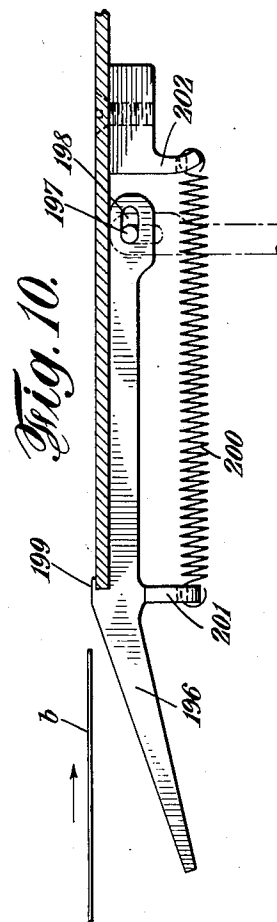


Fig. 10.

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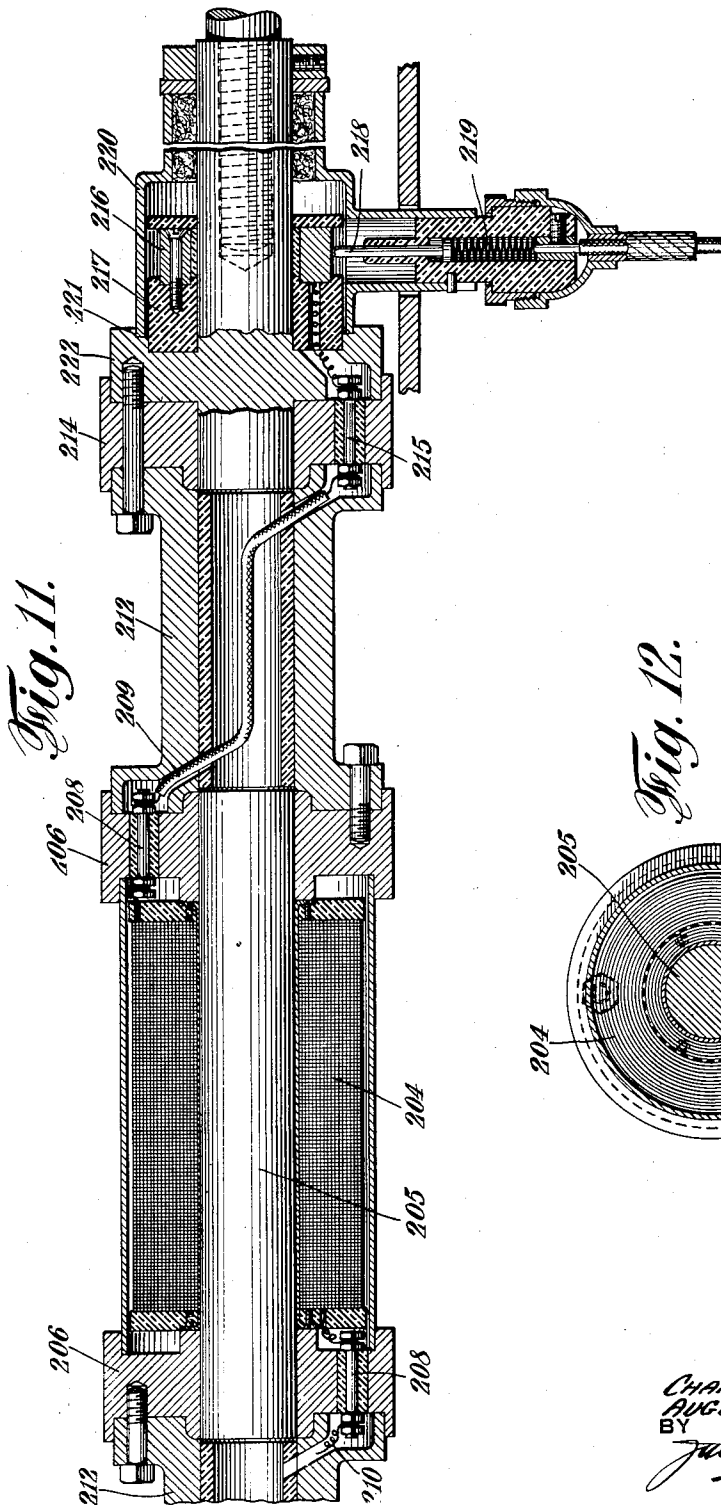
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METAL SHEET FEEDING MECHANISM

