

A. KENT.
MACHINE FOR SEPARATING SHEET METAL.
APPLICATION FILED JULY 13, 1909.

995,018.

Patented June 13, 1911.

2 SHEETS-SHEET 1.

Fig. 2

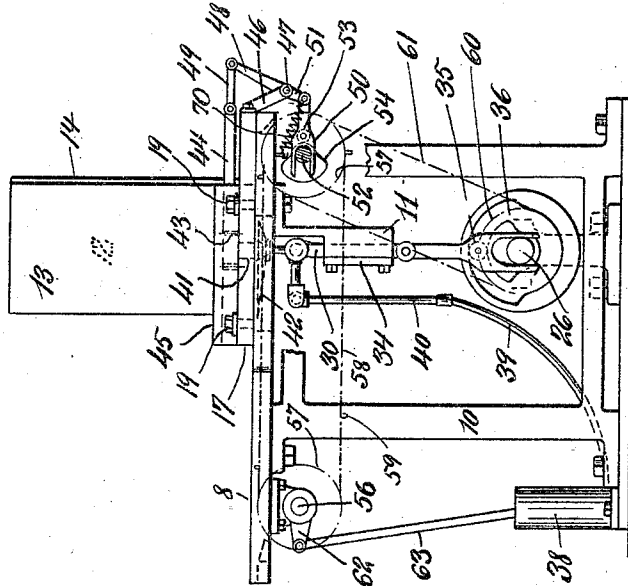
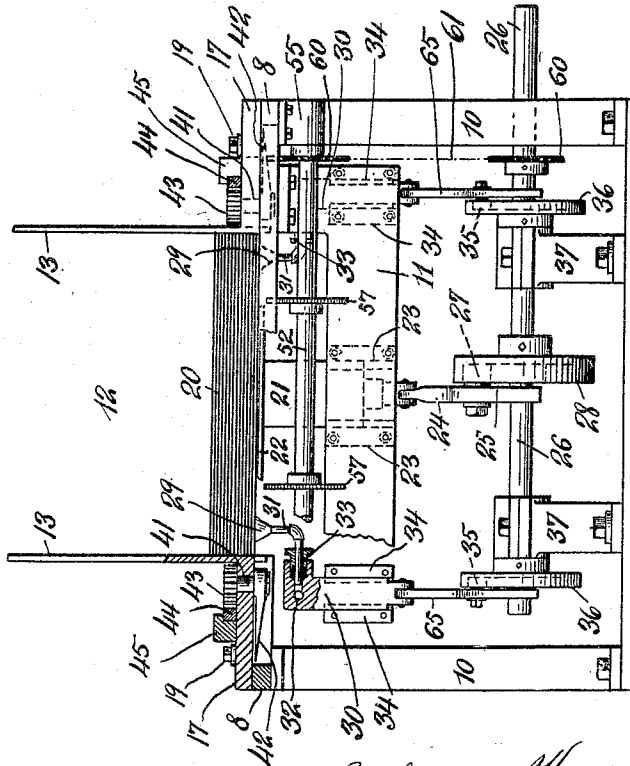


