Oct. 13, 1925. 1,556,695

K. KRONBORG

SHEET AND PLATE PILING DEVICE

Filed Oct. 25, 1923 2 Sheets-Sheet 1

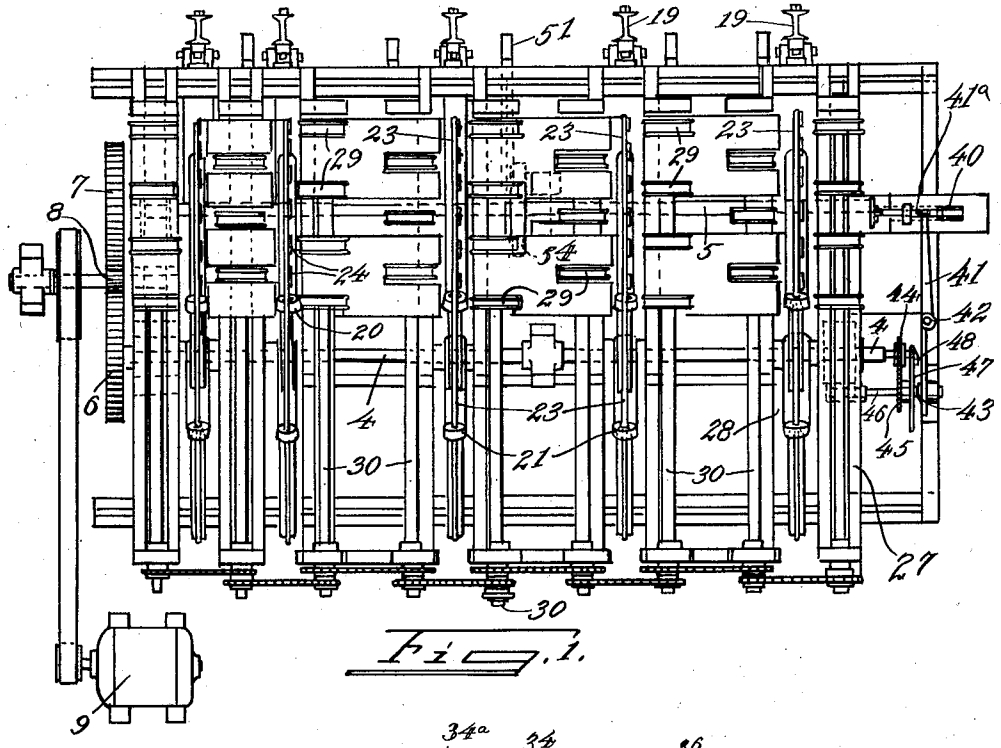


Fig. 1.

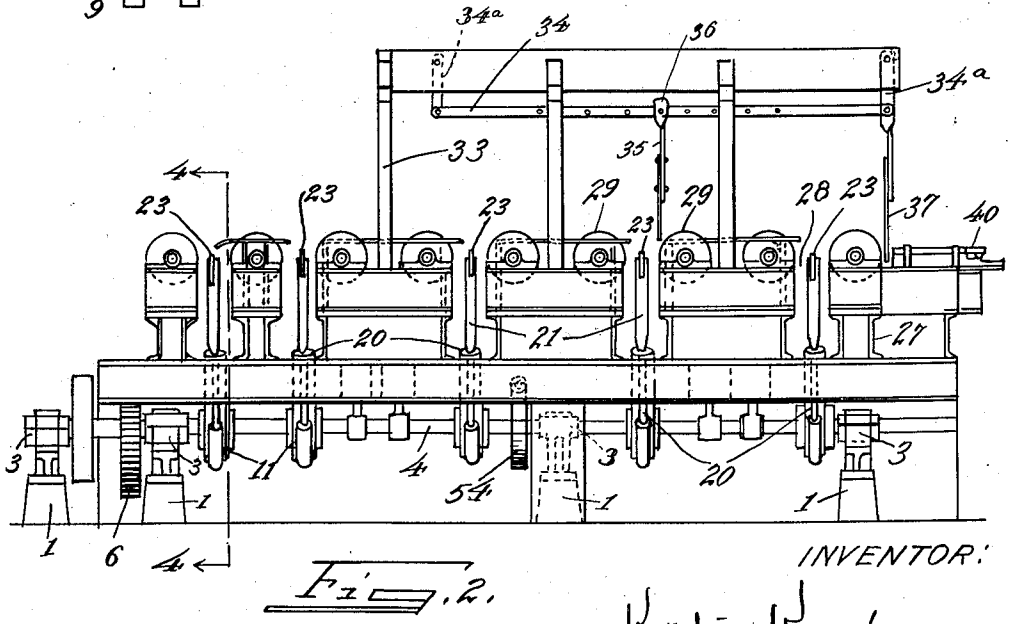


Fig. 2.