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8 Sheets-Sheet 7



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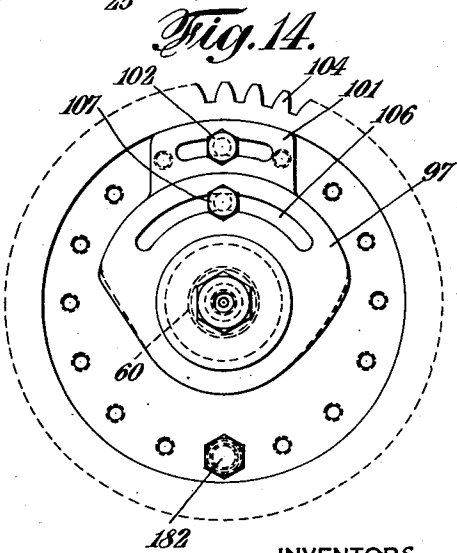
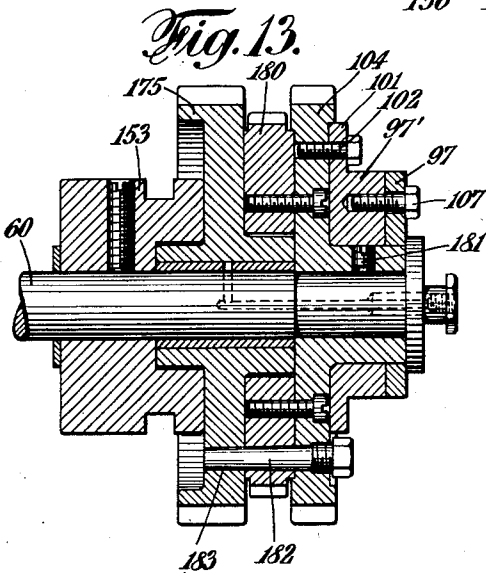
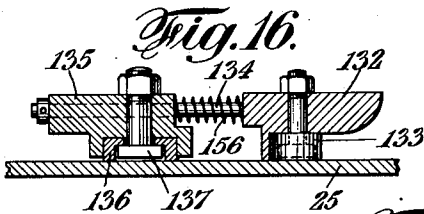
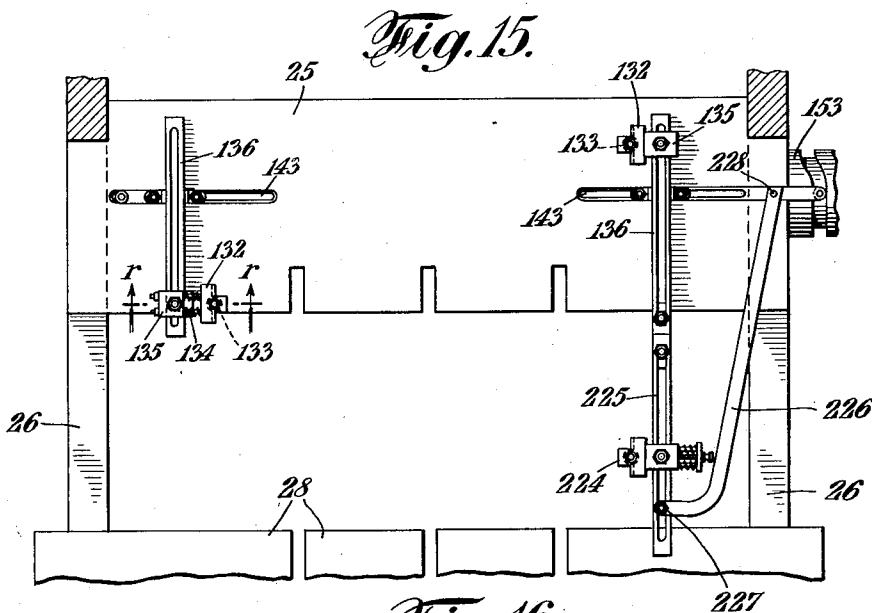
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METAL SHEET FEEDING MECHANISM

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8 Sheets-Sheet 8



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UNITED STATES PATENT OFFICE

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METAL SHEET FEEDING MECHANISM

Application filed June 19, 1930. Serial No. 462,159.

This invention relates to sheet metal feeding mechanisms for roller impression or imprint machines such as employed in lacquer and varnish coating of metal sheets for the manufacture of tins or containers wherein certain portions of the surface of the metal sheets are suitably coated for the subsequent printing and ornamentation thereof.

In the feeding of the sheet metal blanks to the impression or coating rolls, in machines of the character referred to, to obtain the desired registration with the roll design, a determined timed relation of the feeding operation with respect to the angular position of the impression roller is essential for obtaining the properly spaced relation of the coating impressions upon the sheets. An important object of the present improvements is to accurately insure the properly timed feeding of the sheets to the impression roll with provisions for adjustment and improved automatic feeding of the sheets while maintaining the operating relation of the parts.

A further object of the present improvements is to provide a sheet advancing mechanism adapted to advance the sheets through the machine by engagement with the underside of the sheets only. This is accomplished by the employment of magnetic feed rollers and the feeding of the sheets thereby independent of the impression roller engagement. This advantageously allows of the impression roller having spaced or non-engaging portions and moreover effects the feeding of the sheets without engagement with the treated or coated surfaces.

