June 20, 1933. A. HORMEL 1,914,806

APPARATUS FOR FEEDING METAL PLATES

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Fig. 1.

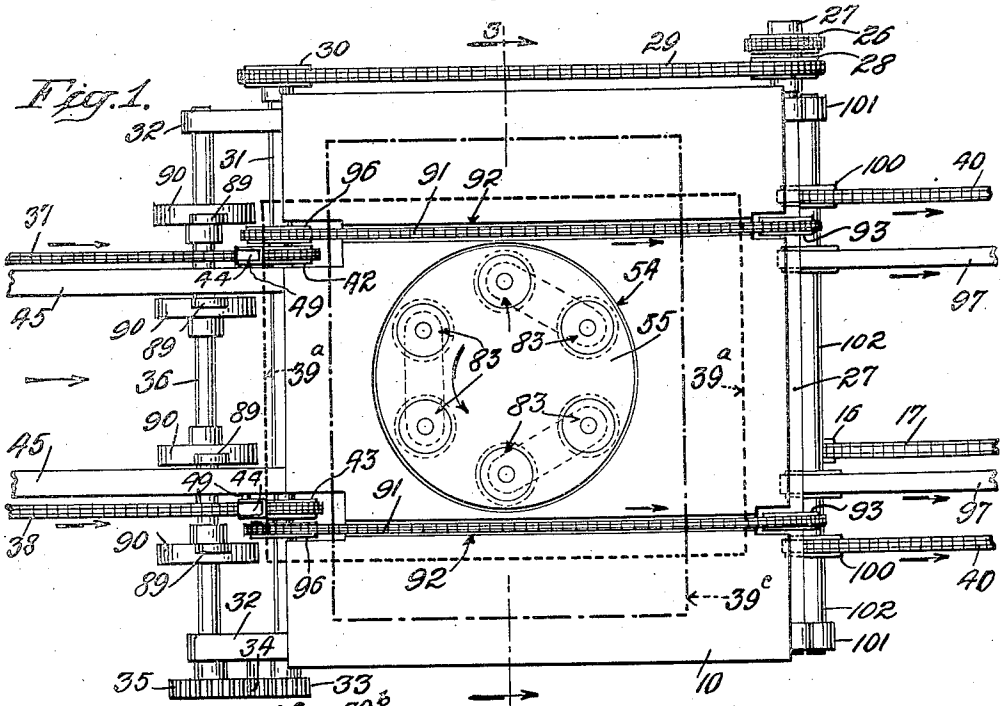

Fig. 2.