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BY Albert Miller

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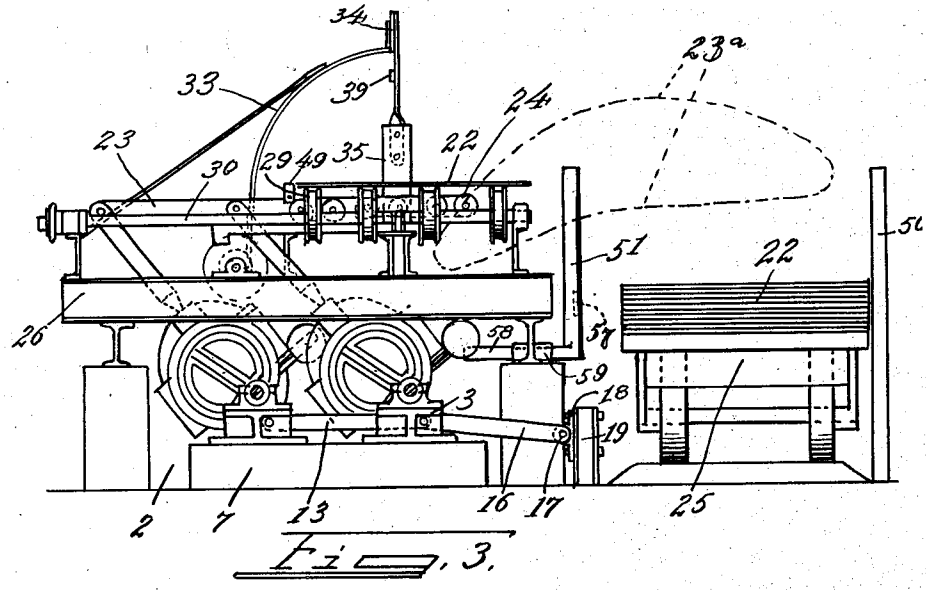


Fig. 3.

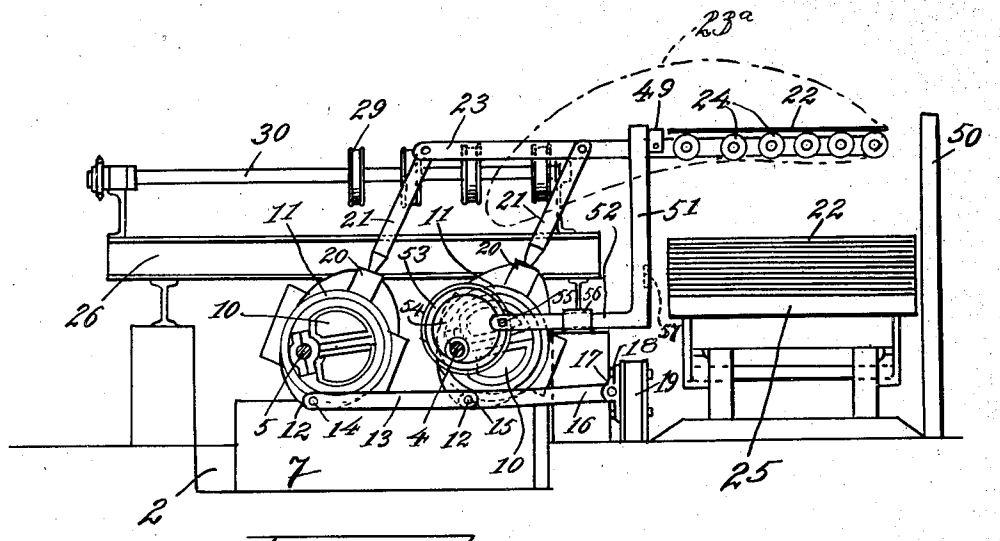


Fig. 4.

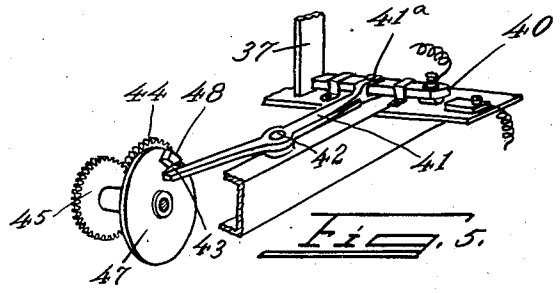


Fig. 5.