Important features of the present invention which contribute to the more successful operation and improved efficiency of our improved machine include;—an improved design and structural arrangement of the feed table providing for the adjustment with facility of the feed table to accommodate sheets of varied sizes while maintaining the operating relation of the feed drive connections; means to effect adjustment of the operating ratio of the parts with relation to the different sizes of sheets under treatment; automatically operating

mechanism incorporated therewith and adapted to advance the sheet metal blanks to the impression roll in predetermined timed relation to the position of the roll for obtaining correspondingly spaced impressions or coated areas upon the successive blanks as fed through the machine; of a magnetic traction entry roller adapted to advance the metal sheets or blanks to a feed-in position upon the feed table under the control of automatically timed releasing stop means operative to insure the timed advance of the sheets to a feed-in mechanism; an improved automatic feed-in mechanism operative to effect proper longitudinal registration of the sheet with the impression roll and having adjustment for varying the initial engagement of the sheet with the roller; an improved magnetic feed roller having associated therewith a lifter or retaining means operative normally to retain the sheets out of feeding engagement with the roller and to allow feeding engagement under control of automatic connections thereto; automatically controlled side gauges operative to insure proper lateral alignment of the sheets; improved magnetic retarding means positioned to act upon the sheets as they pass from the entry roller to the feed table to check displacement thereof by momentum and the arrangement of improved guides associated with the forward edge of the rear table section adapted to insure proper passage of the sheets and to be removable from operating position to allow full closing of the table sections when desired.

The foregoing and other improved features and advantages of our present improvements will be more fully understood by reference to the accompanying drawings wherein an approved embodiment of our invention is disclosed and wherein like reference numerals are applied to the corresponding parts in the several views.

In the drawings:

Fig. 1 is a view in side elevation showing the present improvements incorporated with a metal sheet lacquering machine.

Fig. 2 is a plan view thereof with a por-

tion thereof in section taken on line $a-a$ of Fig. 1.

Fig. 3 is a partial side elevation taken from the left hand side of Fig. 2.

5 Fig. 4 is a partial rear elevational view.

Fig. 5 is a vertical, longitudinal sectional view taken on line $x-x$ of Fig. 2.

Fig. 6 is a perspective view of the impression roller of the coating mechanism.

10 Fig. 7 is a plan view of a coated metal sheet or blank.

Fig. 8 is a vertical, transverse, sectional view taken on line $y-y$ of Fig. 2.

Fig. 9 is a partial, longitudinal and vertical, sectional view taken on line $z-z$ of Fig. 2.

Fig. 10 is a detail, longitudinal, sectional view of the forward edge of the rear table section showing the guide fingers.

20 Fig. 11 is a detail longitudinal sectional view of the magnetic feed roller construction.

Fig. 12 is a cross-sectional view thereof.

Fig. 13 is a detailed sectional view of the 25 actuating shaft and gearing thereon.

Fig. 14 is a detail side elevation thereof showing the adjustable cam associated therewith.

Fig. 15 is a plan view of the table portion 30 showing the improved side gauge extension.

Fig. 16 is a detail sectional view of the side gauge taken on line $r-r$ of Fig. 15.

The improvements of the present invention are here shown incorporated in a machine adapted for the coating or lacquering of metal sheets upon the upper side surfaces thereof as the sheets are fed through the machine. In the arrangement, as shown, the operating parts are suitably mounted and 40 journaled upon a supporting frame or standard 1 and the coating means comprises an upper coating roller or impression roller 2 mounted upon a shaft 3 journaled in bearing blocks 4-4 adjustably fitted to opposite guideways 6 of the standard and supported by bearing adjustment screws 7 having threaded supporting engagement with the plates 8 secured upon the frame. Vertically aligned therewith is a cooperating 50 platen or bed roller 10 fixed on shaft 11 which is journaled in bearing blocks 12 vertically slidable in ways formed in the standard; the blocks being supported upon adjustable posts 14 having pivotal connection with supporting or toggle arms 15 mounted upon 55 shaft 16 having on its outer end a lever 17 for manually lowering the platen roller to release the sheets when desired.

The metal sheets to be coated or treated 60 are passed between the rollers 2 and 11 of which the upper or impression roller is of a form or surface design to produce the desired coating or printing effect upon the upper surface of the sheets. As shown, the 65 coating material to be applied by the im-

pression roller is contained within a reservoir 20 and transmitted thereto by the transfer rollers 21 and 22 journaled in adjustable bearings and of which the latter rotates within the bath of coating material which may be 70 lacquer as referred to.

As best shown in Fig. 6, the impression roller 2 has a surface design to effect the coating or imprinting of the sheet as shown in shaded lines in Fig. 7 or such modified 75 regional coating effect as may be required. The respective rollers are driven by suitable gearing in the direction indicated by arrows in Fig. 5 and as will be readily understood, for effecting correspondingly 80 spaced or located coating impressions upon the successive sheets as fed through the machine it is required that the feeding of the sheets shall be in properly timed relation to the angular position of the impression roller 85 so as to have a corresponding initial engagement therewith.