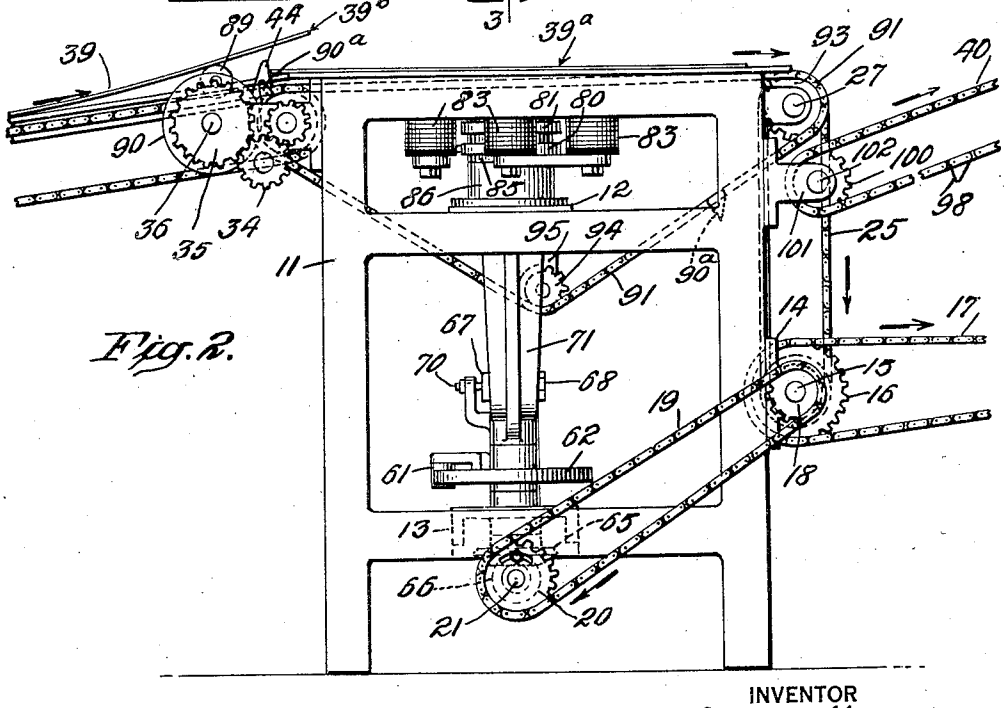

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Fig. 8.

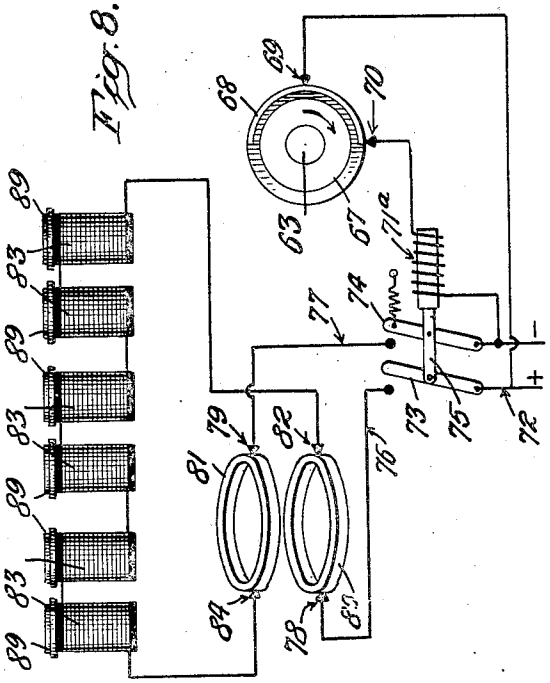


Fig. 6.

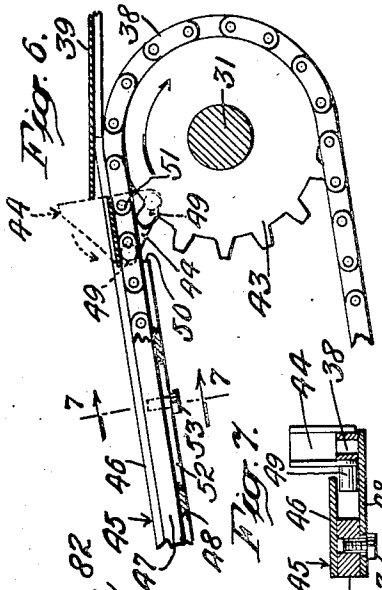


Fig. 7.

Fig. 4.

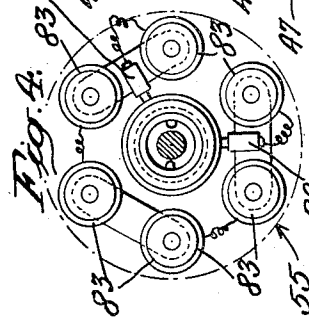


Fig. 3.