INVENTOR:
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Patented Oct. 13, 1925. 1,556,695

UNITED STATES PATENT OFFICE.

KRISTIAN KRONBORG, OF MIDDLETOWN, OHIO, ASSIGNOR TO THE AMERICAN ROLLING MILL COMPANY, OF MIDDLETOWN, OHIO, A CORPORATION OF OHIO.

SHEET AND PLATE PILING DEVICE.

Application filed October 25, 1923. Serial No. 670,795.

To all whom it may concern:

Be it known that I, KRISTIAN KRONBORG, a citizen of the United States, residing at Middletown, in the county of Butler and the State of Ohio, have invented a new and useful Sheet and Plate Piling Device, of which the following is a full, clear, and exact description, reference being had to the drawings accompanying this specification.

In the various departments of a rolling mill in which metallic sheets are transferred from conveyors, roller tables, and other means of conveying metallic sheets, to piles of sheets located either on trucks, skids, or other conveyors, to be transferred further as necessary, this work is accomplished at present by hand instead of mechanically. The number of men required to do this work varies with the weight and size of material and the speed with which it is to be handled.

It is the object of my invention to provide a mechanical means capable of doing this work satisfactorily at any reasonable speed, the mechanism of which is of the simplest possible construction consistent with its requirements, and with the minimum number of parts needing adjustment, thereby affording a constantly workable and dependable machine.

This object I accomplish by that certain construction and arrangement of parts to be hereinafter more specifically pointed out and claimed.

In the drawings:

Figure 1 is a plan view of my device.

Figure 2 is a side elevation.

Figure 3 is an end elevation.

Figure 4 is a vertical section on the line 4—4, Figure 2.

Figure 5 is a perspective view of switch mechanism.

Referring to the drawings in detail, the operative parts of the machine are preferably mounted upon a series of bases 1, placed within a pit 2, said pit being slightly below the floor level to allow certain mechanical parts freedom of motion.

Mounted upon the bases 1 are two series of bearing members 3, surrounding and maintaining the shafts 4 and 5, at convenient intervals, said shafts being revolved by means of the spur gears 6 and 7 which are driven by a pinion 8, said pinion deriving motive power through suitable pulleys and a belt from the motor 9 or other suitable source of power.

Eccentrically mounted upon the shafts 4 and 5, at convenient intervals, are eccentric wheels 10, operating in rings 11; said rings are pivoted at a part of their periphery designated as 12 to the ends of the connecting links 13, by means of the pins 14 and 15. A series of bars 16 are loosely connected at their one end by means of the pins 15 to the links 13, and at the other end by means of like pins 17, operating in bearings 18, to allow a swinging motion, said bearings being secured to a series of posts 19, by means of bolts. By this arrangement the bars 16 and the connecting links 13 are capable of a vertically swinging movement, and the rings 11 which are pivotally attached to them are caused to travel up and down while swinging from side to side with each revolution of the eccentrics 10.

Threaded into the bosses 20, and the rings 11, diametrically opposite to their pivotal attachment at 12, are rods 21, the upper ends of which are pivotally connected to the sheet lifting bars 23. Hardened steel rollers 24 are mounted on the lifting bars so that the sheets 22 may slide easily from the lifting bars to the truck or pile 25 which is to receive them.

A conveyor table 26, connecting with the usual means of delivering sheets from one part of the process to the next, consists of a framework 27, having apertures 28 suitable to permit the free operation of the lifting bars 23 through them, and having mounted thereon a series of conveyor rollers 29 mounted on shafts 30, said shafts obtaining their necessary rotation through a series of sprockets and chain belts mounted upon one end of the shafts 30. By means of the rotation of the conveyor rollers 29 the sheets 22 are carried over the lifting bars 23 while said lifting bars are in their normal receiving position, as shown in Figure 3 of the drawings.

Mounted upon some suitable portion of the framework 27 of the conveyor table 26, is an arch 33 extending over that portion of the table over which the sheets must travel. A bar 34 pivotally supported on arms 34ª on this arch carries the stop 35 mounted on said bar at 36 and extending downward to a point sufficiently low to be

able to obstruct the sheet in passage over the table. The stop 35 may be located at any desired point along the bar 34 to suit predetermined styles of sheets.

An arm 37 similar to the stop 35 is attached to one of the arms 34, and the stop 35 and the arm 37 being connected with each other by the bar 34, have a simultaneous movement. An electric contact switch 40 is positioned to operate through the swinging of the arm 37 by means of the sheet 22 coming in contact with the stop 35.