In accordance with the present invention there is provided an improved automatically operated feeding mechanism combined 90 with an improved adjustable feed table structure adapted for the successful feeding of the metal sheets of different sizes. The improved feed table structure consists of a rearward fixed table section 25 mounted upon 95 forward side extensions 26 of the standard and a movable, forward table section 28 mounted upon slide members 29 at its opposite sides, the slide members being fitted to operate within longitudinal slideways 100 formed in the frame extensions 26 and being formed at their lower edges with the racks 30. The movable forward table section is adjustable by means of a hand wheel 32 upon shaft 33 journaled in the extensions 26 upon 105 which is fixed a pinion 34 meshing with a pinion 35 on shaft 36, the latter meshing with the teeth of the slide rack 30. As will be understood, the shaft 36 is journaled in the extensions and at its opposite end is provided with a companion pinion to 35-meshing 110 with the slide rack at the opposite side. Rotation of the hand wheel 32 will cause forward or rearward movement or adjustment 115 of the movable table section 28 so as to accommodate the table to shorter or longer sheets. Each of the table sections is provided with extension bearing strips having 120 overlapped relation and upon which the metal sheets operated upon have direct bearing. The rear table section, as shown, has forwardly extended bearing strips 38 and the movable section has bearing extension strips 39 in overlying relation to the strips 38 and 125 also outer extension strips 40 overlying and slidable upon the rear table section 25.

Sheet advancing mechanism.—The forward or movable table section 28 has operatively associated therewith sheet advancing mechanism comprising an entry feed roller to 130

advance the sheets to the feed table and feeding means to engage the sheets upon the table for advancing them to the impression roller. The former consists of a flanged magnetic entry roller 42 containing an electro-magnetic coil energized to attract the metal blanks placed in engagement therewith and to have tractive effort thereon upon rotation of the roller. The feed roller 42 is mounted on shaft 43 which is journaled in opposite brackets 44 mounted upon the table section 28 and the roller is driven in a clockwise direction by means of a gear 45 on the shaft end. Pivotaly supported at 46 upon the bracket is a shelf 48 cut out at its rearward edge for the roller flanges, the shelf being positioned to act as an initial rest for the sheets as they are introduced to the machine over the entry feed roller. To time the advance movement of the sheets by the entry roller a releasable stop means is provided having stop arms 50 projected upwardly at the rear of the entry roller and mounted upon a rock shaft 51 journaled in the brackets 44. The stop arms 50 normally project upwardly in the path of the sheets to be engaged by the edge of the sheets to prevent advance movement thereof until released by depression of the stop arms.

The forward table assembly also includes a sheet feeding means in the form of carrier chains 54 carried by sprockets 55 and 56; one of links of each carrier chain (three of which are employed) is provided with a finger or feed lug 57 for engagement with the sheet to be fed thereby. An idler roll 58, in conjunction with the sprocket 56, is positioned to determine the path of movement of the feed finger 57 to be parallel to the table and to project upwardly therethrough for engagement with the edge of the sheet or blank *b*. The table, as shown in Fig. 2, is slotted for the passage of the feed fingers.

The driving and operating connections for the entry roller 42, releasable stop arms 50 and feed fingers 57 are arranged to have movement transmitted thereto from an actuating shaft 60 and to be adjustable for maintaining operative connection in the varied positions of adjustment of the parts with the table 28.

The entry roller and feed finger drive connections include a sprocket shaft 62 journaled in brackets 63 secured to the underside of movable table section 28 and within which the chain idler roller 58 is likewise journaled. As best shown in Fig. 1, the motion is transmitted to the sprocket shaft 62 from the actuating shaft 60 by means of gearing including gear 64 on sprocket shaft 62, gear 65 on the actuating shaft 60 meshing with gear 66 on shaft 67 journaled in the frame and having at its inner end a gear 68 connected by intermediate gears 69, 70 and 71 to the sprocket shaft 62. As shown, the

intermediate gears 69, 70 and 71 have an articulated support to compensate for the movement of the table consisting of supporting links 73 and 74 pivotally connected by the bearing stud of gear 70 and having pivotal connection to the shafts 62 and 67 respectively.

The entry roll drive is taken from the sprocket shaft 62 by means of a sprocket 75 on shaft 62 connected by chain 76 to sprocket 77 journaled on stud 78 carried by lower extension 79 of bracket 44. The sprocket 77 has affixed thereto a gear 80 meshing with gear 81 on bracket stud 82, the gear 81 meshing with the gear 45 on the end of the roller shaft.

The finger feed chains 54 have their drive sprockets 56 fixed to the sprocket shaft 62 to be driven thereby and their forward ends are carried on the idler sprockets 56 journaled on bearing studs 85 carried by sliding members 86 having sliding support on brackets 87 secured to the under side of the movable table 28. The slidable members 86 have threaded thereto screw studs 88 passed through apertures in the bracket 87 and have fitted thereon compression springs 89 acting constantly to maintain proper tension of the feed chains.