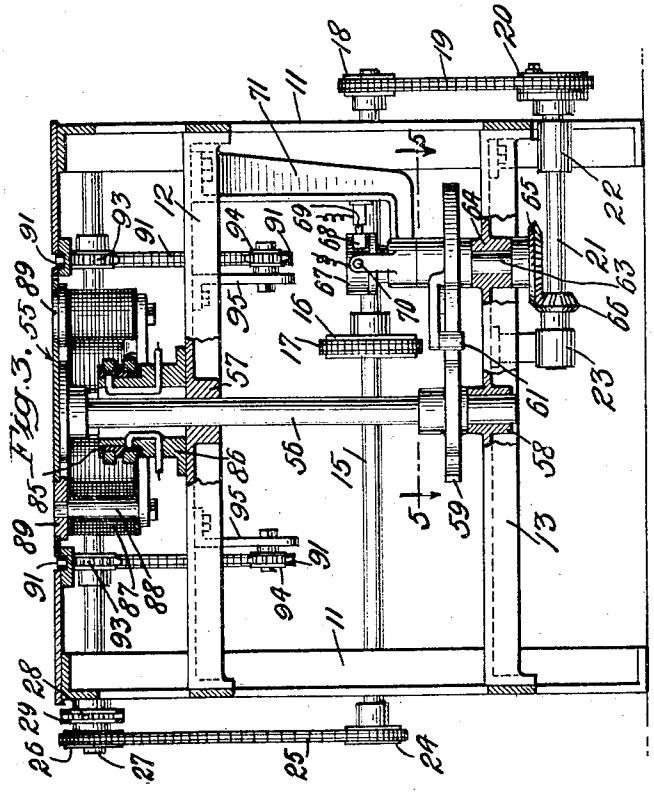
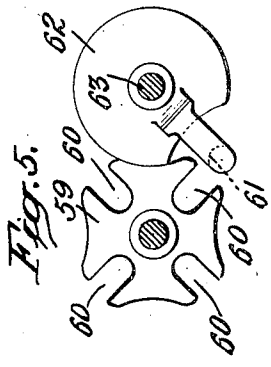


Fig. 5.



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Patented June 20, 1933 1,914,806

UNITED STATES PATENT OFFICE

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APPARATUS FOR FEEDING METAL PLATES

Application filed April 29, 1932. Serial No. 608,222.

This invention relates to a mechanism for feeding or delivering sheets of metal. The object of the invention is to provide a means for automatically supporting and feeding large metallic sheets to a turning or rotating device which engages and rotates the sheets to a position at right angles to that which they occupied when fed to the turning means, and then feeds them to a conveyor which transports them to some other apparatus.

The sheets of metal fed by my improved feeding means are usually large rectangular metal sheets which are received upon a conveyor and are moved by the same to a table or other like support. When the sheet reaches the support, its under face is magnetically engaged and the sheet is rotated about its axis to a position at right angles to that which it initially occupied on the carrier. That is to say, if the sheet when first received on the table was positioned with its longitudinal axis parallel to its direction of feed, the sheet after being rotated is then positioned with its longitudinal axis located transversely to the direction of its further movement. In such a changed position, the sheet is carried away by a conveyor to drying means or to some other mechanisms which operate upon it.

In the embodiment of my invention shown in the accompanying drawings, Fig. 1 is a plan view of a feeding mechanism made in accordance with this invention; Fig. 2 is a side elevation of the same; Fig. 3 is a sectional view on the line 3—3 of Fig. 1, looking in the direction of the arrows; Fig. 4 is a plan view of the electro-magnets; Fig. 5 is a sectional view on the line 5—5 of Fig. 3, looking in the direction of the arrows; Fig. 6 is a side elevation, partly in section, of a portion of one of the conveyor chains and associated parts; Fig. 7 is a sectional view on the line 7—7 of Fig. 6, looking in the direction of the arrows; and Fig. 8 is a diagrammatic view of the electric circuit for the operation of the electro-magnets.

