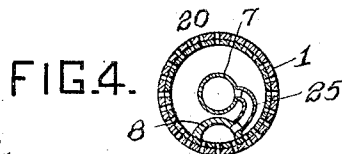
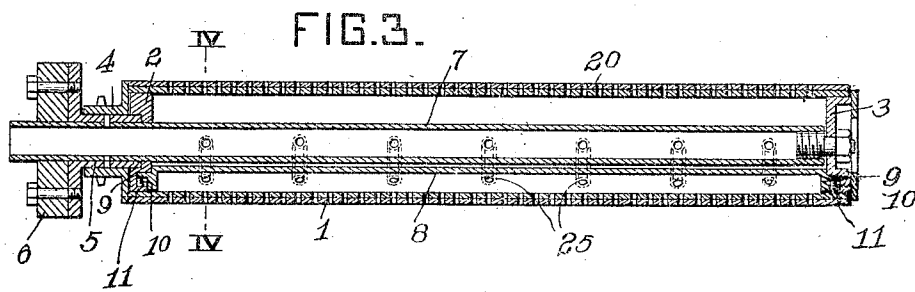
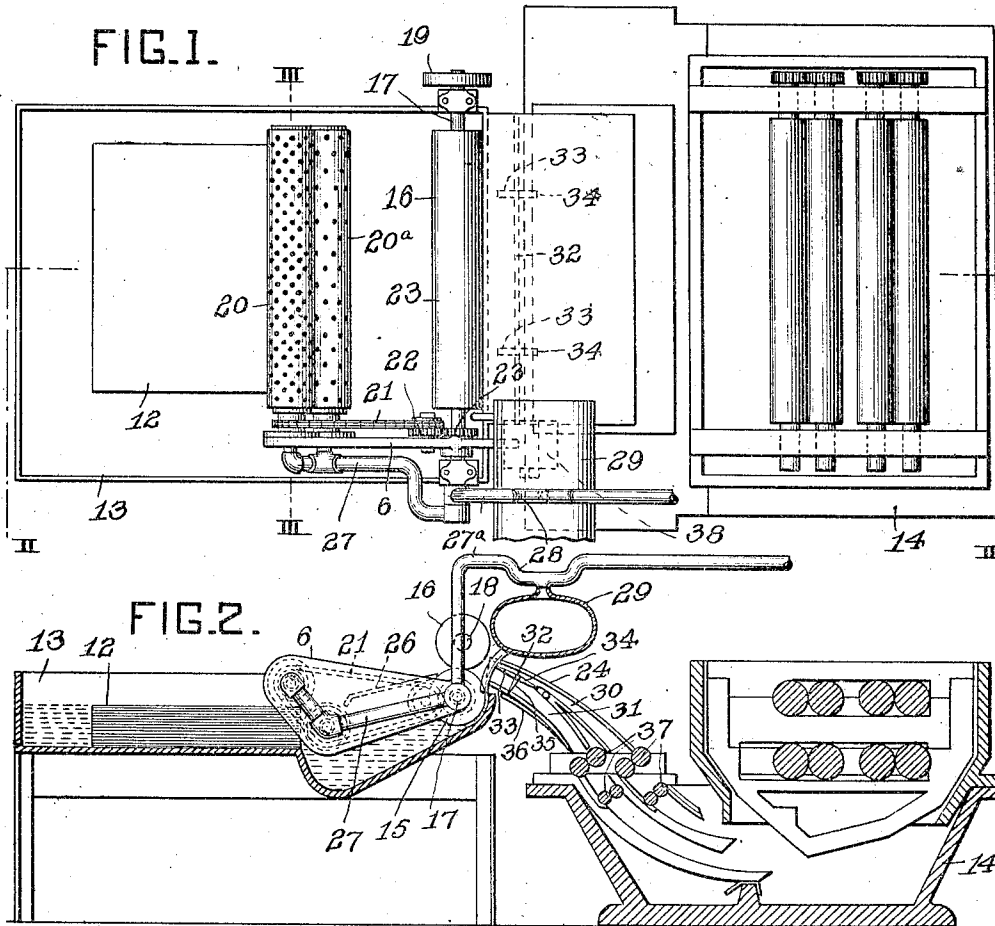


L. C. STEELE.
 PLATE HANDLING MACHINE.
 APPLICATION FILED JUNE 12, 1912.

1,057,183.