The operating connections to the releasable stop 50, as best shown in Fig. 1, comprise an arm 92 on the rock shaft 51 having pivotally connected thereto an adjustable, two-part connecting rod 93—94, the rod section 94 having a guide head 95 having a journaled roller 96 engaged by an adjustable operating cam 97 secured to the actuating shaft 60. The cam 97 operates to move the connecting rod 93—94 in the direction to depress the stop arms 50 against the influence of a retractile spring 99 connected to a pin on the slide rack 30 and to the end of arm 92 as shown. The spring accordingly effects the reverse or lifting movement as allowed by the cam contour. This releasable stop actuating cam 97, as best shown in Figs. 13 and 14, is formed as a two part cam having an inner part 97' having a slotted lug 101 to receive a securing screw stud 102 for securing it to a gear 104 fixed on the actuating shaft 60. The gear 104 is provided with a series of threaded bores to receive the securing screw 102 in varied positions of angular adjustment. The two portions of the cam are also relatively adjustable, for this purpose the outer part 97 having an elongated curved slot 106 to which its fitted screw stud 107 threaded to the inner member. Relative angular adjustment of the cam members 97—97' will effect elongation or shortening of the effective outer peripheral cam surface and correspondingly adjust the duration of the stop release period suited to variations in the lengths of the sheets being fed. The two-part connecting rod 93—94 is connected by set screw retained connecting

yokes 109 which are loosened during adjusting movement of the forward table section.

Feed rollers.—Positioned immediately forward and to the rearward of the impression roller 2 there are provided magnetic feed rollers 110 and 111 mounted upon shafts 112 and 113 suitably journaled in the standard. As shown in Fig. 2, these rollers are driven by suitable gearing connection from the gear 114 fixed on the bed roller shaft 11 in the direction to advance the sheets rearwardly between the rollers 2 and 10 and to eject them over idler 118 at the rear of the machine.

Associated with the forward feed roller 111 there are provided a series of lifters or retainers 120 mounted upon squared portions of a rock shaft 121 journaled in brackets 122 secured to the under side of the rear table section as best shown in Fig. 8. The lifters 120 are of curved form fitting between the flanges of the rollers and are elevated and depressed under the action of a double cam 124 journaled on bearing stud 125 to engage a roller on arm 126 fixed on the rock shaft 121. A spring 127 is secured to the arm and to a fixedly secured pin to effect reverse movement or depression of the lifters. The two parts of the cam 124 are secured by screw studs 128 fitted to slots in one cam member whereby relative angular adjustment will alter the duration of the cam action. The lifters, as shown, are in position to engage the under sides of the sheets and when elevated to retain the sheets out of feeding engagement with the feed roller 110 until automatically depressed by the timing cam 124 thereby to determine the feed action with relation to the position of the impression roller.

Side gauges.—For laterally aligning of the sheets as they pass through the machine, side gauges are provided to engage the side edges of the sheets. In accordance with the present improvements the side gauges are mounted to be laterally movable and are cam actuated for accurately positioning the sheets and guiding them as they progress to the impression roller.

Referring to Figs. 2 and 16, the side gauges comprise gauge members 132 having bevelled inner nose portions undercut to receive anti-friction gauge rollers 133 bearing upon the table for engaging the side edges of the sheets, the rollers being journaled upon vertical studs as shown. The gauge members 132 are provided with outwardly extending posts 134 fitted to apertures in a holder 135 secured upon elongated, movable gauge supports 136 by clamping bolts 137 having squared heads and received within the elongated key slots 138 of the supports so as to be longitudinally adjustable thereon. The gauge supports 136 are secured to laterally shiftable carrier plates 140 and 141 by means of securing bolts 142 passed through lateral guide slots 143 in the rear table section. The carrier plate

140 has secured thereon a roller 145 engaging a laterally acting cam slot 146 of a cam mounted on shaft 147 driven by gear 148 and gear 149 on the actuating shaft 60. In generally similar arrangement, the carrier plate 141 has secured on its under side a roller 152 engaging a laterally acting cam slot of cam 153 secured on the shaft 60.

At one side of the table the side gauge is desirably arranged to be yieldable to compensate for possible variations in the width of the sheets. In the structure shown this is accomplished by the sliding fit of the posts 134 within the holders 135 and the arrangement of springs 156 interposed between the gauge 132 and the holder for the yieldable stop and to the opposite side of the holder for the coacting and laterally rigid stop as shown in Fig. 2.

The contour of the gauge operating cams, as will readily be appreciated, operates to laterally withdraw or separate the gauges as a new sheet is brought into position therebetween after which the gauges are moved inwardly so as to properly center and guide the sheets as they pass to the impression roller. The release movement of the side gauges is desirably timed whereby the spring or yieldable gauge will recede slightly in advance of the rigid gauge and in timed relation to the lifters 120 whereby the latter will be depressed to effect tractive engagement with the associated magnetic feed roller before release of the sheet by the side gauges, this being correspondingly timed with relation to the advancing of the sheet by the fingers 57.

Driving gear connections.—The driving connections for the mechanism as described embody further improvements of the present invention and are designed to allow of changing the operating ratio of the impression roller with relation to the sheet feeding mechanism for the coating of longer sheets or of the oblong sheets when passed through the machine in a lengthwise position. In the normal operation, as hereinbefore referred to, the sheets are of a length, or positioned with their longer dimension transverse of the table, whereby the desired coating thereof will be effected upon a single rotation of the impression roller with the feeding mechanism having an operating ratio thereto to effect the feeding movement of one sheet for each revolution of the roller or an operating ratio of one to one. For the coating of the sheets lengthwise or of longer sheets, special provision is made for changing the operating ratio, the arrangement as here shown providing for one and one-half revolutions of the impression roller for each complete feeding movement of the sheet or feed cycle of the feed mechanism and its associated parts, the latter including the re-

leasable stops 50, feed chain fingers 57, side gauges 132 and timing fingers 120.

