March 25, 1924. 1,488,431

M. KUKULJ

SHEET METAL PLATE HANDLING MACHINE

Filed June 7, 1923 6 Sheets-Sheet 1

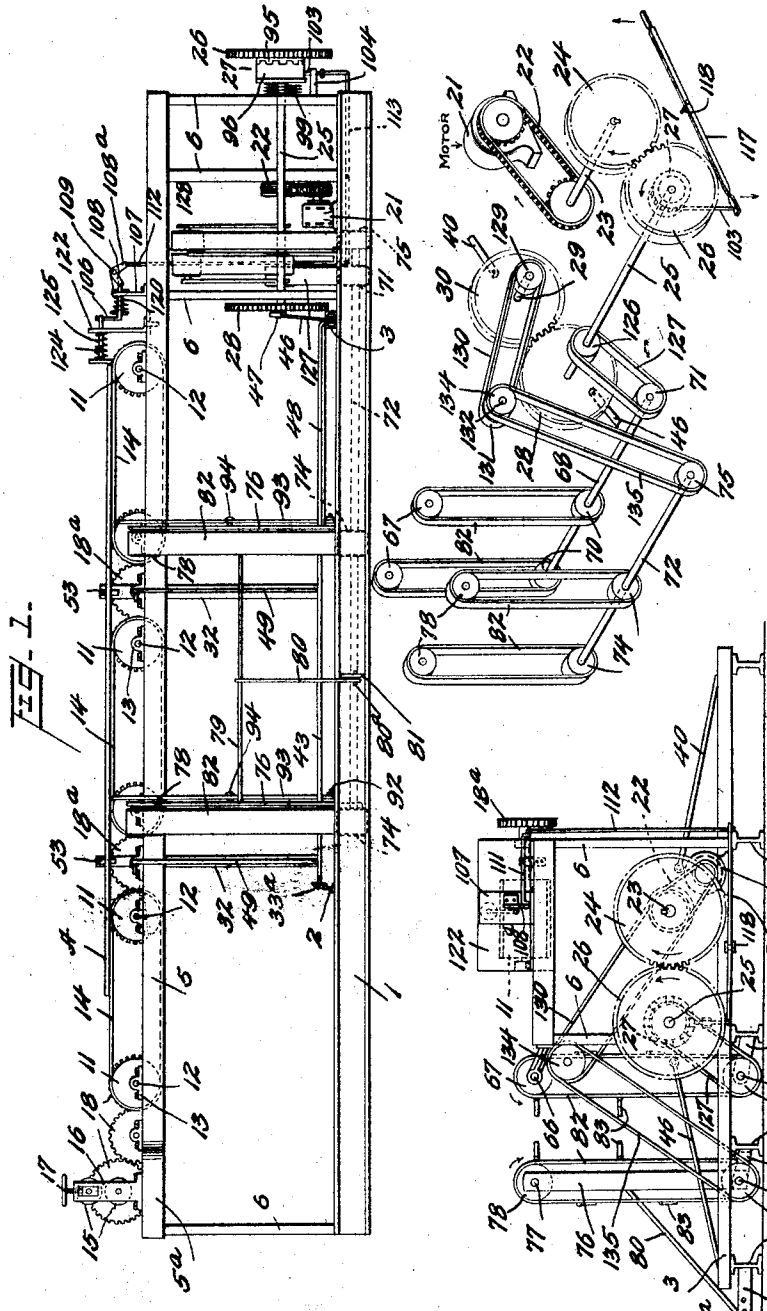


FIG. 1.

FIG. 3.

FIG. 2.

Inventor

M. Kukulj

By

F. R. Bryant

Attorney.

March 25, 1924. 1,488,431

M. KUKULJ

SHEET METAL PLATE HANDLING MACHINE

Filed June 7, 1923 6 Sheets-Sheet 2

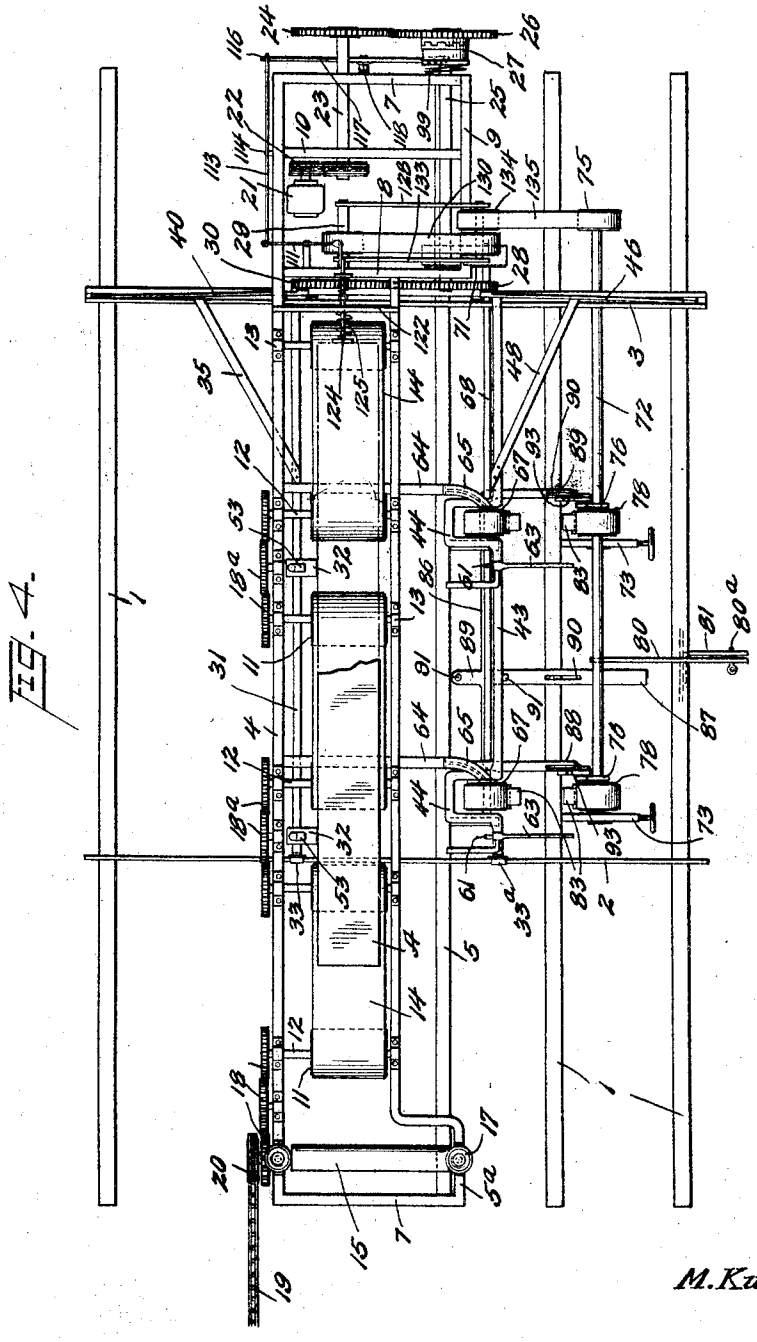


FIG. 4.