Patented Mar. 25, 1913.

2 SHEETS—SHEET 1.



WITNESSES:

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 Francis J. Tomason.

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FIG. 5.

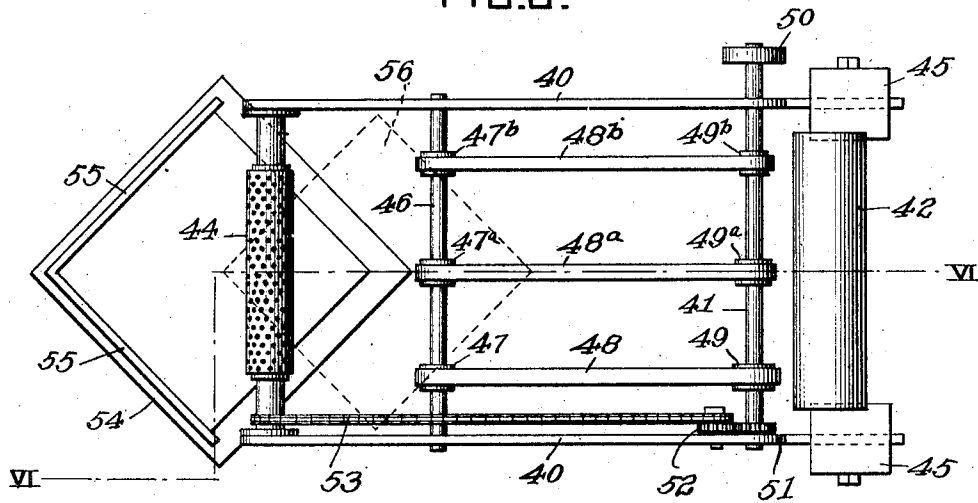
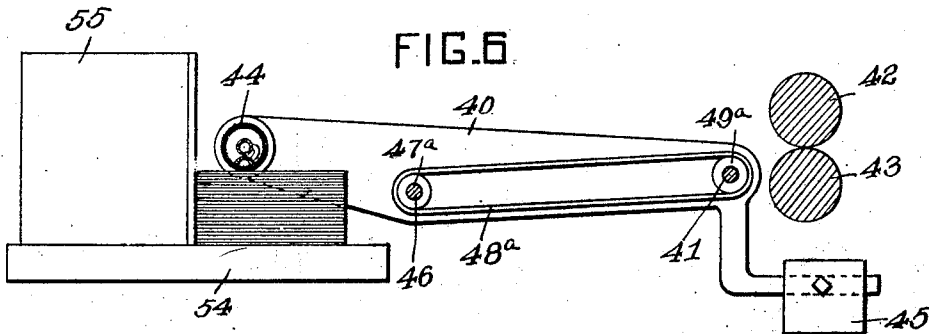


FIG. 6.



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UNITED STATES PATENT OFFICE.

LAWRENCE C. STEELE, OF BEAVER, PENNSYLVANIA.

PLATE-HANDLING MACHINE.

1,057,183.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed June 12, 1912. Serial No. 703,304.

To all whom it may concern:

Be it known that I, LAWRENCE C. STEELE, residing at Beaver, in the county of Beaver and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Plate-Handling Machines, of which improvement the following is a specification.

The invention described herein relates to machines for handling sheets of metal and like articles; and the object of the invention is to provide a simple and efficient machine whereby plates may be successively handled as desired, and without the attention of a workman.

In the accompanying drawings two machines are shown illustrating embodiments of the invention, one machine being adapted to remove, successively, plates of sheet metal from a liquid bath, and the other machine being adapted to arrange such plates in an even and regular manner upon a pile.