In the drawings, 10 indicates a table or support composed of brass or other non-magnetic material, and which is mounted upon a frame mainly composed of the side members 11 suitably braced and connected by the supporting frame elements 12 and 13. The supporting frame, consisting primarily of the frame elements 11, 12 and 13, carries bearings 14 in which a drive shaft 15 is rotated. Secured on the shaft 15 is a sprocket 16 which is driven by a chain 17 from any suitable source of power. At one of its ends, the shaft 15 is provided with a sprocket 18 which engages and drives a chain 19 extending over a sprocket 20 adapted to be adjustably secured on the end of a shaft 21 which is mounted to rotate in bearings 22 and 23 located on the frame of the machine. At its opposite end, the shaft 15 is provided with a sprocket 24 by which a chain 25 is driven, the chain extending upward over a sprocket 26 secured on a shaft 27. The shaft 27 also carries a sprocket 28 which drives a chain 29 extending about a sprocket 30 secured upon a shaft 31. The shaft 31 is mounted in the bearings 32 and at its end opposite to that on which the sprocket 30 is mounted, is secured a gear 33 which meshes with an idle gear 34 that drives another gear 35 secured on the end of a shaft 36.

37 and 38 are a pair of parallel conveyor chains which transport the metal sheets 39 to the table 10 where they are magnetically engaged and swung to a position at right angles to that in which they were received, and then delivered to rails 97 on which they are shifted by a pair of chains 40, which move them off to other mechanisms or to drying means. The conveyor chains 37 and 38 are driven by sprockets 42 and 43 which are secured on the driven shaft 31. Each of the chains 37 and 38 carries spaced conveyor lugs 44 which act against the edge of one of the metal plates 39 to force the plate along on the top of a pair of channelled supporting rails 45, shown in detail in Figs. 6 and 7. Each of these rails 45 is provided with a top plate 46, a spacing member 47 and an adjustable bottom plate 48 of greater width than the top plate so that it acts as a rest or support for the chains 37 or 38. The conveyor lugs 44 are triangular in shape and channel-shaped in cross section. Each of said lugs is pivoted at 51 to the chain and is provided with a laterally extending pin 49

which rests upon the plate 48 of one or the other of the supporting rails 45 to hold the lug erect when the lug is positioned over one of said rails, as shown in Fig. 7. While the lug is moved along on the rail 45, the pin 49 is supported on the plate 48 which serves to hold the lug upright, in the position indicated in dotted lines in Fig. 6, so that two of these lugs 44 in this erect position press against the edges of a plate 39 to move it to the table 10. When the pair of lugs on the chains 37 and 38 have been carried beyond the ends 50 (Fig. 6) of the plates 48, the pins 49 on the lugs 44 that have been moving the plate 39 being no longer supported on these plates 48, permit the lugs to swing downwardly about their pivotal points 51 to the position shown in full lines in Fig. 6 so that the lugs are then inoperative upon the plate 39 and further movement of the plate ceases, leaving the plate on the surface of the table 10, in the position indicated by the dotted outline 39*a* in Fig. 1. The plates 48 of the supporting rails 45 are slotted at 52 and are held in place by the screws 53, the slots permitting a longitudinal adjustment of these plates whereby they may be positioned to release the conveyor lugs 44 at any required point.

The table 10 is provided with a central opening 54 within which a rotatable plate or disk 55 is positioned, this disk being attached to the upper end of a vertical shaft 56. The shaft 56 is rotatably mounted in the bearings 57 and 58, and near its lower end is provided with a slotted wheel 59 formed with the four slots 60. The shaft 56 is rotated a quarter of a turn by each engagement of one of the slots 60 with the pin 61 provided on a disk 62 fixed on a stud shaft 63. A bearing 64 supports the stud shaft 63, the lower end of said shaft being provided with a bevel gear 65 which meshes with a bevel gear 66 secured on the driven shaft 21. Secured on the upper end of the stud shaft 63, and therefore rotatable therewith, is a commutator disk 67 made of insulating material and provided with an arcuate section or segment 68 of metal. Stationary brushes or contacts 69 and 70 are supported on the bracket 71, these contacts being constantly held against the periphery of the commutator disk 67 in the conventional way. The contact 70 connects to one side of a power line through the windings of an electro magnet 71*a*, while the other contact 69 connects to the other lead 72 in the line as shown in Fig. 8. The power leads connect to the arms 73, 74 of a switch, these arms being both connected to the armature 75 of the magnet 71. Consequently, when both of the brushes or contacts 69 and 70 are bearing against the metal segment 68 of the commutator disk 67, the magnet 71 is energized and the armature 75 of the magnet causes the switch arms 73 and 74 to close circuit to leads 76 and 77 which terminate in the brushes 78 and 79 respectively. The brush 78 is in constant contact with the metal ring 80 while the brush 79 is in constant contact with a similar ring 81. A brush 82 connects the ring 80 with a plurality of electric magnets 83, the windings of which are connected in series as shown in Fig. 8. At their opposite end the windings of these magnets connect to the brush 84 which is in constant contact with the face of the ring 81. Both of the rings 80 and 81 are mounted in spaced relationship in an annulus 85 of insulating material which is supported on a boss 86 held on the frame of the machine.