The driving arrangement, as best shown in Figs. 1, 2, 3, 4 and 8, comprises a drive shaft 160 journaled in the frame upon which is suitably keyed a slidable clutch member 161 formed to have key driving connection with the hub of a drive sprocket 162 journaled on the shaft 160. The drive sprocket 162 may be driven by chain connection from an automatic drying oven of the character described in Patent No. 1,736,866, dated Nov. 26, 1929, for the feeding of the sheets thereto in synchronized operating relation. A pivotal lever 164 is provided for shifting of the movable clutch element 161 and a hand wheel 165, for manual rotation of the drive shaft, is provided as shown in Fig. 4.

Slidably keyed on the drive shaft, is a movable transmission sleeve 166 having affixed thereon larger and smaller gears 167—168 alternately to engage gears 170 and 171 respectively on the shaft 11 of the bed roller 10 as the sleeve is shifted by means of lever 172. The roller 10 is accordingly rotated faster or slower as determined by the gear engagement and the driving motion thereof is transmitted to the upper or impression roller by means of a gear 174 on the opposite end of shaft 11 meshing with a gear 175 journaled on the actuating shaft 60 and meshing with gear 176, the latter gear meshing with gear 178 fixed on impression roller shaft 3.

For driving the actuating shaft 60 in the one to one ratio referred to for the feeding of the sheets of shorter length, the transmission gear 168 is engaged with coacting gear 171, as shown in Figs. 2 and 4, and the gear 175 is then connected to be rotatively secured to the shaft 60. This is accomplished by means of a double gear 104—180, secured upon the end of shaft 60 by set screw 181, the double gear being apertured for a coupling key 182 (Fig. 3) registering with an aperture 183 in the gear 175 whereby they are keyed to rotate in unison.

For changing of the operating ratio as referred to, the transmission gear 167 is moved into mesh and the key 182 is removed, and the driving of the double gear 104—180 is then effected through connections independent of the impression roller drive. As here shown, the independent driving connections therefor consist of a sprocket 184 normally loose on a hub bearing 184' on the end of drive shaft 160 and connected by chain 185 to drive a sprocket 186 journaled on bearing stud 187 and upon the hub of which is a gear 188 driving gear 189 journaled on stud 190 and carrying a gear 192 meshing with gear 180 secured to the actuating shaft 60 as described. The sprocket 184 and bearing hub 184' are provided with registering apertures to receive the key 182, when re-

moved from the double gear connecting position of Fig. 13, thereby completing the driving connection to shaft 60 from the driving shaft for driving the actuating shaft 60 independently of the impression roll drive and in a ratio to effect one and one-half revolutions of the impression roller to a single feed operation.

Retard magnets.—To further insure accuracy of the feeding operation there are provided retarding magnet extension bars 194 having retarding portions bearing on the forward table section 28 adjacent to the bearing strips and having rearward portions curved into close proximity to the magnetic entry roller 42 to be magnetized thereby. The action of the retarding bars is to have magnetic gripping effect on the ends of the sheets as they drop onto the table from the entry roller thereby to check forward momentum of the sheets so as to resist displacement.

Guide fingers (Fig. 10).—Associated with the forward edge of the rear table section there are desirably provided a series of downwardly and forwardly inclined guide fingers 196 mounted upon a pivotal rod 197 engaging elongated slots 198 in rounded off rearward end portions as shown in Fig. 10. The forward portions of the guide fingers are formed with rearwardly directed hook portions 199 engaging the table edges to be held in operating position by springs 200 attached to finger lugs 201 and to table lugs 202. The office of the guide fingers is to engage with the forward edges of the sheets and to deflect them upwardly to insure against abutting engagement with the table edge by sagged or deformed sheets. The fingers may be displaced from operating position by pulling forward and depressing into the dotted line position of Fig. 10.

Magnetic feed rollers.—The structural arrangement of the magnetic feed rollers is shown in Figs. 11 and 12 wherein the energizing coils are indicated at 204 wound upon soft iron core 205 upon which are fitted the flange sheet engaging portions 206. The coils are connected to the terminal connections 208 fitted to insulated supports in the portions 206 and to which the conductors 209 and 210 are connected. The leads 209 and 210 are passed through insulated cylindrical roller extensions 212 to outer flange members 214 carrying terminals 215 from which a connection is made to a ring terminal member 216 carried by insulator support 217 and engaged by a brush terminal 218 spring pressed by spring 219 into engagement therewith to maintain contact during rotation of the roller. The ring and brush terminals are enclosed within a protective cover 220 having its inward directed edge freely received within an annular groove or depression 221 in a roller member

222 to allow relative rotative movement of the roller while protecting the terminals from the coating fluid.