Inventor
M. Kukulj

By

F. L. Bryant.
Attorney.

March 25, 1924. 1,488,431

M. KUKULJ

SHEET METAL PLATE HANDLING MACHINE

Filed June 7, 1923 6 Sheets-Sheet 3

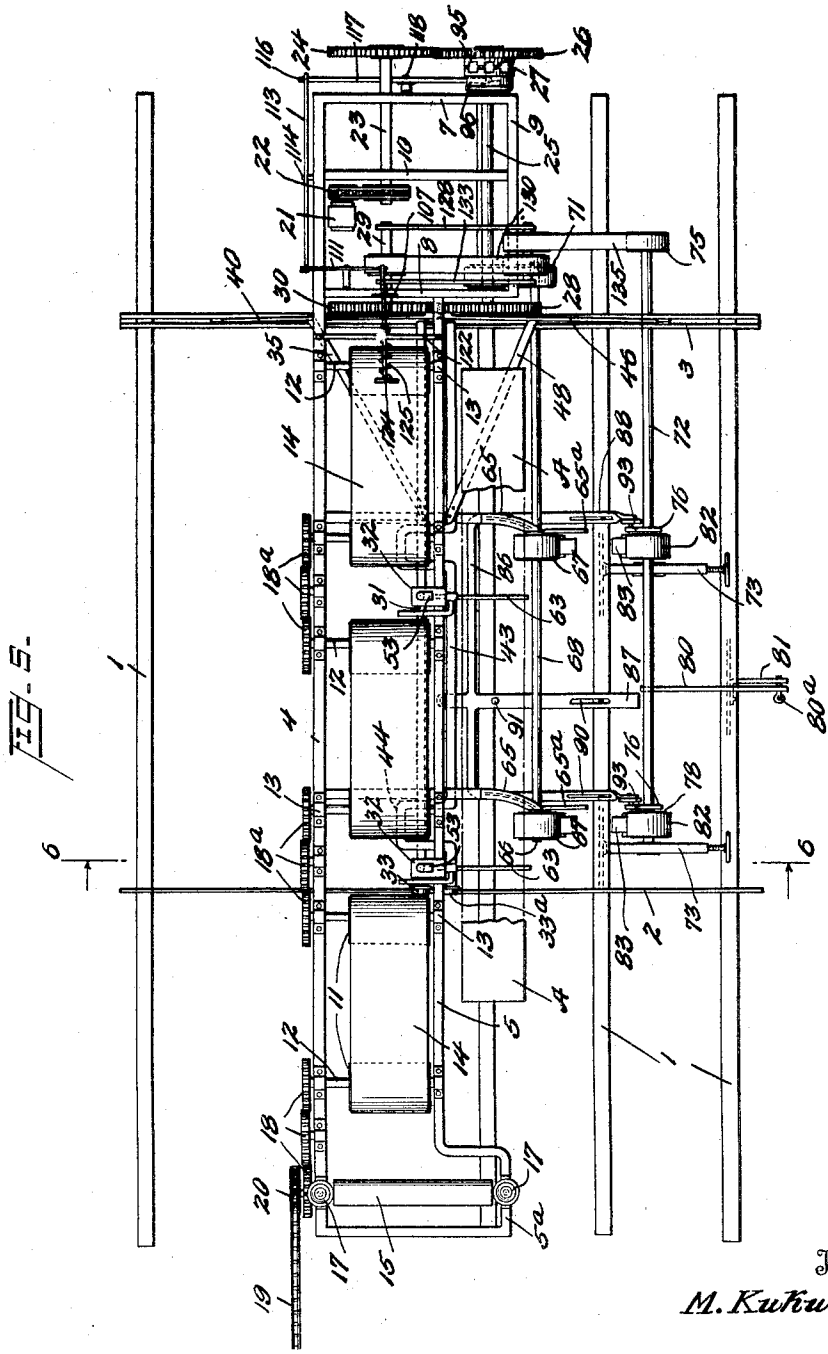


FIG. 5.