The sheets coming in forcible contact with the stop 35 cause it and the arm 37 to swing over thus closing the switch bar 40 as aforesaid, this bar being arranged to slide on the table bed. This permits electric current to pass to the motor 9 for the period of a given number of revolutions. Actuated by the closing of the switch 40, is an arm 41, forked at 41^a over the switch bar and pivoted at 42 and having a lug 43 at its free end. Mounted upon the farther end of the shaft 4 is a gear 44, which is in mesh with a like gear 45 mounted upon a shaft 46 and carrying a disk 47, said disk having a lug 48 on some portion of its face near the periphery. The closing of the switch 40 forces the lug 43 against the face of the disk 47, and the motor rotating the shaft 4 through the aforementioned transmissions rotates the disk until the lug 48 comes in contact with the lug 43 on the arm 41 rocking said arm and breaking the contact of the switch 40.

The sheet 22 having reached the desired position upon the table 26, and contact having been established to cause motor to revolve the shafts 4 and 5, the eccentrics 10 mounted thereon transmit a twofold rocking motion, up and down and from side to side, through the rings 11 and the rods 21 to the lifting bars 23, thus lifting the sheet 22 from the table and out over the truck upon which the sheets are intended to be piled. Owing to the relative positions of the shafts 4 and 5 to the pivotal connections of the rings 11, the return movement of the lifting bars 23 is at a greater speed than the delivery forward, so that the action of the inertia of the sheet will allow the lifting bars to pass from under it when said lifting bars change their direction of travel. The line of travel of the lifting bars is as indicated by the dotted line 23^a in the drawings.

When the lifting bars 23 first lift the sheet from the conveyor table 26, there is a tendency due to the inertia of the sheet to cause it to slip back on the bar. To avoid any possibility of the sheet slipping back on the table, a stop 49 is provided which will hold the sheet in alignment when traveling forward.

When the lifting bars are at their extreme outer position, the edge of the sheet will be thrown against several upright posts 50, which are provided to align the sheets when they drop to the pile on the truck. Another stop 51 is provided on the frame of the conveyor table 26 to preclude any possibility of the sheet being carried back on the lifting bars 23.

The stop is preferably formed of a series of upright bars 51 connected together by a cross piece below the plane of movement of the carrier arms 23, the uprights 51 being spaced to permit the arms 23 to pass between them.

I find that the sheets on the truck or other conveyance will not form in the most accurate shaped bundle, if the uprights 51 are stationary, as there will be difference in the way the sheets fall as the pile increases beneath the discharge point. Accordingly I provide for the uprights 51 moving outwardly to a position of contact with the edges of the sheets, thereby straightening up the pile and bringing each sheet to a definite position as soon as it is deposited.

On one of the shafts, as the shaft 4, I mount an eccentric disk 54, which in one form of device may have a groove 53 therein. The uprights 51 have bars 52 which are guided in sleeves 56 mounted on the machine base, so that the entire structure can slide outwardly and inwardly in a single place. One of the arms 52 has a stud at its end which rides in the groove 53, so that as the eccentric 54 revolves the selected arm 52 will be thrust in and out.

Any suitable structure which will thrust the members 51 toward and away from the pile of sheets will serve, provided this structure is suitably timed. As shown, the eccentric in the drawings is set so that it will move out the uprights 51 outwardly at about the time that the arms 23 are fully extended away from the machine. The uprights will then stay out until the arms 23 have been retracted to the extent of discharging the sheet. As noted also the uprights 51 will, preferably at each movement strike a blow to the side of the pile of sheets and line them up. The position of the stop 35 and its function will insure quite an accurate lining up of the ends of the sheets.

It will be evident that mechanical equivalents of the mechanisms employed to accomplish the several movements of my device might readily be devised which would not depart from the scope of my invention, and while calling in the claims for certain particular means, I wish to include the equivalents thereof, as coming within the scope of the invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A device capable of lifting and conveying sheets or plates of a desired material from a suitable conveyor table, comprising

lifting bars operating in a horizontal position, having a lifting movement, a transporting movement, and a return movement, carrying said sheets or plates in a horizontal position to an adjacent stack or pile upon a truck or other means of transportation, and means for operating said lifting bars, said operating means comprising rings operating upon eccentrics mounted upon rotatable shafts, and means for enforcing a parallel motion at one side of the rings, and connected to the lifting bars at the other side of said rings.