The electro-magnets 83 are of conventional construction, the same being carried by and rotated with the plate or disk 55, each of the magnets having the conventional winding 87 and core 88, the upper end of the core terminating in an enlarged head 89 of iron or other magnetizable material. The disk 55 is preferably of brass or some similar non-magnetic material. The heads 89 are flush with the surface of the plate or disk 55 as clearly shown in Fig. 3.

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

The metal sheets to be fed are received upon the rails 45 and are moved along these rails by the action of the conveyor lugs 44, a pair of which abut against the edge of a plate 39 to slide the same along on the rails 45 until the plate is brought to the table 10. When the plate nears the table 10, its edge 39*b*, then located adjacent to the table, is elevated by means of cam surfaces 89 formed on disks 90 which are secured on the shaft 36. This edge of the plate 39 is so elevated in order that the same may be kept clear of the preceding plate 39*a* then on the table 10 and in the process of being pivoted about its axis to the position shown at 39*c* in Fig. 1. The plate 39 in continuing its movement along the rails 45 is brought to rest upon the table 10 and is then in the position indicated at 39*a* where it is ready to be swung to a position at right angles to that in which it is brought to rest upon the table. When the plate reaches the position shown at 39*a* and is ready to be swung about its axis, the commutator disk 67 has been so rotated that the contacts or brushes 69 and 70 are both bearing against the metal segment 68 thereon, causing the switch arms 73, 74 to close circuit to the rings 80 and 81 which causes the electro-magnets 83 to be energized so that their armatures magnetically engage the under face of the plate 39, and as the disk 55 is rotated through a quarter turn by operation of the slotted-wheel 59 and pin 61, the plate 39 being held by the magnetic attraction of the magnets is swung with the disk

55 about its vertical axis to the position shown at 39*c* in Fig. 1. While this rotative movement of the plate 39 has been taking place, the next disk is positioned with its end 39*b* elevated and ready for deposit upon the table 10 as soon as the plate 39 has been moved away.

When the plate 39 has been pivoted or swung to the position shown at 39*c* one of the contacts 69 or 70 has broken the circuit, and the switch 73, 74 has been opened so that the magnets 83 are de-energized. The plate in the position 39*c* is then carried from the table 10 by lugs 90*a* secured on a pair of chains 91 which move in recesses 92 in the table 10. These chains extend over sprockets 93 secured on the shaft 27, passing under idler sprockets 94 rotatably mounted in the brackets 95 and thence extend over sprockets 96 secured on the shaft 31. The lugs 90*a* move the reversed plates from the table 10 to a pair of rails 97 along which the plates are moved by lugs 98 on chains 40 until they reach a station where they are operated upon by some other mechanism. The chains 40 are driven from any suitable source of power, and at the machine, these chains extend over the sprockets 100 which are secured on the shaft 102 that is rotatably supported in the brackets 101 mounted on the frame of the machine.

The mechanism described thus speedily and effectively feeds the plates to a support, rotates them to a position at right angles to that which they initially occupied and then feeds them along a support in the position to which they have been rotated.

What I claim is:—

1. An apparatus for feeding metal plates having means for receiving and conveying a plate, a support to which the plate is moved by the conveying means and on top of which the plate is brought to rest, magnetic means forming a part of the support for engaging the plate when the plate is received on the support, means for rotating the magnetic means to cause the plate engaged thereby to be rotated to a position at an angle to that occupied by it when being conveyed, and conveying means for moving the plate away from the support.