Inventor
M. Kukulj

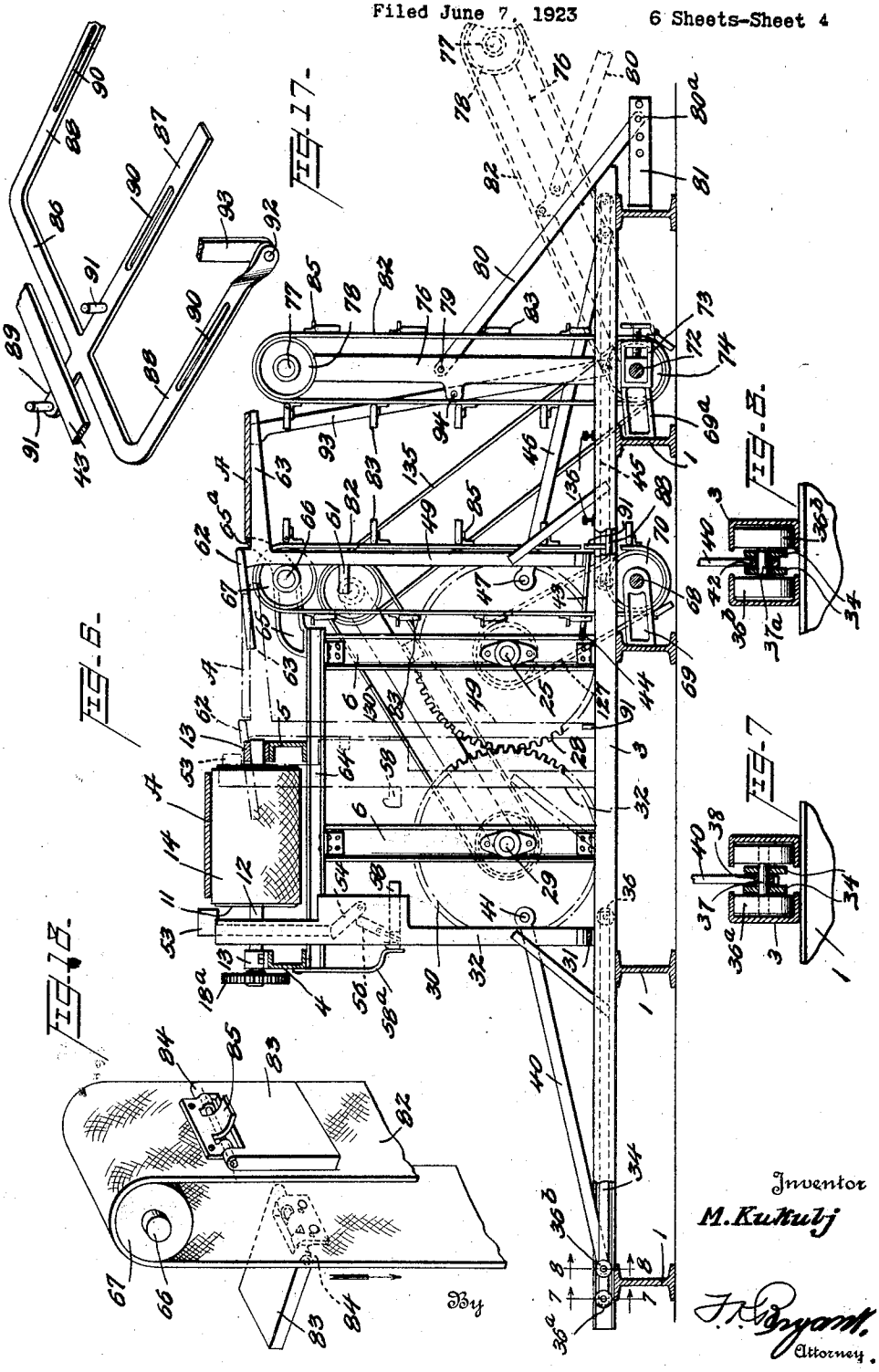
By F. K. Bryant
Attorney

March 25, 1924. 1,488,431

M. KUKULJ

SHEET METAL PLATE HANDLING MACHINE

Filed June 7, 1923 6 Sheets-Sheet 4



Inventor
M. Kukulj

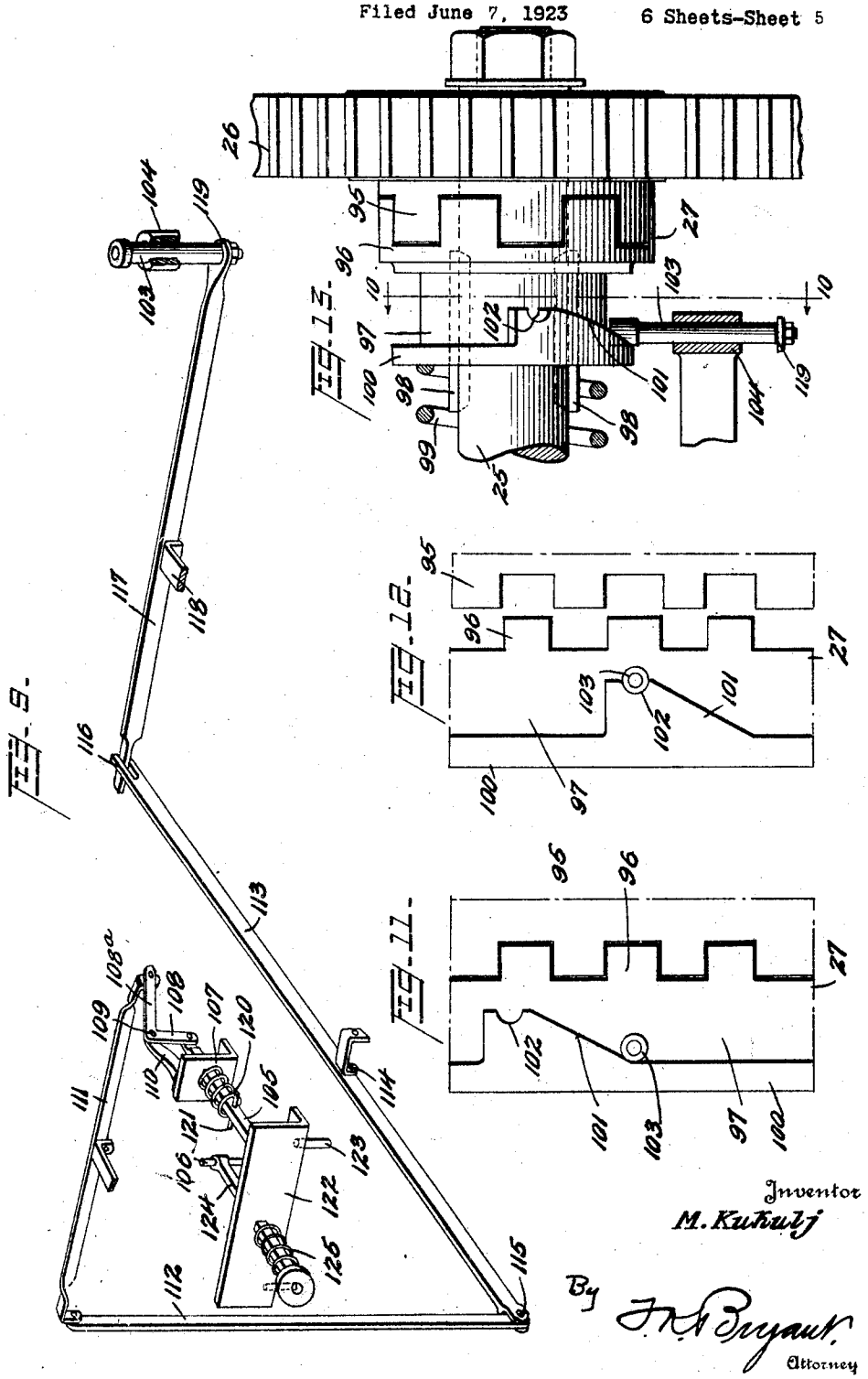
By F. G. Bryant
Attorney.

March 25, 1924. 1,488,431

M. KUKULJ

SHEET METAL PLATE HANDLING MACHINE

Filed June 7, 1923 6 Sheets-Sheet 5



Inventor
M. Kukulj

By F. N. Bryant
Attorney

March 25. 1924. 1,488,431

M. KUKULJ

SHEET METAL PLATE HANDLING MACHINE

Filed June 7, 1923 6 Sheets-Sheet 6

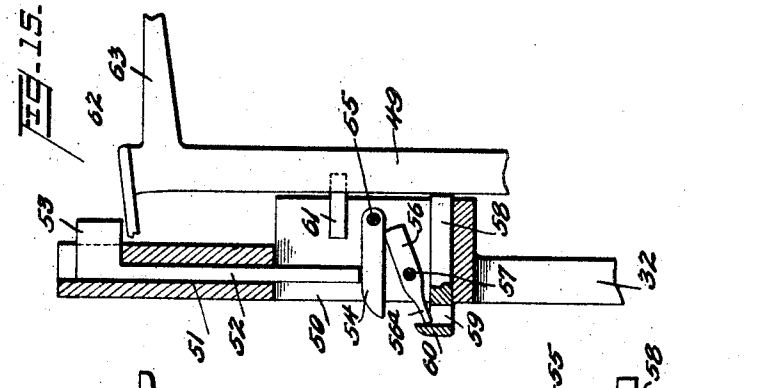


FIG. 15.

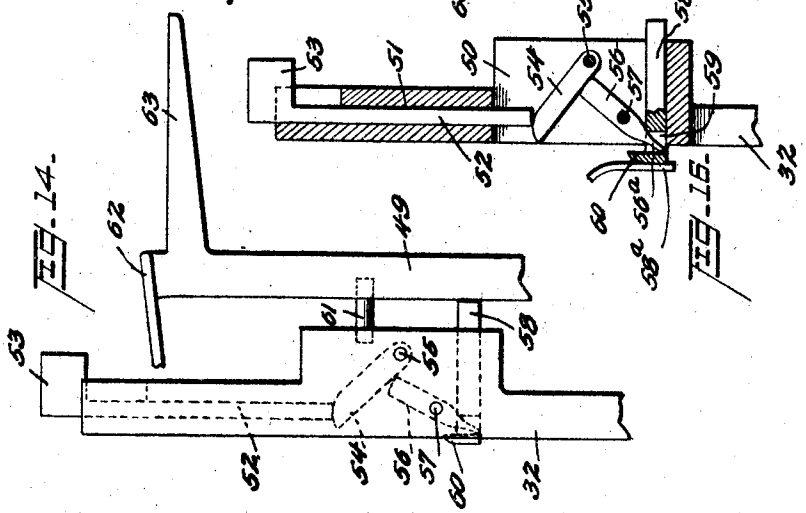


FIG. 14.

FIG. 16.

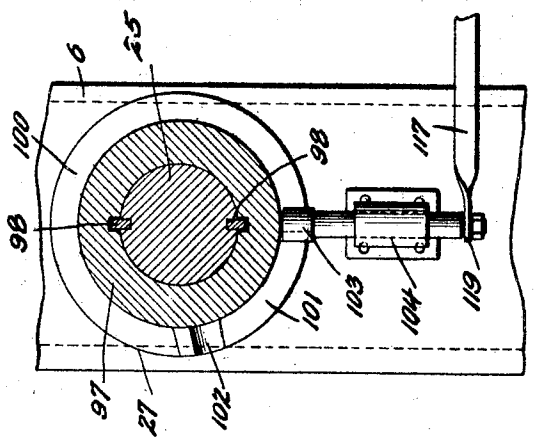


FIG. 10.

Inventor
M. Kukulj

By F. K. Bryant
Attorney.

Patented Mar. 25, 1924. 1,488,431

UNITED STATES PATENT OFFICE.

MILE KUKULJ, OF FARRELL, PENNSYLVANIA.

SHEET-METAL-PLATE-HANDLING MACHINE.

Application filed June 7, 1923. Serial No. 643,955.

To all whom it may concern:

Be it known that I, MILE KUKULJ, a citizen of Yugoslavia, residing at Farrell, in the county of Mercer and State of Pennsylvania, have invented certain new and useful Improvements in Sheet-Metal-Plate-Handling Machines, of which the following is a specification.