Fig. 1



Witnesses
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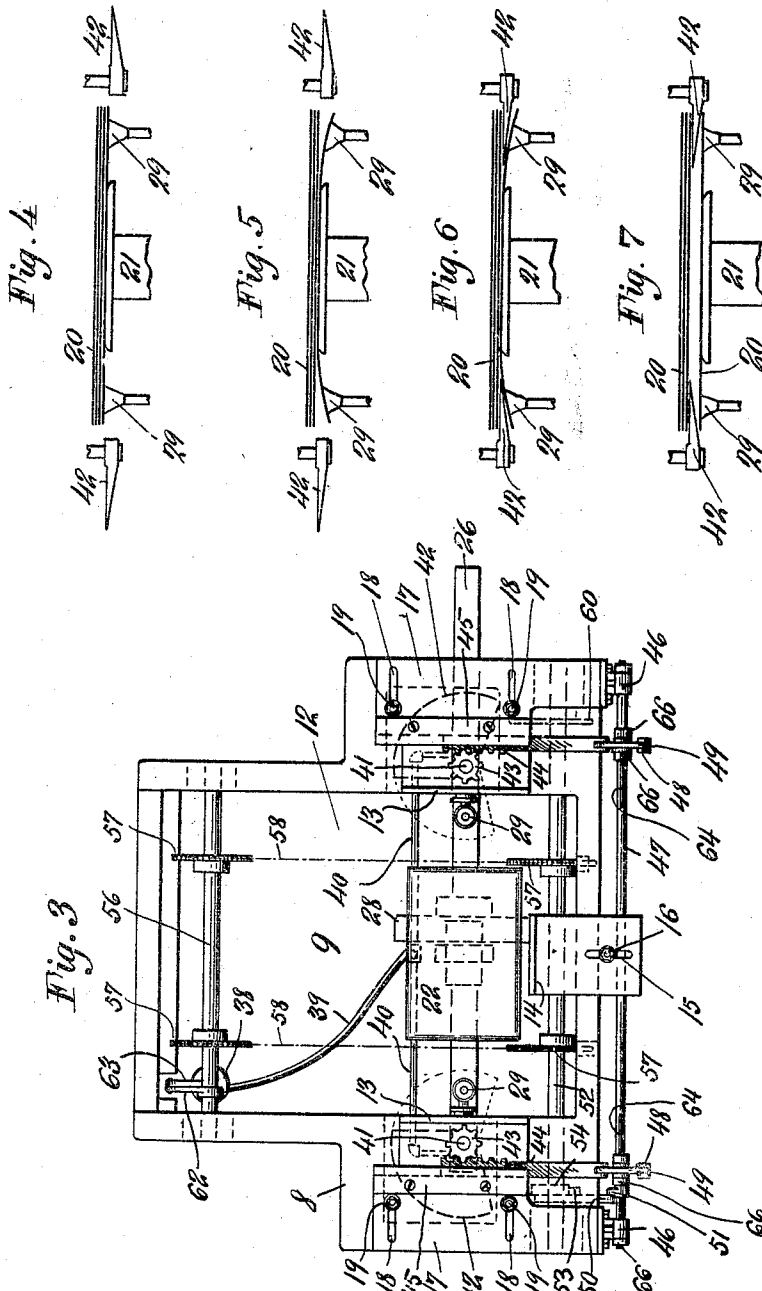
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MACHINE FOR SEPARATING SHEET METAL.

995,018.

Specification of Letters Patent. Patented June 13, 1911.

Application filed July 13, 1909. Serial No. 507,325.

To all whom it may concern:

Be it known that I, ARCHIBALD KENT, a citizen of the United States of America, and a resident of Hoboken, Hudson county, New Jersey, have invented certain new and useful Improvements in Machines for Separating Sheet Metal, of which the following is a specification.

This invention relates to a machine for separating sheet metal and has particular reference to a machine for separating large sheets of tin and to carry the separated sheets to some other machine to be worked into a finished product as for instance tin cans.

The objects of the invention are to provide a machine for this purpose of simple, practical and strong design, and adapted to be operated at a fairly high rate of speed, further to construct the machine in such a manner that it may readily be attached to some other machine in which the sheet metal is to be worked upon and also to provide means for adjustment for different sizes of sheets.

Other objects will appear as this specification proceeds.

To this end the invention comprises such details of construction and arrangement of parts as is hereinafter set forth in detail while reference is had to the accompanying drawings in which—

Figure 1 is a front view of a machine embodying the invention and with parts removed for the sake of clearness. Fig. 2 is a side elevation of the machine. Fig. 3 is a plan view and Figs. 4, 5, 6, and 7 are diagrammatic views illustrating the operation of the separating mechanism.

The reference numeral 8 represents the bed plate of the machine which is provided with a rectangular opening 9 and supported on side frames as 10. A bracket 11 is bolted to the underside of the bed plate and extends across the machine. A hopper 12 is formed over the opening 9 by means of the side guides 13, 13 and the front guide 14 which latter is adjustable by means of slot 15 and bolt 16. The side guides are each provided with a foot 17 having slots 18 so that they may also be adjusted and fastened by bolts 19. This is all best seen in Fig. 3. The sheets of metal 20, in this instance tin sheets, are laid in the hopper 12 and rest by their full weight on a central support 21

which preferably carries a pad 22 to properly support the sheets. The support 21 is movable vertically in the gibs 23, bolted to the aforesaid bracket 11, by the following means. To the support a link 24 is pivoted which ends in a fork 25 straddling the main shaft 26 and which carries a cam roll 27 running in a cam 28 fast on said shaft. As the latter is rotated the support 21 is reciprocated vertically.

