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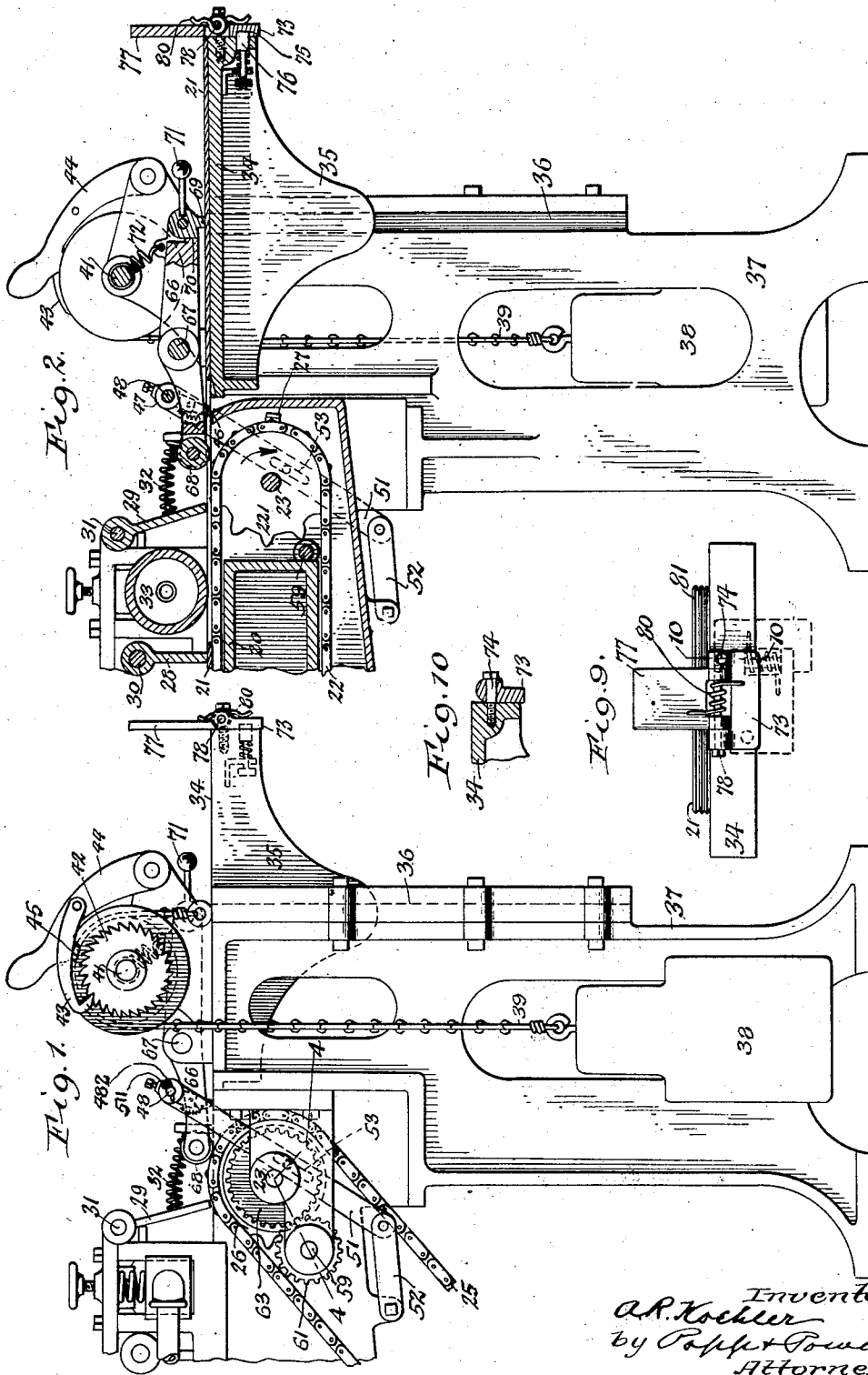
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PLATE STACKING MECHANISM