In these drawings, which form part of the specification, Figure 1 is a plan view of the plate removing machine shown in connection with a water-bosh and a tin-plating machine; Fig. 2 is a sectional view taken on the line II—II, Fig. 1; Fig. 3 is a longitudinal sectional view of a plate engager taken on the line III—III, Fig. 1; Fig. 4 is a transverse sectional view taken on the line IV—IV Fig. 3; Fig. 5 is a plan view of the plate piling machine; and Fig. 6 is a longitudinal view, partly in section, taken on the line VI—VI, Fig. 5.

In the several figures like numerals are used to designate like parts.

The invention may be more clearly understood by first describing the preferred form of plate engager, which forms a part of each of the machines shown herein. Such plate-engager is particularly illustrated in Figs. 3 and 4, and, as shown therein, consists of a perforated or port-provided cylinder 1, rotatably mounted upon disks 2 and 3, and connected to a sprocket wheel 4, which in turn is rotatably mounted upon a flanged sleeve 5, rigidly secured to a frame 6. Within the cylinder 1 a pipe 7 and a valve chamber 8 are arranged. The said pipe is rigidly secured to the disks 2 and 3 and to the sleeve 5; and a plurality of flexible pipe connections 25 extend between the chamber 8 and the said pipe 7, which is also suitably connected at its outer end to a conduit leading to an exhaust pump (not shown). The

valve chamber 8 may be trough shaped having its open side continuously closed by means of the rotatable cylinder 1, and is secured to the disks 2 and 3 by means of tongues 9 formed integrally with the said chamber and extending into suitably provided recesses 10 in the said disks; the arrangement being such that the trough may have a limited radial movement with relation to the cylinder 1, but will be held from rotation. In order to prevent the chamber 8 from bearing too heavily upon the inner surface of the cylinder 1 when air is exhausted from the said chamber, a spring 11 may be placed within the recess 10 of each disk 2 and 3, such spring bearing, at its opposite ends, against the tongue 9 and the bottom of the recess 10, as shown.

In operation, the above described plate engager is placed upon a plate, which may be lying on a plane surface and which is to be moved, the plate engager being placed in such a position that the open side of the chamber 8 will be adjacent to such plate. By exhausting air from the chamber 8 the plate will, on account of the unequal pressure on its sides, adhere to the ports or perforations in the portion of the cylinder covering the open side of the said chamber, so that, by rotating the cylinder, the plate will be advanced along its supporting surface. It will be understood that the effective power of such a plate engager is dependent upon the number and cross-sectional size of the cylinder perforations, and also upon the degree of vacuity in the chamber 8.

Referring now to the machine shown in Figs. 1 and 2, a pile of plates 12 are shown resting on the floor of a water-bosh 13; and, at the side of the water-bosh, there is a tinning apparatus 14 adapted to receive plates from the water-bosh, such plates passing through directing rolls 15, 16, and along guides 24. The directing rolls 15 and 16 are mounted upon shafts 17 and 18, respectively, the shaft 17 being driven through the belt wheel 19. On the shaft 17 a rigid frame 6 is pivotally mounted, and two plate engagers 20 and 20', the construction of which is described above, are secured to the said frame, which frame may also be provided with a suitable counterweight 38. These plate engagers have different effective powers and are arranged to act on opposite sides of a plate and in opposing directions. The plate engager 20 is, as shown, placed above

and to the left of the plate engager 20^a, which has fewer perforations through its cylinder than there are through the cylinder of the plate engager 20. The cylinders of the said engagers are rotated in opposite directions by a chain 21, which passes around a sprocket-wheel 22, mounted in the frame 6 and driven by the sprocket 23 secured to the shaft 17. By driving the shaft 17 in a right hand direction in order to cause plates to be advanced into the guides 24, it will be seen that the sprocket wheel 22 will be driven in a reverse direction so that the cylinders of the plate engagers 20 and 20^a will be rotated in a left handed direction. The plate engager 20, bearing on the top plate of the pile 12 will engage such plate and move it to the right along an upwardly sloping guide 26, which is suitably secured to the frame 6. The lower plate engager 20^a, contacting with the lower surface of the advancing plate, but with less engaging force than the engager 20, will be effective to prevent a second plate, which might be sticking to the under side of the top plate, from being simultaneously advanced with the top plate.