For the purpose of separating the bottom sheet from the pile I employ two suckers in the form of cups 29. These latter are each carried in slides 30, one on each side of the machine, by means of the bent connections 31. These connections communicate with ports 32 in said slides and for the purpose of adjustment stuffing boxes 33 are interposed between the connections and the slides. These latter are vertically movable in the gibs 34 bolted to the bracket 11 and are operated by a cam roll 35 coacting with the cam 36 on the main shaft 26. The cam rolls are carried in forked links 35 pivoted to the slides 30 as shown and the construction is alike for the two suckers on both sides of the machine. The main shaft is preferably journaled in bearings as 37 and will be driven from the machine to which the sheets are to be fed by any suitable power transmitting means so as to drive the separating machine at the proper speed to suit the operation of such other machine, which it is not necessary to show or describe in detail. On the opposite side of the machine is a vacuum pump 38 which connects by means of flexible connection 39 with the branched rigid pipes 40 which latter connect with the ports 32 in the slides 30. In this manner the suckers are in direct communication with the pump and at the same time are movable vertically.

In the foot of each side guide there is pivoted on a short vertical shaft 41 a sector 42 which lies under the said foot in a cut out in the bed plate as shown. At the top the shaft carries a gear 43 meshing with a rack 44 which slides in a way formed by the rack guide 45. As the rack is reciprocated the shaft 41 is rotated to swing the sector from the position shown in Fig. 1 inwardly into the hopper under the sheet next to the bottom one as will be presently explained. The bottom of the side guide is of course cut out far enough to permit the sector to pass.

The racks are operated by the following means. To the feet 17 of the guides 13 and in front of the machine there is supported in brackets 46 a shaft 47 having arms 48 to which the racks are connected by links 49. The shaft 47 is oscillated by means of the forked member 50 the free end of which is pivoted to a short arm 51 depending from the shaft 47. The member 50 straddles a sprocket shaft 52 and carries a cam roll 53 running on the cam 54 fast on said shaft. A spring 70 keeps the roll 53 on the cam 54. The latter is supported in hangers 55 on each side of the machine and as it rotates the member 50 is reciprocated which in turn through the arm 51, shaft 47, arms 48 and links 49 causes the racks to reciprocate to operate the gears 43. A similar sprocket shaft 56 is supported at the rear of the machine and both of said shafts carry sprocket wheels 57 over which passes a chain 58 having lugs 59 adapted to catch the separated sheet and carry it out from the machine. The shaft 52 is driven from the main shaft 26 by means of sprocket wheels 60 and chain 61. The shaft 56 carries at the one end a crank 62 to which a link 63 is pivoted for operating the pump 38.

The operation is as follows, see Figs. 4-7 which illustrate the cycle of the machine. During the first part of the operation the sheets 20 rest with their entire weight on the support 21 and the suckers 29 are up and abut the bottom sheet and the sectors are swung outward as in Fig. 4. Next the suction is applied to the suckers and these latter are moved down taking with them the edges of the bottom sheet as shown in Fig. 5. In other words the suckers bend the sheet over the support 21. Next the sectors 42 are swung inwardly above the bent down edges of the bottom sheet as seen in Fig. 6. Then the member 21 is moved down as in Fig. 7 and the entire weight of the pile of sheets is now supported by the sectors. At the same time the member 21 moves down the suction ceases to act and the sheet, now fully separated, is ready to be caught by the lugs 59 on the chain 58 for the purpose of carrying it out from the separating mechanism. Next the support 21 is moved up to support the sheets again, the sectors are swung outward, and the cycle of the machine is completed and the mechanism is again ready to separate the bottom sheet.

This construction is particularly advantageous for separating large sheets of metal because of the central support while the edges of the sheet are bent down. Without this central support the large sheets will buckle and fall through the hopper as soon as the suction is applied. On the other hand the sectors are so large that even a single sheet cannot buckle and slide down

between, and they also furnish ample support for a large pile of sheets. A further advantage resides in the fact that the separated sheet lies perfectly straight and loose on the support and thus can readily be removed to whatever other mechanism is going to act on it.

When the size of the sheets varies it becomes necessary to adjust the separating mechanism to suit. For this purpose the side guides are moved inwardly to make the hopper smaller and the front guide is also adjusted to straighten the edges of the sheets. When the side guides are moved it follows that all the elements on the shaft 47 must also be moved and adjusted to operate the racks in their new positions nearer the center of the machine. This is easily accomplished by sliding the arms 48 and 51 along on their keys 64 on the said shaft and at the same time also adjusting the position of the cam 54 in a similar manner on the shaft 52. Collars as 66 may be used to fix the various arms, etc. in their respective places on the shafts. So it will be seen that when the guides are adjusted they carry with them the sectors and their operating mechanisms and of course each machine will be built to handle and take in certain sizes of the sheets.