This invention relates to certain new and useful improvements in sheet metal plate handling machines and has particular reference to apparatus for receiving sheet metal plates from a rolling machine and causing an assembly thereof in stack formations to facilitate handling of the plates in transferring the same from a rolling mill.

The primary object of the invention resides in the provision of a sheet metal plate handling machine associated with the discharge or the delivery end of a rolling mill, successively receiving finished rolled plates therefrom and causing the same to be piled in a stack formation permitting the handling of a larger group of plates at one operation.

Another object of the invention is to provide in a sheet metal plate handling machine of the type above set forth, a driving mechanism embodying a normally disengaged clutch element with devices associated with the clutch element and operated by a sheet metal plate entering the machine to shift the clutch element to an operative position causing a change in direction of travel of the plate on the machine for stacking the same.

With the above and other objects in view as the nature of the invention is better understood, the same consists of the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawings and claimed.

In the drawings, wherein like reference characters designate corresponding parts throughout the several views,

Figure 1 is a side elevational view of a sheet metal plate handling machine constructed in accordance with the present invention, the same being adapted for cooperative association with a sheet metal plate rolling mill,

Figure 2 is an end elevational view of the machine,

Figure 3 is a diagrammatic perspective view showing the driving mechanism for the machine and the endless belt construction operated thereby,

Figure 4 is a top plan view of the machine showing the first step in the handling of a sheet metal plate,

Figure 5 is a top plan view, similar to Fig. 4 showing the second step in the handling of a sheet metal plate with the latter shifted to a lateral position with respect to the feed belt of the handling machine,

Figure 6 is a cross-sectional view taken on line VI—VI of Fig. 5 showing the second position of the sheet metal plate by dotted lines, and the third position thereof in full lines to be received on the hinged flight carried by the endless belt, and further showing the outwardly positioned flight carrying belt shifted to a lower position as illustrated by dotted lines permitting the ready removal of a stacked pile of plates,

Figures 7 and 8 show detail sectional views taken on line VII—VII and VIII—VIII of Fig. 6,

Figure 9 is a perspective view of the operating mechanism for the shiftable clutch element detached from the machine and adapted to have a part thereof disposed in the path of movement of a sheet metal plate being received in the machine,

Figure 10 is a cross-sectional view taken on line X—X of Fig. 13 showing the pin engaged with the shiftable clutch element,

Figure 11 is a diagrammatic view showing the clutch elements engaged with the shifting pin therefor at the base of the clutch cam,

Figure 12 is a diagrammatic view, similar to Fig. 11 showing the pin at the apex of the clutch cam with the clutch element separated,

Figure 13 is a side elevational view of the clutch mechanism with the operating pin for the shiftable clutch element in position for shifting the same,

Figure 14 is a fragmentary elevational view showing the positions of the two movable bars for transversely shifting a sheet metal plate,

Figure 15 is a detail sectional view, similar to Fig. 14 showing the latch mechanism for one of the shiftable bars in its operated

or released position with the plate shifting head thereof lowered,

Figure 16 is a detail sectional view of one of the movable bars showing the mechanism for restoring the same to its set position,

Figure 17 is a fragmentary perspective view of a shiftable frame structure carrying supporting arms for the outer edges of the sheet metal plates prior to their last step of handling, and

Figure 18 is a fragmentary perspective view showing a portion of an endless belt structure carrying hinged flights that receive the sheet metal plates to convey the same to a lower support for stacking.

Briefly described, the primary object of the present invention is to provide a machine for handling sheet metal plates that are delivered from a rolling mill for the purpose of piling or stacking the same to permit the conveyance of a plurality of plates from the handling machine as a unit, the machine embodying a series of endless belts that are constantly driven and form conveyor supports for the sheet metal plates delivered from the rolling machine. The endless conveyor belts are supported in a frame structure into which laterally shiftable bars upwardly project to engage the plates and shift them laterally of the belt and frame structure to be received upon laterally movable supports that in turn deliver the sheet metal plates between cooperating pairs of vertically disposed endless belts having flights thereon that support the sheet metal plates to convey the same downwardly to a support carried by the base frame of the machine for successively stacking the plates and permitting the removal of a plurality of plates at a single operation. The laterally movable bars for shifting the plates away from the endless conveyor belt and the vertical belts provided with flights are operated independently of the endless conveyor belt and has a normally open clutch apparatus adapted to be moved to a closed position by operating devices therefor arranged in the path of movement of a sheet metal plate passing over the conveyor belt.

To accomplish the above objects, the machine illustrated in the accompanying drawings is associated with the delivery end of a sheet metal plate rolling machine and embodies a base supporting structure of I-beams 1 upon which a single track rail 2 is transversely supported, while a second track rail spaced from the track rail 2 is of double channel iron formation as indicated at 3 and shown more clearly in Figs. 1, 7 and 8.

An upper frame structure including longitudinally extending side bars 4 and 5 is supported by perpendicular posts 6 and cross rails 64, the bar 5 at the receiving end of the machine being offset as at 5^a with the ends of the side bars 4 and 5 connected by the cross bar 6, the opposite ends of the side bars 4 and 5, as shown in Figs. 4 and 5 being formed in a rectangular frame having a connecting end bar 7, an inner cross bar 8 and a side bar 9 spaced outwardly of the side bar 5, an intermediate cross bar 10 being positioned between the cross bars 7 and 8. A plurality of endless feed belts is associated with the upper frame structure, rollers 11 carried by shafts 12 with the ends of the shafts journaled in bearings 13 that are carried by the side bars 4 and 5, the rollers 11 being arranged in pairs as illustrated with an endless belt 14 passing over each pair of rollers, the upper sides of the rollers being disposed above the side bars 4 and 5 as shown in Fig. 1. A pair of guide rollers 15 is journaled in the brackets 16 carried by one end of the side bar 4 and the end portion 5^a of the opposite side bar, the distance between the two rollers 16 being varied by the adjusting screw 17 as shown in Figs. 1 and 5 between which rollers sheet metal plates from a rolling machine are passed. The driving means for the guide rollers 15 and the endless belt sections 14 includes a gearing train 18 connecting the lower roller 15 with the adjacent roller shaft 12 while similar trains of gearing 18^a connect the adjacent rollers of each endless belt construction, the driving mechanism for the gearing including a sprocket chain 19 extending from a suitable source of power and connected to a sprocket wheel 20 upon the shaft supporting the lower roller 15 as shown in Figs. 4 and 5. From the gearing arrangement shown, it will be noted that the endless belts 14 travel in the same direction while a sheet metal plate passing between the guides and feed rollers 15 is received upon the endless feed belt.

The devices for handling the sheet metal plates after the latter have reached their limit of traveling movement upon the endless feed belt embodies power devices entirely separate from the driving means 19 and include a motor 21 supported within the rectangular frame structure intermediate the cross bars 8 and 10 as shown in Figs. 4 and 5 and having a chain and sprocket connection 22 with a shaft 23, the shaft 23 extending outwardly of the cross bar 7 and carrying a gear wheel 24 upon the projecting end thereof. A shaft 25 is journaled in perpendicular posts 6 and projects outwardly of the cross bars 7 and 8, one end of the shaft 25 having a gear wheel 26 journaled thereon that meshes with the gear wheel 24 and is adapted to be locked to the shaft 25 by the clutch mechanism 27 shown in Figs. 4 and 5, while a gear wheel 28 is secured to the other end of the shaft 25. A stub shaft 29 journaled in a perpendicular post 6, as shown in Fig. 6 has a gear wheel

30 fixed thereto that is in mesh with the gear wheel 28.