2. In a device capable of lifting and conveying flat sheets or plates of a desired material, a conveyor table, having means for conveying said sheets, a series of lifting arms movable laterally of the table and positioned for conveying such sheets or plates edgewise from said conveyor table to a stack or pile upon a truck or other means of further transportation means for operating said arms, and impact means lying in the path of sheets on the table and adapted to control the operating means, thereby setting into operation said lifting arms by contact with the sheets or plates on the table.

3. In a device of the character described, a conveyor table capable of carrying flat sheets or plates of a desired material over a series of lifting arms, movable lifting arms, said lifting arms movable laterally of the table and positioned for conveying said sheets to an adjacent stack or pile at a given time, said conveyor table having a limited movement stop mounted thereon, an electric switch operated by the stop when sheets are brought in contact with it and a motor for driving the arms and controlled by the switch; thereby starting the operating mechanism of the lifting arms at a fixed position of the sheets and a control element also operated by the motor for throwing off the switch.

4. In a device of the character described, a conveyor table capable of conveying flat sheets or plates of a desired material over a series of lifting arms, said lifting arms operating to lift and convey said sheets to an adjacent stack or pile at a fixed time, a switch, a stop so connected that the movement of the sheets or plates against such stop will close the switch, conveying motive power, receiving current from the switch, to operate said lifting arms, and means of breaking contact in said switch after a fixed period of movement of the operating mechanism of said lifting arms.

5. In a sheet piling machine, the combination of a conveyor table, having a plurality of rollers mounted on rotatable shafts, means for rotating said shafts and the rollers thereon in a manner and direction to carry flat sheets of a desired material over a series of lifting arms, a series of rotatable shafts having wheels eccentrically mounted thereon, means for rotating said shafts, peripheral rings on the wheels, a connecting rod connecting opposite rings in series, said rings pivoted at some part of their periphery to the connecting rods, a link having a fixed pivot so as to swing in one plane and pivoted to the connecting rod, arms secured to the rings diametrically opposite to their pivots, lifting bars pivoted upon said arms in series and operated in the plane of the connecting rods by means of the said combination of parts, substantially as herein described.

6. In a sheet piling machine, the combination of a conveyor table, having a plurality of rotatable rollers capable of conveying flat sheets of a desired material in a given direction, a motor, an electric switch therefor, a stop on said table movable sufficiently to close the electric switch by the impact of said sheets thereon, a series of lifting and conveying arms operating at right angles to the direction of the conveyor table, said arms energized by the motor, said lifting arms lifting and conveying such sheets in a horizontal plane to an adjacent stack or pile upon a truck or other means of further transportation, a disk receiving rotary movement from the motor, a lug on said disk, a rocker arm engaging the lug at a desired phase of the revolution of said disk and said rocker arm connected to the switch to throw the switch into open position, thus interrupting the operation of the lifting arm, all substantially as herein described.

7. A piling device for sheet metal, comprising a support onto which the sheets are fed, a lifting device in a horizontal plane throughout, and adapted to rise through the support, move outwardly away from the support, and then return, and a stop to strip away the sheet from the lifting device upon its return movement.

8. A piling table for sheet metal, comprising a support onto which the sheets are fed, a lifting device adapted to raise the sheets from the support and lay them on a pile to one side of the support, and a device timed with the lifting device to come into engagement with the side of the pile as it accumulates, and bring the pile into lateral alignment.

9. A piling table for sheet metal, comprising a support, formed of interspaced members, interspaced lifting bars, having a movement in a horizontal plane up between the said members, and thence out over the side of the support, and down and back again, and a strike-off device adapted to extend between the lifting bars upon their down and back movement and strip off the sheets.

10. A piling table for sheet metal, comprising a support, formed of interspaced

members, interspaced lifting bars, having a movement in a horizontal plane up between the said members, and thence out over the side of the support, and down and back again, and a strike-off device adapted to extend between the lifting bars upon their down and back movement and strip off the sheets, said device having a movement timed with the lifting bars, and adapted to bring it into position of lateral engagement with the pile of sheets.

11. A piling table for sheet metal, comprising a support, formed of interspaced members, interspaced lifting bars, having a movement in a horizontal plane up between the said members, and thence out over the side of the support, and down and back again, and a strike-off device adapted to extend between the lifting bars upon their down and back movement and strip off the sheets, said device having a movement timed with the lifting bars, and adapted to bring it into position of lateral engagement with the pile of sheets, said device being timed to move outwardly into such lateral engagement as the lifting bars come to their extended position away from the machine, and stay in such engagement until the sheets have been entirely stripped away upon the down and back movement of said bars.

KRISTIAN KRONBORG.