2. An apparatus for feeding metal plates having means for receiving and conveying a plate, a support to which the plate is moved by the conveying means, a rotating magnet forming a part of the support for engaging the face of a plate positioned over it by the conveying means, and means for intermittently rotating the magnet to cause the plate engaged thereby to be rotated with the magnet to a position at an angle to that occupied by the plate when first engaged by the magnet.

3. An apparatus for feeding metal plates having means for receiving and conveying a plate, a support to which the plate is moved by the conveying means, a rotating magnet having its operative face forming a part of the support and adapted to engage the face of a plate positioned over it by the conveying means, means for intermittently rotating the magnet to cause the plate engaged thereby to be rotated with the magnet to a position at right angles to that occupied by the plate while disposed on the conveying means.

4. An apparatus for feeding sheet metal plates having a conveyor for moving the plates, a table to which the plates are moved by the conveyor, means adjacent the table for elevating the edge of each plate as said edge reaches the table, an opening in the table, a rotating magnet disposed in said opening, and means for intermittently energizing the magnet to cause it to magnetically engage successive plates and rotate them to a position at an angle to that which they occupied while being carried on the conveyor.

5. An apparatus for feeding sheet metal plates having rails for supporting plates to be fed, chains movable along said rails, spaced lugs carried by the chains for engaging plates located on the rails and moving said plates, a table to which the plates are moved, means adjacent the table for elevating the edge of each plate as the edge reaches the table, an opening in the table, an electro-magnet disposed in said opening, means for intermittently rotating the magnet, means for energizing the magnet while the same is being rotated whereby a plate disposed over the magnet will be attracted thereby and rotated with the magnet, and means for moving the plate thus rotated away from the table.

6. An apparatus for feeding metal plates comprising a table provided with an opening, an electro-magnet disposed in said opening, means for rotating the magnet therein, conveyor means for feeding plates to a position over the magnet and conveyor means for moving the plates away from the magnet after said plates have been rotated by the magnet.

7. An apparatus for feeding sheet metal plates, having rails for supporting the plates to be fed, chains movable along the rails, spaced lugs carried by the chains and supported in an erect position by the rails to cause said lugs to engage plates located on the rails and move said plates, a support to which the plates are fed and on which the plates lie flat, means adjacent the support for elevating the edge of each plate as the edge reaches the table, an opening in the table, an electro-magnet disposed in said opening and having its operative face located substantially flush with the face of the support, means for intermittently energizing the magnet, means for rotating the magnet while the same

is energized whereby a plate positioned over the magnet is magnetically attracted by it and rotated with it, and means for conveying the plate from the support after it has been rotated by the magnet.

8. An apparatus for feeding sheet metal plates, having an electro-magnet, means for intermittently rotating the magnet for one quarter of a turn during each rotative movement, means for energizing the magnet while the same is being rotated, means for feeding metal plates successively over the face of the magnet to position said plates flat thereon, and means for carrying the plates away from the magnet after the plates have been engaged and rotated by the said magnet.

9. An apparatus for feeding sheet metal plates, having an electro-magnet, means for intermittently rotating the magnet, an electric circuit for intermittently energizing the magnet, switch means for interrupting the electric circuit to the magnet during pauses in the rotative movement of the magnet, a conveyor for feeding plates to the magnet and conveyor means for carrying away plates that have been rotated by the magnet.

10. An apparatus for feeding metal plates, having a conveyor, a table to which plates are carried by the conveyor, a rotating magnet having its operative face forming a part of the table and adapted to engage the face of a plate positioned over it by the conveyor, means for intermittently rotating the magnet to cause the plate engaged by it to be rotated also, means for carrying away the plates after they have been rotated by the magnet, and means adjacent to the table for elevating the edge of each plate as it nears the table so that said edge is held clear of a plate that is being rotated by the magnet.

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