The connection of the pipes 7 of the plate engagers 20 and 20^a to a suitable air pump or exhauster may be made by a pipe 27, which extends from the plate-engager 20 to the plate-engager 20^a and along the frame 6 to the shaft 17. A flexible joint is provided in the pipe 27 at the shaft 17, so that the pipe carried by the pivoted frame 6 may move freely therewith; and a suitable liquid trap 28 and reservoir 29 are arranged to interrupt the continuity of the pipe 27^a to the end that whatever liquid is taken into the chambers 8 of the plate engagers and is drawn through the pipes 27 and 27^a may be trapped and retained in the said reservoir for use when a second pile of plates have been placed in the water-bosh 13.

The guide 24 is provided with upper and lower passageways 30 and 31, and means are provided for causing the successively fed plates to pass in alternation through such passageways. The means shown herein for such purpose consist of a series of fingers fixedly secured to a pivoted shaft 32, which extends transversely of the line of advance of the plates. Two fingers 33 and 34 lie in one plane and the third finger 35 is perpendicularly disposed with relation to the said other fingers. When the several fingers are in the position shown in Fig. 2 a plate, passing between the directing rolls 15 and 16, will strike the underside of the finger 33, and, being turned downwardly thereby, will strike the finger 35 and move it so that the shaft 32 will rotate. In the further travel of the plate, the ends of the fingers 33 and 35 will bear upon the top of the plate and cause it to pass down the

lower passageway 31. When such plate has passed beyond the finger-provided shaft 32 the finger 33 will be inclined downwardly, so that the next following plate will strike against the top of the said finger and thereby be directed into the upper passageway 30. In order to prevent the shaft 32 from turning after a plate has passed beyond it and before the following plate strikes the fingers of the shaft, a suitable spring 36 may be arranged in the bottom of the guide 24, as shown. After passing down the passageway 30 or 31 of the guide 24 each plate is further directed through the tinning apparatus by means of suitable directing rolls 37, there preferably being two pairs of such rolls in each of the said passageways.

In the operation of the above described plate-handling machine, the plates are first arranged in an even and regular pile 12 in the water-bosh 13, and in such a position that the plate-engager 20 will bear lightly upon the outer border of the top plate of such pile. Power is then applied to the directing rolls 15 and 16 and to the plate engagers 20 and 20^a through belt wheel 19, shaft 17, sprocket wheels 23 and 22, and chain 21; and, simultaneously with the operation of such mechanism, the exhauster being connected to the pipe 27^a, is put in operation so that a partial vacuum is created in the cylinders 8 of the plate engagers 20 and 20^a. The top plate of the pile 12 will be engaged by the plate engager 20 and moved to the right where the plate engager 20^a, operating in opposition to the first named plate engager, will be effective to prevent two plates from advancing simultaneously to the tinning bath. The plate thus being advanced along the guide 26 will be engaged by the directing rolls 15 and 16, and passed into the guide 24 and through the passageway 30 or 31 thereof, depending upon the position of the finger-provided shaft 32. In this operation the fluid drawn into the chambers 8 of the plate engagers 20 and 20^a will, as it is drawn through the pipe 27^a, be trapped in the chamber 29, and may be returned to the water bosh 13 when the next pile of plates is arranged therein.