Filed March 16, 1927

2 Sheets-Sheet 1



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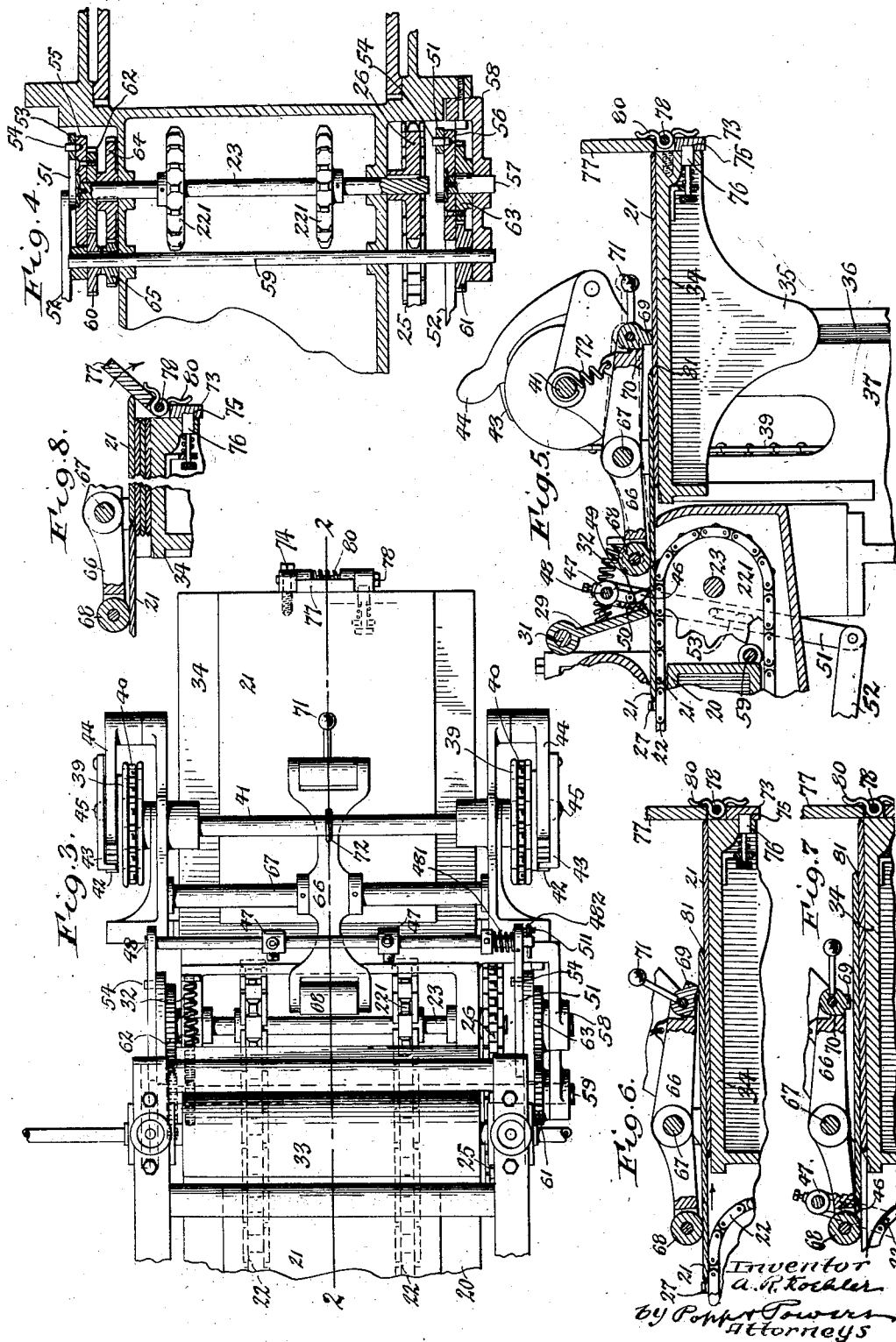
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

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PLATE-STACKING MECHANISM

Application filed March 16, 1927. Serial No. 175,904.

This invention relates to a mechanism for delivering and stacking in a pile plates from which wax has been scraped after an electrotype has been obtained from the wax for printing purposes.

It is the object of this present invention to improve the means for delivering the plates from the scraping machine and stacking the same in a pile ready to be used over again. This mechanism includes essentially means for positively and automatically depressing the stacking table equal to the thickness of each plate which is delivered, and also removable and yieldable stop means at the outside of the stacking table which can be moved out of the way to facilitate removal of the pile of plates from the stacking table and which will yield and prevent breakage in the event that a plate should be accidentally caught by a following plate and advanced beyond the normal stacking position.

In the accompanying drawings:—

Figure 1 is a side elevation of the stacking mechanism embodying my invention and the adjacent part of the table forming part of the plate scraping machine.

Figure 2 is a vertical longitudinal section of the same taken on line 2—2 Fig. 3.

Figure 3 is a top plan view of the stacking mechanism and the delivery end of the scraping machine.

Figure 4 is a horizontal section taken on line 4—4 Fig. 1.