Side guide extension.—In the feeding of extra long sheets through the machine, there may be employed a side guide extension arrangement as best shown in Fig. 15. As here shown, the extension guide is composed of a supplemental guide member 224 of the construction shown in Fig. 16 and hereinbefore described. The guide member 224 is supported upon a slotted supporting bar 225 secured to the forward end of gauge bar 136 to be laterally shiftable therewith and is connected at its outer end portion to a brace bar 226 having securing stud 227 fitted to the key slot of the bar 225 and at its other end secured by a pin 228 to the gauge carrier plate.

In the operation of the machine as will readily be understood from the foregoing, the sheets are advanced to the feed table by the entry roller 42 under the timed control of the releasable stop 50. When so deposited on the feed table the side gauges will be moved inwardly to properly align the sheets with respect to the impression roller. The sheets are then advanced by the feed fingers 57 to establish a proper position relation to the impression roller, which may be accurately adjusted by the table adjustment, from which position it is fed to the roller under the timing action of the lifter or retainer 120 by the feed roller associated therewith.

The advancing of the sheets under the impression roller by means of the magnetic rollers 110 and 111 provides for the feeding of the sheets by feeding engagement with the under sides of the sheets only which is desirable in avoiding engagement with the treated surface and with the further provision as described for positively driving of the impression roller the arrangement provides a cooperating relation allowing the employment of impression rollers having spaced or non-engaging surface portions which otherwise would interrupt the feeding of the sheets.

While there is shown and described an approved embodiment of the features of the present invention, it will be readily understood that varied modifications may be made therein without departing from the scope of the invention as defined in the appended claims. It is accordingly intended that all matter herein shall be interpreted as illustrative and not in a limiting sense.

Having described our invention, we claim:

1. A machine of the character described having in combination with impression means suitably operated, of sheet feeding mechanism associated therewith consisting of a feed table, automatic means for advancing the sheets from said table to the im-

pression means in timed relation thereto, an entry feed roller positioned in forward relation to the feed table to advance the sheets thereto, said entry feed roller being electro-magnetically energized for tractive engagement with the sheets, releasable stop means associated with the entry feed roller arranged in the path of the sheets and means for automatically operating the stop means in timed relation to the operation of the impression means.

2. A metal sheet feeding mechanism of the character described having in combination with a standard and an impression roller suitably operated, of a feed table mounted on the standard, said table having a longitudinally adjustable forward section, sheet feeding means associated with the adjustable table section and movable therewith consisting of a feed chain supported to have movement parallel to the table and a feed finger carried thereby, and driving connections for the feeding means adapted to maintain driving connection in the different positions of adjustment.

3. A machine of the character described having in combination with an impression roller suitably journaled and driving means therefor, of sheet feeding mechanism associated therewith consisting of a feed table, means for advancing the sheets from said table to the impression roller in timed relation thereto consisting of a feed chain supported to have movement parallel to the table and a feed finger thereon, an electro-magnetically energized entry feed roller positioned in forward relation to the feed chain for advancing the sheets thereto and releasable stop means associated with the entry feed roller and positioned to be engaged by the sheets and automatically operated connections to the stop means operative to effect the release of the sheets in timed relation to the position of the impression roller.

4. A machine of the character described having impression means suitably operated, sheet feeding mechanism incorporated therewith consisting of a magnetic traction feed roller positioned to be engaged by the sheet to be fed, means for driving the feed roller and means operative to engage the sheet to retain same out of feeding engagement with the roller and automatically operating connections to said retaining means for retracting the retaining means to effect feeding engagement in timed relation to the operation of the impression means.

5. A machine of the character described having an impression roller suitably journaled, driving means therefor, sheet feeding mechanism incorporated therewith consisting of a magnetic traction feed roller positioned to be engaged by the sheet to be fed, means for driving the feed roller and means operative to engage the under side of the

sheet to retain it out of feeding engagement with the roller consisting of lifter arms mounted upon a rock shaft and means for automatically operating the lifter arms comprising a rotatable cam operatively connected to rock the rock shaft, said cam being of two part construction and relatively adjustable for adjusting the duration of the cam action.

6. A machine of the character described comprising impression means suitably driven, sheet feeding mechanism comprising a feed table having suitably journaled magnetic feed roller associated therewith and operative to advance the sheets to the impression means, means operative to engage the sheet to retain it out of feeding engagement with the feed roller and automatically operating connections to said retaining means for retracting the retaining means to effect feeding engagement in timed relation to the position of the impression means, a cam for actuating the operating connections, said cam being adjustable to alter the duration of its action and for timing the relation to the impression means.

7. A machine of the character described having in combination, with an impression roller and driving connections therefor, of sheet feeding mechanism associated therewith consisting of a feed table, means for advancing the sheets from said table to the impression roller in timed relation thereto, a drive shaft, gearing connections from the drive shaft to the impression roller including a changeable gearing connection, independent driving connections from the drive shaft, operating connections for the feeding mechanism adapted for driving connection with the impression roller drive connections and for driving connection with the independent connections to have a changed operating ratio to the operation of the impression roller.