A frame structure is laterally shiftable upon the rails 2 and 3 and carries perpendicular bars movable between the side bars 4 and 5, the frame structure including a longitudinally extending base bar 31 carrying a pair of spaced perpendicular bars 32, one end of the base bar 31 carrying a wheel 33 mounted on the track rail 2, the other end of the base bar 31 being connected to a relatively long strap rod 34 moving between the channel rails 3 as shown in Fig. 6, an angle brace 35 extending between the base bar 31 and strap rods 34 as shown in Fig. 4. Guide rollers 36 are carried by the inner end of the rods 34 and roll within the channel rails 3, while similar rollers 36^a are carried by the outer end of the rod 34 as shown in Figs. 6 and 7, the rollers 36 and 36^a being journaled on a cross shaft 37, the rollers 36^a being maintained in spaced relation by the spacer 38.

A pitman 40 eccentrically connected as at 41 to the gear wheel 30 has the other end thereof pivotally connected as at 42 to the shaft 37^a supporting a pair of guide rollers 36^b positioned inwardly of the outer roller 36^a as shown in Fig. 6. It will therefore be seen that when the gear wheel 30 is rotated, the pitman connection 40 with the shaft 37^a will cause reciprocating movements thereof with the perpendicular arms 32 similarly moved between the side bars 4 and 5 of the upper frame structure.

Another laterally shiftable frame structure is movable transversely of the machine and embodies a base bar 43 having lateral offset portions 44, one end of the base bar 43 carrying a wheel 33^a mounted on the track rail 2 while the other end of the base bar 43 is connected to the rod 45 slidably mounted within the channel bars 3 of the track structure, a pitman 46 eccentrically connected as at 47 to the gear 28 having the outer end thereof attached to the rods 45 in a manner as disclosed in connection with the pitman 40 as illustrated in Figs. 6, 7 and 8. An angle brace bar 48 extends between the base bar 33 and the slide bars 45 as clearly shown in Fig. 4, the base bar 43 carrying perpendicular bars 49 alined with the perpendicular bars 32 carried by the base bar 31. The pitman rods 40 and 46 are connected to the meshing gear wheels 30 and 28 respectively in a manner to cause the slide rods 34 and 45 carrying the perpendicular bars 32 and 49 to move in directions toward and away from each other.

The detail construction of the perpendicular bars 32 is illustrated in Figs. 14 to 16, each bar 32 having a vertical slotted opening 50 intermediate the upper and lower ends thereof while a vertical opening 51 is formed in the upper end of the bar, extending from the extreme upper end thereof to the slotted opening 50 as shown in Figs. 15 and 16. A rod 52 is slidable in the opening 51 and carries a laterally extending head 53 at the upper end thereof, the lower end of the rod 52 extending into the slotted opening 50 for engagement with the lever 54 that is pivoted as at 55 in the side walls of the slot. A lever 56 pivoted as at 57 within the slot 50 has one end thereof engaging the free end of the lever 54 while a sliding latch 58 riding upon the bottom wall of the slot 54 as shown in Figs. 15 and 16 has an opening 59 formed therein adjacent its outer end and an upwardly extending lip 60 at the extreme outer end thereof, the outer end 56^a of the lever 56 extending into the opening 59 when the latch 58 is at its limit of inward movement as shown in Fig. 16 with the inner end of the lever 56 engaging the free end of the lever 54 to hold the same elevated with the rod 52 at its limit of upward movement and with the head 53 disposed above the upper plies of the endless belt 14 as shown in Fig. 6, the latch being so retained by the abutment stop 58^a carried by the frame bar 4.

Each perpendicular bar 49 as shown in Figs. 6, 14 and 15 carries a pin 61 adapted to be received in the slotted opening 50 while the upper end of the bar 49 carries a forwardly inclined arm 62 and a laterally directed arm 63. When the bars 32 and 49 move in directions toward each other, the bar 49 engages the latch 58 to move the same from the full line position shown in Figs. 14 and 16, to the position shown in Fig. 15, causing the rod 52 to drop in the opening 51, and should the lever 54 be accidentally held in engagement with the rod 52, the pin 61 carried by the bar 49 will engage the same to effect proper movement thereof as will at once be obvious from an inspection of Fig. 14.

The frame structure for supporting the upper side bars 4 and 5 in addition to the perpendicular posts 6 includes cross rails 64 supported at the upper ends of the posts 6 as shown in Fig. 6, the outer ends of the cross rails 64 outwardly of the side bar 5 carrying projection arms 65 having abutment shoulders 65^a at their extreme outer ends, and each arm 65 carrying a stub shaft 66 that rotatably supports a pulley 67. A longitudinally extending shaft 68 is journaled in brackets 69 carried by the base supporting I-beams 1 and has pulleys 70 fixed thereon in spaced relation beneath the pulleys 67 on the stub shafts 66. The shaft 68 extends beyond the meshing gears 28 and 30 and has a pulley 71 fixed to the projecting end thereof.

A second longitudinally extending shaft 72 is journaled in adjustable bearings 73 supported on bracket arms 69^a as shown in Fig. 6, the shaft 72 carrying spaced pulleys

74 while the end of the shaft 72 projecting beyond the meshing gears 28 and 30 carries a fixed pulley 75.

A frame structure embodying a pair of upright side bars 76 has the shaft 72 journaled through the lower ends of the side bars, the upper ends of the side bars 76 supporting stub shafts 77 upon which pulleys 78 are journaled, the side bars 76 being connected by a cross rod 79 with which one end of a link 80 is connected, the other end of the link having an adjustable connection 80ª with the bracket arm 81 projecting outwardly from the adjacent I-beam 1 as shown in Fig. 6.

An endless belt 82 passes over the vertically alined pulleys 67—70 and 74—78 and carries a plurality of flights 83 hinged thereto as at 84 and limited in their opening movement by the brackets 85, the flights 83 assuming horizontal positions when the adjacent inner plies of the endless belts 82 travel in downward directions as indicated by the arrow in Fig. 18. Upon disconnecting the outer end of the link 80 from the bracket arm 81, the frame structure embodying the side bars 76 may be swung outwardly to the dotted line position shown in Fig. 6 for purposes presently to appear. Attention is also called to the fact that the flights 83 upon the alined endless belts 82 travel in horizontal alinement during downward movement thereof.

A frame of the type best illustrated in Figs. 4, 5 and 17 is slidably mounted upon the base supporting I-beams 1 and include a cross bar 86 carrying a central leg 87 and end leg 88 projecting from one side thereof and a relatively short centrally positioned leg 89 projecting from the opposite side, each leg 87 and 88 being slotted as at 90 through which guide pins project, the frame illustrated in Figs. 4 and 5 being disposed beneath the base bar 43 carrying the perpendicular bars 49. For purposes presently to appear, the legs 87 and 89 of the shiftable frame carry perpendicular pins 91 at each side of the base bar 43. The outer end of each leg 88 is angularly bent and has pivoted thereto as at 92, a vertical leg 93 that is pivotally mounted intermediate its end as at 94 to the lateral lug carried by the adjacent side bar 76 as shown in Fig. 6 of the belt supporting frame structure, the upper ends of the legs 93 projecting above the side bars 76 and pulleys 78 as illustrated.

The gear wheel 27 freely rotatable upon the shaft 25 and constantly driven by the gear 24 is in communication with the motor 21, with the clutch mechanism and control devices for keying the same to the shaft 25 being shown more clearly in Figs. 9 to 13. The clutch mechanism 27 embodies a clutch element 95 that is fixed to the inner face of the gear 26 and a companion clutch element 96 is slidable upon the shaft 25 and is carried by a collar 97 keyed as at 98 to said shaft, a coil spring 99 surrounding the shaft as illustrated in Figs. 1 and 13 engaging the movable clutch element 96 for normally forcing the same in a direction toward the loose clutch element 95. The outer end of the collar 97 carries an annular flange 100 having a cam face 101 overlying the collar 97 as shown in Figs. 11 to 13 with a pocket 102 formed in the edge of the highest part of the cam for purposes presently to appear. The clutch element 96 is normally retained in a disengaged position with respect to the clutch element 95 by a pin 103 vertically slidable in a bracket arm 104 projecting from an adjacent vertical supporting post 6 as shown in Figs. 10 and 13.