Figure 5 is a view similar to Fig. 2, but showing another position of the parts.

Figures 6, 7 and 8 are fragmentary views similar to Figs. 2 and 5, showing still further changed positions which the parts assume during the operation of the machine.

Figure 9 is a fragmentary front elevation of the stacking table and the plate stop mounted thereon in accordance with my invention.

Figure 10 is a vertical section taken on line 10—10 Fig. 9.

Similar characters of reference indicate like parts in the several figures of the drawings.

The numeral 20 represents the horizontal supporting bed of the machine whereby wax is scraped from plates 21 after an electroplate copy has been obtained of the impression on the wax for use in making an electrotype for printing purposes. These plates are moved over the bed of the wax removing apparatus by a carrier or conveyer of any suitable construction, but consists in the present instance of two carrying belts 22 preferably of the chain type passing with their upper operative stretches over the plate supporting bed 20 and with their lower inoperative stretches underneath this bed, while their delivery turns pass around sprocket wheels 221 mounted on a transverse shaft 23 which is journaled in suitable bearings on the adjacent part of the main frame of the scraping machine. This shaft constitutes the driving shaft of the machine and may receive power from any suitable source, for example, by a chain belt 25 geared to an electric motor and passing around a sprocket wheel 26 on one end of the driving shaft, as shown in Figs. 1, 3 and 4. The conveyer belts are provided at intervals with carrying wings or lugs 27 which are adapted to engage with the rear ends of the plates and move them forwardly so that their advancing ends project beyond the bed and then these wings are disengaged from the plates as the wings move with the conveyer belts from the upper side of the bed downwardly around the sprocket wheels 221 and backwardly underneath the bed preparatory to again engaging the rear end of another plate on the table.

While the plates are being thus moved forwardly over the delivery end of the bed, the same are subjected to a final scraping action for removing traces of wax therefrom by

two scrapers or blades 28, 29 engaging the upper surface of the plates which had been wax-coated, which scrapers are pivoted at their upper ends by transverse pivots 30, 31 on the main frame and yieldingly held with their lower edges on the path of the plates—for example, the rear scraper 28 being held in place by gravity and the front scraper 29 being aided by a spring 32 interposed between the same and the main frame, as shown in Figs. 1, 2, 3 and 5. Between these two scrapers is arranged a straightening roller 33 mounted transversely on the main frame and internally heated and adapted to engage the upper side of the plates and roll them flat before leaving the scraping machine in case they have become warped or distorted during the cleaning or wax removing operation.

The improved delivery and stacking mechanism which is associated with this scraping mechanism and which embodies my invention is constructed as follows:—

The numeral 34 represents a horizontal stacking table which is arranged in front of the delivery end of the scraper bed and upon which the cleaned plates are successively deposited to form a pile and removed from time to time for repeated use. This stacking table is movable vertically and for this purpose is provided at its opposite ends with guide arms 35 which slide in vertical ways 36 on standards or legs 37, forming part of the main frame of the machine. Means are provided which operate constantly to hold the stacking table yieldingly in an elevated position, these means in this instance consisting of two vertically movable counter weights 38 arranged adjacent to the standards 27 and connected with the table by chain belts 39 passing over sprocket guide wheels 40 mounted on the upper ends of the standards as shown in Figs. 1, 2 and 3. No slippage of the belts 39 on the wheels 40 is possible and this permits of using a table depressing mechanism which will prevent the table from dropping when loaded heavily with plates.

The sprocket wheels 40 are mounted on the opposite ends of a transverse shaft 41 arranged above the table and journaled in bearings on the upper ends of the frame legs 37.

The heft of these weights is slightly greater than the heft of the stacking table, so that a downward pressure is required to depress the table and make room on the same or at the top of the pile of plates thereon for the next plate delivered from the scraping mechanism. In order to hold the table and the stack of plates thereon in whatever position the same has been depressed, each of the sprocket wheels 40 is provided with a ratchet wheel 42 which is engaged by a detent pawl 43 adapted to prevent turning of these wheels

in the direction which would permit elevation of the stacking table under the pull of the weights 38. These pawls are mounted on shifting levers 44 which are adapted to rest on the ratchet wheels and which are pivoted on the standards 37 and provided with lifting fingers 45 adapted to engage the undersides of the pawls.

By raising the lifting levers the pawls are lifted by the fingers 45 out of engagement from the ratchet wheels, thereby permitting the weights 38 to raise the stacking table so as to bring its top or the top of the pile thereon into the plate receiving position.