The above is thought to fully disclose this invention and the operation thereof. The particular construction may of course be varied but I claim all such variations and changes as come within the scope of the invention and the claims.

I claim:—

1. The combination of a vertically movable member for supporting a pile of sheets, vertically movable members for separating the edges of the bottom sheet and rotatable members for supporting the sheets above the bottom one.

2. The combination of a central supporting member, means for causing the same to support a pile of sheets at given intervals, rotatable supporting members and means for causing these latter to support the said pile of sheets during the intervals in which the same is not supported by the said supporting member.

3. The combination of a member for supporting a pile of sheets, guides for said sheets, other supporting means and mechanism for simultaneously adjusting the said other supporting means and the said guides.

4. A sheet separating device comprising a vertically movable central support, means for separating the edges of the bottom sheet, other supporting means and mechanism for alternately operating the said supporting means and central support to support the pile.

5. A sheet separating device comprising separate supporting mechanisms for supporting a pile of sheets, a section device for

separating the edges of the bottom sheet from the pile and means for actuating one of the said mechanisms to engage the sheets above the bottom one for the support of the pile.

6. A sheet separating device comprising means for supporting a pile of metal sheets, means for disengaging a portion of the bottom sheet, mechanism for withdrawing all of the said means to separate the bottom sheet and supporting means adapted to engage the pile of sheets above the bottom one and before the aforesaid supporting means has been withdrawn.

7. A sheet separating device comprising means for centrally supporting a pile of sheets, a suction device for disengaging the opposite edges of the bottom sheet, means for lowering said central support and suction means, and mechanism for supporting the pile of sheets at the edges thereof.

8. A sheet separating device comprising a central support a suction device for bending down the opposite edges of the bottom sheet, supporting devices adapted to enter the pile above the bottom sheet to support the sheets above and means for lowering said central support and suction device.

9. A sheet separating device comprising separate supporting devices for alternately supporting a pile of sheets, suction means for disengaging the opposite edges of the bottom sheet, mechanism for actuating one of the said supporting devices while the suction means is in action and mechanism for actuating the other supporting device after the suction means ceases to act.

10. A sheet separating device comprising a vertically reciprocating member for supporting a pile of sheets, means for detaching a portion of the bottom sheet while the said member is at its highest position and means for supporting the said sheets while the said member is in motion.

11. A sheet separating device comprising suction means for disengaging a portion of the bottom sheet from the pile and periodically operated supporting means for supporting the pile of sheets before and after the action of the suction means and for supporting the detached bottom sheet.

12. A sheet separating device comprising suction means for disengaging a portion of the bottom sheet from the pile, a central supporting member below said pile, side supporting means adapted to support the sheets above the bottom one and mechanism for lowering the said central member and

the suction means to separate the bottom sheet from the pile.

13. A sheet separating device comprising suction means, central supporting means, mechanism for actuating all of said means for removing the bottom sheet from the pile and means for supporting the sheets above the bottom one.

14. A sheet separating device comprising vertically movable suction means, movable central supporting means, mechanism for actuating all of the said means to engage the bottom sheet of the pile at the same time and for lowering the suction means ahead of the supporting means and periodically operated devices for supporting the sheet above the bottom sheet.

15. A sheet separating device comprising movable members for alternately supporting a pile of sheets, mechanism for causing said members to move in two different directions at an angle to one another and suction means for disengaging a portion of the bottom sheet and adapted to be operated in a direction parallel to the direction of operation of one of the said members and simultaneously therewith.

16. A sheet separating device comprising a central supporting member, means for moving the same to support a pile of sheets at given intervals, a suction mechanism for separating the edges of the bottom sheet while the said member supports the same, means for moving said member away from the pile and side supporting means for supporting the pile of sheets above the bottom one while the said member is being moved.

17. A sheet separating device comprising means for centrally supporting a pile of sheets, suction means for disengaging the opposite edges of the bottom sheet, means at the sides of the said pile for supporting the same and mechanism for adjusting the said side supporting means in a direction parallel to the plane of the sheets.

18. A sheet separating device comprising means for centrally supporting a pile of sheets, means for guiding the edges of said sheets, a suction device for separating the opposite edges of the bottom sheet and oscillating members for supporting the said sheets above the bottom one.

Signed at New York, N. Y., this 10th day of July 1909.

ARCHIBALD KENT.

Witnesses:

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K. G. LE ARD.