In the machine illustrated in Figs. 5 and 6 the invention is shown in its adaptation to receiving plates from a pair of directing rolls and piling such plates in an even and regular manner. In this machine a two-part frame 40 is pivoted to a shaft 41, suitably mounted adjacent to the directing rolls 42 and 43. To the opposite end of the said frame a plate-engager 44, of the same construction as heretofore described, is mounted; and the frame is suitably counter-balanced by weights 45, as shown. Between the shaft 41 and the plate-engager 44 a shaft 46 is mounted in the frame 40, and such

shaft is provided with a series of idlers 47, 47^a and 47^b adapted to carry conveyer belts 48, 48^a and 48^b. The shaft 41, which has a series of belt wheels 49, 49^a, and 49^b secured to it may be driven, from any suitable source of power, through the belt wheel 50; and the plate engager may be driven by a sprocket wheel 51 secured to the shaft 41, sprocket wheel 52 rotatably mounted on the frame 40 to mesh with the sprocket wheel 51, and chain 53. By such arrangement of driving parts it will be seen that the cylinder of the plate engager 44 will be rotated in a right handed direction so as to move plates engaged thereby to the left, and that the conveyer belts will be effective to carry plates from right to left. In order to change the position of the plates as they advance from the directing rolls 42 and 43 to the plate-engager 44, the conveyer belts 48, 48^a and 48^b are driven at different relative speeds by making the pulley wheels 49, 49^a and 49^b of different relative sizes, as shown. The plate-handling machine extends from the directing rolls 42, 43 to a stacking box consisting of a bottom 54 and sides 55. A plate, passing between the said directing rolls is carried by the conveyers 48, 48^a and 48^b to the bottom portion 54 of the stacking box; and, in its travel upon the conveyer, such plate is partially turned so as to be in the position indicated by the dotted lines 56 when it reaches the plate engager 44, which further advances the plate until its sides are brought firmly against the side walls 55. Each successive plate is similarly piled upon the one preceding it until there is an even and regular pile of the required number of plates.

I claim as my invention:

1. In a plate-handling machine, the combination of a frame, an exhaust chamber secured to said frame and having an opening in a side thereof, a perforate cylinder surrounding said chamber and closing by its inner wall said opening therein, means for holding said chamber immovable with relation to said frame, and means for rotating said cylinder over said chamber opening.

2. In a plate-handling machine, the combination of a frame, an elongate exhaust chamber immovably secured thereto, there being a longitudinally disposed slotted opening in a side of said chamber, a cylinder surrounding said chamber and closing by its inner wall said slotted opening therein, said cylinder wall provided with a plurality of perforations equally spaced throughout the entire circumferential extent thereof, and means for rotating said cylinder over said chamber opening.

3. In a plate-handling machine the combination with a frame, of a plate engager consisting of a chamber immovably secured to said frame and provided with an elongated opening, a perforated rotatably mounted cylinder inclosing the said chamber and forming a continuous closure for the said opening therein, and means for rotating the said cylinder on its own axis.

4. In a plate-handling machine, the combination of a frame, a pair of plate engagers secured to said frame and arranged to act in opposition to each other and on opposite sides of a plate and means for operating the said plate-engagers to advance plates singly and successively.

5. In a plate-handling machine, the combination of an arm having free pivotal movement, a chamber secured to said frame and having an opening in a side thereof, there being a second opening in said chamber affording communication with an air-exhauster, a perforate cylinder surrounding said chamber and closing by its inner wall said opening therein, means for holding said chamber immovable with relation to said frame, and means for rotating said cylinder over said chamber opening.

6. In a plate-handling machine, the combination of a frame, a chambered member secured thereto and having communication with an air-exhauster, a perforate cylinder rotatably mounted upon and surrounding said chambered member, a valve chamber within said cylinder and having an opening therein adjacent to and covered by the inner wall of said cylinder, said valve chamber mounted for radial movement with relation to said cylinder wall, and flexible connecting members affording communication between said chambered member and said valve chamber.

7. In a machine for removing plates immersed in a liquid bath, the combination of a movably mounted plate-engager adapted to bear upon a pile of plates and remove each plate successively therefrom, said plate engager having as a part thereof an exhaust chamber in communication with an air-exhauster, a conduit leading from said chamber to such air exhauster, and a fluid trap communicating with said conduit and adapted to remove the liquid mingled with the air flowing through said conduit.

In testimony whereof I have hereunto set my hand.

LAWRENCE C. STEELE.

Witnesses:

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FRANCIS J. TOMASSON.