8. A machine of the character described having in combination with a standard and an impression roller suitably journaled thereon, of sheet feeding mechanism comprising a feed table, an entry feed roller in advance relation to the table, releasable stop means associated with the entry feed roller, a feed chain supported to have movement parallel to the table and having a feed finger thereon for engagement with the sheet, laterally movable side gauges on the table, a drive shaft, changeable gearing connections from the drive shaft to the impression roller, an actuating shaft, connections from the actuating shaft for operating the entry feed roller, releasable stop, feed chain and side gauges, independent driving connections from the drive shaft and means for coupling the actuating shaft to be rotated by the impression roller driving connections or by the independent driving connections, substantially as described.

9. A machine of the character described having in combination with a standard and an impression roller suitably journaled thereon, of sheet feeding mechanism comprising a feed table, an entry feed roller positioned in advanced relation to the table, said entry feed roller being electro-magnetically energized to have tractive effort on the sheet, releasable stop means associated with the entry roller, a sprocket shaft suitably journaled transversely of the table adjacent the forward end thereof, feed chain sprockets on said shaft, a series of feed chains engaging said sprockets and supported on adjustable rearward sprockets, said chains having a portion thereof supported to be movable parallel to the table and having feed fingers carried thereon, a drive shaft, changeable gearing connections from the drive shaft to the impression roller, an actuating shaft, connections from the latter for operating the sprocket shaft, connections from the sprocket shaft to the entry roller for operating same, connections from the actuating shaft to the releasable stop means including an adjustable cam for altering the timed action thereof, independent driving connections from the drive shaft and means for coupling the actuating shaft to be rotated by the impression roller driving connections or by the independent driving connections substantially as described.

10. A metal sheet feeding mechanism of the character described having in combination with a standard and an impression roller suitably journaled, of a feed table mounted on the standard, feeding means associated with the table for advancing the sheets to the impression roller and means for laterally aligning the sheets upon the table and guiding them to the impression roller comprising oppositely positioned side gauges positioned to engage the sides of the sheets, laterally shiftable supports for the gauges, said gauges being mounted upon the supports to be longitudinally adjustable thereon and one of said gauges being outwardly yieldable, operating connections for the gauges supports operative to separate the supports as the sheets are delivered therebetween and operative to retract the yieldable gauge in advance of the opposite gauge.

11. A metal sheet feeding mechanism having in combination with a standard and impression means operatively supported thereon, of sheet feeding mechanism comprising a table, feeding means for advancing the sheets over the table, an entry feed roller electro-magnetically energized and operable to advance the sheets to the table and magnetic extension bars associated with the entry roller operable by their attraction to retard forward momentum of the sheets as they are delivered to the table.

12. A sheet feeding mechanism having a

- standard, a feed table mounted on the standard, said table having a longitudinally adjustable forward section and a rearward section, means for adjustably moving the forward section and forwardly directed guide finger elements mounted on the forward edges of the rear table section having inclined upward deflecting surfaces positioned to be engaged by the sheet edges, said finger elements being mounted to be shiftable to an inoperative position and to give clearance for the closing up of the table sections.
13. A sheet feeding mechanism having a standard, a feed table mounted upon the standard, an impression roller suitably operated, electro-magnetic feed roller journalled with relation to the table for feeding the sheets to the impression roller, said feed roller being provided with a ring terminal, a brush resiliently supported for engagement with the ring terminal and a protective casing for the terminals having an annular flange fitted within an annular seat formed within the feed roller to allow of relative rotative movement of the latter.
14. A metal sheet feeding mechanism of the character described having in combination with a standard and impression means suitably operated, of a feed table mounted on the standard, sheet advancing means associated with the table and operative to advance the sheets and adjustable to establish a position relation of the sheet to the impression means and automatically actuated feeding means operative for feeding the sheet to the impression means from said position in timed relation to the position of the impression means.
15. A metal sheet feeding mechanism having in combination with a standard and impression means operatively supported thereon, of sheet feeding mechanism comprising a table, feeding means for advancing the sheets over the table, an entry feed roller suitably journalled in advance of the table, said feed roller being electro-magnetically energized and magnetic retarder bars extended within the plane of the table to engage the sheets as deposited thereon, said bars having curved forward portions closely encircling the feed rollers to be energized therefrom.
16. A machine of the character described having in combination with a standard and an impression roller suitably journalled thereon, of a feed table mounted on the standard, means for driving the impression roller and means for advancing the sheets through the machine consisting of an electro-magnetic feed roller suitably journalled for engagement with one side of the sheet and means for driving the feed roller whereby the sheet is fed independent of the impression roller engagement therewith.
17. A machine of the character described having in combination with a standard and an impression roller suitably journalled thereon, of a feed table mounted on the standard, means for driving the impression roller and means for advancing the sheets through the machine consisting of electro-magnetic feed rollers suitably journalled forwardly and rearwardly of the impression roller for feeding engagement with the under side of the sheet, means for driving the feed rollers and automatically operated timing means associated with the advance feed roller to time the engagement of the sheets therewith.
- Signed at Hoboken, in the county of Hudson and State of New Jersey, this 9 day of June, A. D. 1930.
- CHARLES WAGNER.
AUGUST HORMEL.