The mechanism for shifting the pin 103 into and out of engagement with the cam 101 of the collar 97 as illustrated in Fig. 1, is further shown in detail in Fig. 9 and includes a slide rod 105 carrying an upwardly directed pin 106 at one end thereof, the slide rod 105 projecting through a guide plate 107 for attachment to one leg 108 of a bell crank lever that is pivotally mounted as at 109 upon a bracket arm 110 carried by the guide plate 107 with the other leg 108ª of the bell crank being pivotally connected to one end of a lever 111 that extends outwardly of the side bar 4 of the upper frame structure and to the outer end of which a depending link rod 112 is attached. A longitudinally extending lever rod 113 pivotally mounted intermediate its ends as at 114, has one end thereof pivotally attached as at 115 to the lower end of the link 112 while the other end of the lever rod 113 has a fork connection 116 with a horizontal lever 117 that is pivotally mounted upon the bracket 118 with the other end of the lever 117 associated with the lower end of the clutch pin 103 as at 119. A coil spring 120 encloses the slide rod 105 between the plate 107 and stop pin 121 placing the slide rod under tension as well as the system of levers associated therewith. A cross bar 122 having depending end pins 123 may be mounted on the side bars 4 and 5 of the upper frame structure with a slide rod 124 slidable therethrough, the rod 124 being tensioned as at 125 and having an eye in the outer end thereof to be received on the pin 106 as shown in Fig. 9.

The driving means for the two shafts 68 and 72 includes a pulley 126 fixed to the shaft 25 and having a belt connection 127 with the pulley 71. The shaft 29 journaled in one of the posts 6 and supported at its other end by the bar 128 as shown in Figs. 4 and 5 carries a pulley 129 that has a belt connection 130 with a pulley 131 fixed to the shaft 132 that is journaled in the upper ends of the bar 128, and the bar 133, the

shaft 132 carrying a pulley 134 having a belt connection 135 with the pulley 75.

The operation of the machine is as follows:

Sheet metal plates in leaving the rolling mill are received by the handling machine disclosed in this application, singly between the feed rollers 16, pressure thereon being regulated by the adjusting screws 17 for delivery to the endless feed belt sections 14, the belts 14 being continuously rotated by the gearing trains above described. The sheet metal plate A is moved by the endless conveyor 14 into engagement with the push rod 124 and upon movement of the system of levers and links above described, and more clearly illustrated in Fig. 9, the pin 103 is lowered from engagement with the highest point of the cam 101 and the clutch element 96 moved by the spring 99 from the open position shown in Fig. 11 to the closed position shown in Figs. 12 and 13, the meshing gears 24 and 26 driven by the motor 21 then rotating the shaft 25. The meshing gears 28 and 30 being then rotated, their pitman connections 40 and 46 with the transversely slidable frame structures carrying the perpendicular bars 32 and 49 are operated, the bars 32 being initially positioned adjacent the side bar 4 while the bars 49 are initially positioned adjacent the outer ends of the frame bracket 65 as shown in Fig. 6, the heads 53 of the rods 52 slidably mounted in the bars 32 being disposed above the side bar 4 and in position to engage the adjacent edge of the sheet metal plate A. With the clutch mechanism engaged, the bars 32 carried by the base bar 31 move transversely of the frame structure and shift the plate A laterally of the side bars 4 and 5 while the bars 49 carried by the base bar 43 move in directions toward the side bar 5 as illustrated in Fig. 6 by dotted lines to receive the laterally shifted plate A. When the bars 32 and 49 reach their limit of movements toward each other, the latch mechanism within the bar 32 is operated to cause the rod 52 to be lowered in the bar 32 to position the head 53 thereof below the upper plies of the endless belt 14, the levers 54 and 56 collapsing as illustrated in Fig. 15 and insured by the pin 61 carried by the bar 49. When the plate is shifted laterally from the endless belt conveyor 14, the springs 120 and 125 associated with the clutch operating mechanism functions to raise the pin 103 into engagement with the flange 100 carried by the clutch collar 97 to the position shown in Fig. 11, the type of clutch illustrated permitting a complete separation of the bars 32 and 49 to the full line positions shown in Fig. 6 before the pin 103 moving over the cam 101 completely separates the clutch elements 95 and 96. During the rotation of the gears 28 and 30, the frame structures supporting the bars 32 and 49 are moved outwardly of each other, the lowered rod 52 escaping a plate upon the conveyor 14, the latch bar 58 carried by the bars 32 engaging the depending arm 58[a] carried by the side bar 4 as shown in Figs. 6 and 16 for restoring the rod 52 to its elevated operative position as illustrated when the bars 32 are completely returned. The plate A being shifted by the bars 32 from the endless belt conveyors 14 to the arms 62 and lateral bracket arms 63 carried thereby, the plates A are moved beyond the frame brackets 65 with the inner edges of the plates engaging the abutment ends 65[a] of said brackets. With the frame structures supporting the bars 32 and 49 positioned as illustrated by full lines in Fig. 6 with a plate A being conveyed by the endless belt 14, and with a plate A supported on the bracket arms 63 of the bars 49, the upper ends of the legs 93 are positioned to support the outer edge of the plate A by reason of the base bar 43 engaging the pin 91 carried by the central leg 87 of the slidable frame shown in Fig. 17, shifting the frame to cause the legs 93 to move upon their pivotal mountings 94 to project the upper ends of the leg beneath the outer edge of the plate. When the plate upon the endless belt 14 engages the operating mechanism for the clutch, the shaft 25 is rendered operative for moving the frame structures carrying the bars 32 and 49 toward each other, the plate supported upon the bracket arms 63 and legs 93 being prevented from return movement with the bracket arms by the inner edge of the plate engaging the abutment shoulders 65[a] of the frame brackets 65, the legs 93 remaining immovable until the base bar 43 moves a sufficient distance to engage the pin 91 carried by the central leg 89 of the sliding frame causing the outer ends of the bracket arms 63 and the upper ends of the legs 93 to simultaneously release a plate supported thereby to be received upon horizontally alined flights 83. The bars 32 and 49, and the endless belt 82 carrying the flights 83 operate in a step by step movement with the lowering of the sheet metal plates A between the belts 82 to be finally received upon the supporting rails 136 for stacking. When a sufficient number of plates have been stacked upon the rails 136, the link 80 is disengaged from the frame bracket 81 permitting the frame structure embodying the side bars 76 carrying the outwardly positioned conveyor belt 82 to be lowered to the dotted line position shown in Fig. 6 permitting ready access to the stacked plates upon the rails 136 for removal thereof as a unit. The several cooperating devices of the machine are so constructed and timed in their operation to permit the bars 49 to move in a direction toward the side bar

5 of the upper frame structure to receive a plate A delivered thereon by the bars 32, and to convey the plate to the endless belt 82 prior to the lateral shifting of the following plate that is received upon the endless belts 14. The offset portions 44 in the base bar 43 provide clearances for the endless belts 82 and permit sufficient movement of the base bar 43 in delivering a plate to the endless belts 82.

While there is herein shown and described the preferred embodiment of the present invention, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope of the invention as claimed.

What is claimed as new is:—

1. In a sheet metal plate handling machine, a continuously moving conveyor, means for removing the plates from the conveyor and stacking same, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt.

2. In a sheet metal plate handling machine, a continuously moving conveyor, intermittently operating means for removing the plates from the conveyor and stacking the same, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt.

3. In a sheet metal plate handling machine, means for initially moving the plates in one direction, means for subsequently moving the plates in another direction for stacking the same, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt.

4. In a sheet metal plate handling machine, a continuously moving conveyor, intermittently operating means for shifting the plate laterally of the conveyor, power devices for operating the intermittently operating means rendered operative when a plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt.