After the conveyer wings 27 let go of the plates the same are operated upon by a transfer or delivery mechanism whereby the plates are carried from the bed of the scraping mechanism to the stacking table or the pile of plates thereon.

This delivery mechanism includes one or more delivery or feed dogs 46, preferably two, which are adapted to move backwardly idly over the plates and then forwardly into active engagement with the rear edge of the same and propel the same from the supporting bed to the stacking table. To permit of this, each delivery dog is pivoted at its upper end on the lower end of a rock arm 47 secured to a transverse supporting rod 48 arranged over the bed, each dog being permitted to fold forwardly to clear the respective plate 21 during its backward movement but prevented from turning beyond a straightened position during its forward movement by cooperating jack-knife shoulders 49 which latter are yieldingly held in engagement with each other by a spring 50 connecting the feed dog with its rock arm, as best shown in Fig. 5. The supporting rod 48 is mounted at its opposite ends on the upper ends of two upright rock levers 51 the lower ends of which are connected with the main frame by links 52.

The intermediate parts of the rock levers are provided with longitudinal slots 53 which receive crank pins 54 arranged on the side of crank disks 55, 56. The crank disk 55 turns loosely on one end of the driving shaft 23 and the crank disk 56 is pivotally mounted by a pin 57 on a bracket 58 of the main frame so that the axes of the crank disks 55, 56 are in line. The two crank disks are caused to turn in unison by a counter or jack shaft 59 arranged transversely and journaled in bearings on the main frame parallel to the driving shaft provided at its opposite ends with gear pinions 60, 61 meshing with gear wheels 62, 63 which are connected with the crank disks 55, 56 respectively, as shown in Fig. 4. Motion is transmitted from the driving shaft 23 to the counter shaft 59 by a gear wheel 64 secured to the driving shaft and meshing with a gear pinion 65 secured to the counter shaft.

By this means the crank disks are turned in unison and the rock levers are caused to move back and forth for engaging the dogs successively with the rear edges of the plates and moving the latter from the place where they were left by the conveyer wings to a position over the stacking table.

Means are provided whereby upon feeding a plate off from the delivery end of the supporting bed the stacking table will be lowered an extent equal to the thickness of the respective plate and thereby make room for the latter either on the table or on the top of the stack of plates already on the table. These means are constructed as follows:

The numeral 66 represents a vertically swinging presser lever which turns on a cross rod 67 carried on the upper ends of the frame standards 37. At its rear end this lever is provided with a gage member 68 having preferably the form of a roller which is adapted to be engaged by the front edge of each plate and to be lifted and thus producing the movement required for depressing the table. At its front end the depressing lever is provided with a presser foot 69 which is pivotally mounted thereon to turn in a vertical plane. This foot is free to swing forwardly from a vertical position but its rearward movement from this position is prevented by cooperating stops 70 arranged on the presser foot and lever, the foot being yieldingly held in its normal pendant position in engagement with the presser lever by a weight 71 projecting forwardly from the presser foot. The presser lever is yieldingly held in a position in which its front arm is raised and its rear arm is depressed by a spring 72 connecting the front arm of this lever with the adjacent part of the shaft 41, or other convenient part of the machine.

Before a plate is fed off from the supporting bed to the stacking table or the pile of plates thereon, the presser lever is turned so that its gage roller projects downwardly into the space between the bed and table and into the path of the oncoming plate. As the latter advances its front edge strikes the gage roller and lifts the same a distance equal to the thickness of the plate. This causes the presser foot to descend and engage the table or the top plate thereon and push the same downwardly an extent somewhat greater than the thickness of the respective plate inasmuch as the distance from the fulcrum of the presser lever to the presser foot is greater than the distance from this fulcrum to the gage roller, thereby providing a little more than necessary clearance space on top of the stacking table or the top of the uppermost plate thereon for receiving the last plate which is fed off the supporting table as shown in Fig. 5. After the new oncoming plate has raised the gage roller and depressed the table by means of the presser foot, the front edge

of the plate upon moving over the uppermost plate on the table engages with the presser foot and trips the same forward, as shown in Fig. 6, in order to avoid breaking the presser lever, during which time the weighted arm 71 is raised. When the rear edge of the plate being fed off has passed forwardly beyond the gage roller, the latter is again depressed into its lowermost position as shown in Fig. 7 preparatory to intercepting the next following plate and being raised thereby. When the presser lever is thus turned for depressing the gage roller the presser foot is again raised clear of the plate which is being fed to the stacking table whereby the weight 71 is permitted to return the presser foot automatically into its pendant operative position relative to the uppermost plate on the stack, as shown in Fig. 7.