5. In a sheet metal plate handling machine, a continuously moving conveyor, means for removing the plates from the conveyor and stacking same rendered operative when the plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between

the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt.

6. In a sheet metal plate handling machine, a continuously moving conveyor, intermittently operating means for removing the plates from the conveyor and stacking the same rendered operative when the plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt.

7. In a sheet metal plate handling machine, means for initially moving the plates in one direction, means for subsequently moving the plates in another direction for stacking the same, rendered operative when the plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt.

8. In a sheet metal plate handling machine, a continuously moving conveyor, means for removing the plates from the conveyor and stacking same, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, and stacking means for the plates positioned laterally of the frame bars.

9. In a sheet metal plate handling machine, a continuously moving conveyor, intermittently operating means for removing the plates from the conveyor and stacking the same, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit

return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, and stacking means for the plates positioned laterally of the frame bars.

10. In a sheet metal plate handling machine, means for initially moving the plates in one direction, means for subsequently moving the plates in another direction for stacking the same, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, and stacking means for the plates positioned laterally of the frame bars.

11. In a sheet metal plate handling machine, a continuously moving conveyor, intermittently operating means for shifting the plate laterally of the conveyor, power devices for operating the intermittently operating means rendered operative when a plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, and stacking means for the plates positioned laterally of the frame bars.

12. In a sheet metal plate handling machine, a continuously moving conveyor, means for removing the plates from the conveyor and stacking same rendered operative when the plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section. driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical silde rod carried by each bar having a bead at it upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, and stacking means for the plates positioned laterally of the frame bars.

13. In a sheet metal plate handling machine, a continuously moving conveyor, intermittently operating means for removing the plates from the conveyor and stacking the same rendered operative when the plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars and stacking means for the plates positioned laterally of the frame bars.

14. In a sheet metal plate handling machine, means for initially moving the plates in one direction, means for subsequently moving the plates in another direction for stacking the same, rendered operative when the plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, and stacking means for the plates positioned laterally of the frame bars.

15. In a sheet metal plate handling machine, a continuously moving conveyor, means for removing the plates from the conveyor and stacking same, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, and a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates.

16. In a sheet metal plate handling machine, a continuously moving conveyor, intermittently operating means for removing the plates from the conveyor and stacking the same, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair

of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath the plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, and a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates.

17. In a sheet metal plate handling machine, means for initially moving the plates in one direction, means for subsequently moving the plates in another direction for stacking the same, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, and a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates.

18. In a sheet metal plate handling machine, a continuously moving conveyor, intermittently operating means for shifting the plate laterally of the conveyor, power devices for operating the intermittently operating means rendered operative when a plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, and a pivotally mounted frame supporting the outer pair of

endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates.

19. In a sheet metal plate handling machine, a continuously moving conveyor, means for removing the plates from the conveyor and stacking same rendered operative when the plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, and a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates.

20. In a sheet metal plate handling machine a continuously moving conveyor, intermittently operating means for removing the plates from the conveyor and stacking the same rendered operative when the plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gears connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, and a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates.

21. In a sheet metal plate handling machine, means for initially moving the plates in one direction, means for subsequently moving the plates in another direction for stacking the same, rendered operative when the plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the

bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertical disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, and a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates.

22. In a sheet metal plate handling machine, a continuously moving conveyor, means for removing the plates from the conveyor and stacking same, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates, a frame slidably mounted beneath the base bar of the second named frame structure, hinged legs carried by the sliding frame and pivotally connected to the frame supporting the outer endless belts with the upper ends of the plates adapted to support the outer edge of a plate prior to reception on the belt flights, and means carried by the sliding frame adapted to be engaged by the base bar of the second frame structure to move the sliding frame in opposite directions to move the frame legs to operative and inoperative positions relative to the travelling plates.

23. In a sheet metal plate handling machine, a continuously moving conveyor, intermittently operating means for removing the plates from the conveyor and stacking the same, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limits of operative movement to lower the rod bead to permit return of the bar beneath the plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates, a frame slidably mounted beneath the base bar of the second named frame structure, hinged legs carried by the sliding frame and pivotally connected to the frame supporting the outer endless belts with the upper ends of the plates adapted to support the outer edge of a plate prior to reception on the belt flights, and means carried by the sliding frame adapted to be engaged by the base bar of the second frame structure to move the sliding frame in opposite directions to move the frame legs to operative and inoperative positions relative to the travelling plates.

24. In a sheet metal plate handling ma-

chine, means for initially moving the plates in one direction, means for subsequently moving the plates in another direction for stacking the same, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates, a frame slidably mounted beneath the base bar of the second named frame structure, hinged legs carried by the sliding frame and pivotally connected to the frame supporting the outer endless belts with the upper ends of the plates adapted to support the outer edge of a plate prior to reception on the belt flights, and means carried by the sliding frame adapted to be engaged by the base bar of the second frame structure to move the sliding frame in opposite directions to move the frame legs to operative and inoperative positions relative to the travelling plates.

25. In a sheet metal plate handling machine, a continuously moving conveyor, intermittently operating means for shifting the plate laterally of the conveyor, power devices for operating the intermittently operating means rendered operative when a plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edges of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates, a frame slidably mounted beneath the base bar of the second named frame structure, hinged legs carried by the sliding frame and pivotally connected to the frame supporting the outer endless belts with the upper ends of the plates adapted to support the outer edge of a plate prior to reception on the belt flights, and means carried by the sliding frame adapted to be engaged by the base bar of the second frame structure to move the slding frame in opposite directions to move the frame legs to operative and inoperative positions relative to the travelling plates.

26. In a sheet metal plate handling machine, a continuously moving conveyor, means for removing the plates from the conveyor and stacking same rendered operative when the plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between

the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts hinged flights carried by the belts adapted to receive the plates to lower the same, a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates, a frame slidably mounted beneath the base bar of the second named frame structure, hinged legs carried by the sliding frame and pivotally connected to the frame supporting the outer endless belts with the upper ends of the plates adapted to support the outer edge of a plate prior to reception on the belt flights, and means carried by the sliding frame adapted to be engaged by the base bar of the second frame structure to move the sliding frame in opposite directions to move the frame legs to operative and inoperative positions relative to the travelling plates.

27. In a sheet metal plate handling machine, a continuously moving conveyor, intermittently operating means for removing the plates from the conveyor and stacking the same rendered operative when the plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod bead to permit return of the bar beneath a plate being fed by the endless belts, a second frame structure including a base bar and vertical bars alined with the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates, a frame slidably mounted beneath the base bar of the second named frame structure, hinged legs carried by the sliding frame and pivotally connected to the frame supporting the outer endless belts with the upper ends of the plates adapted to support the outer edge of a plate prior to reception on the belt flights and means carried by the sliding frame adapted to be engaged by the base bar of the second frame structure to move the sliding frame in opposite directions to move the frame legs to operative and inoperative positions relative to the travelling plates.

28. In a sheet metal plate handling machine, means for initially moving the plates in one direction, means for subsequently moving the plates in another direction for stacking the same, rendered operative when the plate reaches its limit of travel on the conveyor, said conveyor including a series of horizontally alined endless belts, gear connections between the endless belts, a pair of guide rollers preceding the endless belts, gear connections between the guide rollers and the adjacent endless belt section, driving means for the guide rollers continuously operating the endless belts, the means for removing the plates from the conveyor including a transversely shiftable frame structure carrying vertical bars disposed between the endless belt sections, a vertical slide rod carried by each bar having a bead at its upper end normally projecting above the endless belt sections for engaging the adjacent edge of a plate, trigger mechanism

associated with each bar adapted to be operated when the bar reaches its limit of operative movement to lower the rod head to permit return of the bar beneath a plate being fed by the endless belt, a second frame structure including a base bar and vertical bars alined with the vertical bars of the first frame structure adapted to move toward and away from the bars of the first frame structure, the vertical bars of the second frame structure adapted to operate the trigger mechanism of the bars of the first named frame structure, means carried by the bars of the second frame structure to receive the plates delivered by the first named bars, stacking means for the plates positioned laterally of the frame bars, the stacking means including pairs of transversely alined vertically disposed endless belts, hinged flights carried by the belts adapted to receive the plates to lower the same, a pivotally mounted frame supporting the outer pair of endless belts permitting lowering movement thereof for unitary removal of a pile of stacked plates, a frame slidably mounted beneath the base bar of the second named frame structure, hinged legs carried by the sliding frame and pivotally connected to the frame supporting the outer endless belts with the upper ends of the plates adapted to support the outer edge of a plate prior to reception on the belt flights and means carried by the sliding frame adapted to be engaged by the base bar of the second frame structure to move the sliding frame in opposite directions to move the frame legs to operative and inoperative positions relative to the travelling plates.

29. In a sheet metal plate handling machine, an independently operated continuously moving conveyor, means for shifting the plates laterally of the conveyor, laterally moving means for receiving the plate from the conveyor, lowering and stacking means for the plates receiving the plates from the last named means, and power devices for operating the plate handling means separate from the conveyor operating means.

30. In a sheet metal plate handling machine, an independently operated continuously moving conveyor, means for shifting the plates laterally of the conveyor, laterally moving means for receiving the plate from the conveyor, lowering and stacking means for the plates receiving the plates from the last named means, and power devices for operating the plate handling means separate from the conveyor operating means and adapted to be operated when a plate reaches its limit of travel over the conveyor.

31. In a sheet metal plate handling machine, an independently operated continuously moving conveyor, means for shifting the plates laterally of the conveyor, lowering and stacking means for the plates receiving the plates from the last named means, power devices for operating the plate handling means separate from the conveyor operating means, said power devices including a driven shaft having a movable clutch element associated therewith, a gear wheel on the driven shaft, a second gear wheel meshing therewith and connections between the gears and plate shifting means.

32. In a sheet metal plate handling machine, an independently operated continuously moving conveyor, means for shifting the plates laterally of the conveyor, laterally moving means for receiving the plate from the conveyor, lowering and stacking means for the plates receiving the plates from the last named means, power devices for operating the plate handling means separate from the conveyor operating means and adapted to be operated when a plate reaches its limit of travel over the conveyor, said power devices including a driven shaft having a movable clutch element associated therewith, a gear wheel on the driven shaft, a second gear wheel meshing therewith and connections between the gears and plate shifting means.

33. In a sheet metal plate handling machine, an independently operated continuously moving conveyor, means for shifting the plates laterally of the conveyor, lowering and stacking means for the plates receiving the plates from the last named means, power devices for operating the plate handling means separate from the conveyor operating means, said power devices including a driven shaft having a movable clutch element associated therewith, a gear wheel on the driven shaft, a second gear wheel meshing therewith, connections between the gears and plate shifting means, and operative connections between the lower and stacking means and the driven shaft.

34. In a sheet metal plate handling machine, an independently operated continuously moving conveyor, means for shifting the plates laterally of the conveyor, laterally moving means for receiving the plate from the conveyor, lowering and stacking means for the plates receiving the plates from the last named means, power devices for operating the plate handling means separate from the conveyor operating means and adapted to be operated when a plate reaches its limit of travel over the conveyor, said power devices including a driven shaft having a movable clutch element associated therewith, a gear wheel on the driven shaft, a second gear wheel meshing therewith, connections between the gears and plate shifting means and operative connec-

tions between the lowering and stacking means and the driven shaft.

35. In a sheet metal plate handling machine, an independently operated continuously moving conveyor, means for shifting the plates laterally of the conveyor, lowering and stacking means for the plates receiving the plates from the last named means, power devices for operating the plate handling means separate from the conveyor operating means, said power devices including a driven shaft having a movable clutch element associated therewith, a gear wheel on the driven shaft, a second gear wheel meshing therewith, connections between the gears and plate shifting means, and devices associated with the clutch and disposed in the path of movement of a plate over the conveyor adapted to be engaged by the plate to shift the clutch and render the driven shaft operative.

36. In a sheet metal plate handling machine, an independently operated continuously moving conveyor, means for shifting the plates laterally of the conveyor, laterally moving means for receiving the plates from the conveyor, lowering and stacking means for the plates receiving the plates from the last named means, power devices for operating the plate handling means separate from the conveyor operating means and adapted to be operated when a plate reaches its limit of travel over the conveyor, said power devices including a driven shaft having a movable clutch element associated therewith, a gear wheel on the driven shaft, a second gear wheel meshing therewith, connections between the gears and plate shifting means, and devices associated with the clutch and disposed in the path of movement of a plate over the conveyor adapted to be engaged by the plate to shift the clutch and render the driven shaft operative.

37. In a sheet metal plate handling machine, an independently operated continuously moving conveyor, means for shifting the plates laterally of the conveyor, lowering and stacking means for the plates receiving the plates from the last named means, power devices for operating the plate handling means separate from the conveyor operating means, said power devices including a driven shaft having a movable clutch element associated therewith, a gear wheel on the driven shaft, a second gear wheel meshing therewith, connections between the gears and plate shifting means, operative connections between the lower and stacking means and the driven shaft, and devices associated with the clutch and disposed in the path of movement of a plate over the conveyor adapted to be engaged by the plate to shift the clutch and render the driven shaft operative.

38. In a sheet metal plate handling machine, an independently operated continuously moving conveyor, means for shifting the plates laterally of the conveyor, laterally moving means for receiving the plate from the conveyor, lowering and stacking means for the plates receiving the plates from the last named means, power devices for operating the plate handling means separate from the conveyor operating means and adapted to be operated when a plate reaches its limit of travel over the conveyor, said power devices including a driven shaft having a movable clutch element associated therewith, a gear wheel on the driven shaft, a second gear wheel meshing therewith, connections between the gears and plate shifting means operative connections between the lower and stacking means and the driven shaft, and devices associated with the clutch and disposed in the path of movement of a plate over the conveyor adapted to be engaged by the plate to shift the clutch and render the driven shaft operative.

39. In a sheet metal plate handling machine, a continuously moving conveyor, a pair of frame structures carrying vertical bars transversely slidable beneath the conveyor, the bars carried by one frame having vertically shiftable means adapted to engage a plate and shift the same laterally of the conveyor, cooperating means carried by the bars adapted to lower the plate engaging means when the bars move toward each other and contact and vertically disposed flight carrying belts receiving the plates for lowering the same in stack formation.

40. In a sheet metal plate handling machine, a continuously moving conveyor, a pair of frame structures carrying vertical bars transversely slidable beneath the conveyor, the bars carried by one frame having vertically shiftable means adapted to engage a plate and shift the same laterally of the conveyor, cooperating means carried by the bars adapted to lower the plate engaging means when the bars move toward each other, contact and vertically disposed flight carrying belts receiving the plates for lowering the same in stack formation, and independent means for operating the frame structures and plate lowering belts rendered operative when the plate reaches its limit of travel on the conveyor.

41. In a sheet metal plate handling machine, a continuously moving conveyor, a pair of frame structures carrying vertical bars transversely slidable beneath the conveyor, the bars carried by one frame having vertically shiftable means adapted to engage a plate and shift the same laterally of the conveyor, cooperating means carried by the bars adapted to lower the plate engaging means when the bars move toward each other,

contact and vertically disposed flight carrying belts receiving the plates for lowering the same in stack formation, independent means for operating the frame structures and plate lowering belts rendered operative when the plate reaches its limit of travel on the conveyor, said operating means including a slidable clutch element normally disengaged and a system of links and levers associated with the clutch element and operated by a plate moving on the conveyor.

In testimony whereof I affix my signature.

MILE KUKULJ.