For the purpose of enabling the plates to be stacked in even piles on the table a stop device is provided on the front edge of the table against which the plates are pushed which stop device is so organized that the same may be shifted out of the way when the attendant wishes to remove some or all of the plates from the table, and said stop device is also provided with means which will permit its stop member to yield or give way in case a plate is forcibly moved against the same by the feeding off mechanism and thereby preventing injury to the machine.

In its preferred form this stop device is constructed as follows:—

The numeral 73 represents a hinge block pivoted at one end by a horizontal screw 74 to the front edge of the stacking table and provided on its opposite end with a recess 75 adapted to be engaged by a spring pressed bolt 76 mounted on the underside of the table. Arranged above the hinge block and normally projecting above the table and across the path of the plates is a stop arm 77 which is pivotally connected at its lower end with the hinge block by a horizontal pintle 78. Forward movement of the stop arm from its upright normal position is permitted but rearward movement from this position is prevented by cooperating stop surfaces between this arm and the adjacent front edge of the table, as shown in Fig. 2. A spring 80 is employed for yieldingly holding the stop arm in its upright operative position against the table and also permitting the same to swing forwardly out of the path of a plate which may be accidentally fed beyond the normal distance.

The spring 80 is strong enough to hold the stop arm sufficiently rigid to permit of evening the plates against the same preparatory to removing them from the pile on the table. If, however, a plate should be fed forwardly an abnormal extent by the feed off mechanism, then the same upon striking the stop arm would simply deflect the latter without

doing any harm. If it is desired to remove the pile of plates from the table without hindrance from the stop device the latter can be turned out of the way below the plane of the table, as shown by dotted lines in Fig. 9, by first releasing the locking bolt for this purpose.

In order to prevent an edge to edge engagement of the plates and avoiding possible injury to the machine the front and rear edges of the plates are preferably bevelled, as shown at 81, thereby enabling the plates to climb one over another and thus pass each other without conflict.

The rod 48 preferably operates as a rock shaft which turns in bearings on the upper ends of the shifting levers 51 and a spring 481 interposed between one of these levers and this shaft operates to hold the dog arms 47 yieldingly in their forward position, the movement in this direction being limited by a stop 482 on the shaft 48 engaging a stop 511 on the adjacent shifting lever, as shown in Figs. 1 and 3. By means of this construction the feeding dogs and the arms on which the same are mounted may yield and thus avoid breakage in case the plates should become stuck for any reason when engaged by the dogs during the forward movement of the latter.

I claim as my invention:—

1. A plate stacking mechanism, comprising a frame, a stacking table guided on the frame for vertical movement, means for delivering plates to the table, means for yieldingly holding said table in an elevated position, and depressing means for successively lowering said table to the same extent as the thickness of each plate as the same is delivered upon the table, said depressing means including a deflectable member which is shifted by engagement with each plate a distance corresponding to the thickness of the respective plate, and a depressing member which is connected with said deflectable member and bears against the top of said table or against a plate resting thereon and is actuated by said deflectable member to depress the table a distance equal to the thickness of the plate to be piled on the table.

2. A plate stacking mechanism comprising a frame, a stacking table guided for vertical movement on said frame, means for resisting downward movement of said table, means for delivering plates upon said table and depressing means which are adapted to be engaged by the plates as they are delivered to said table and which are adapted to depress said table to provide clearance space over the table for the reception of the plate being delivered, said depressing means including a vertically swinging two armed lever having a gage member on one of its arms adapted to be engaged by the plate moving toward said table, and a presser member on

its other arm adapted to engage the table or the plates thereon for lowering the same.

3. A plate stacking mechanism comprising a frame, a stacking table guided for vertical movement on said frame, means for resisting downward movement of said table, means for delivering plates upon said table and depressing means which are adapted to be engaged by the plates as they are delivered to said table and which are adapted to depress said table to provide clearance space over the table for the reception of the plate being delivered, said depressing means including a vertically swinging two armed lever having a gage member on one of its arms adapted to be engaged by the plate moving toward said table, and a presser member movably mounted on the other arm of the presser lever and adapted to engage the table or the plates thereon for lowering the same and also adapted to be engaged by a plate moving over the table and to be deflected thereby into an inoperative position.

4. A plate stacking mechanism comprising a frame, a stacking table guided for vertical movement on said frame, means for resisting downward movement of said table, means for delivering plates upon said table and depressing means which are adapted to be engaged by the plates as they are delivered to said table and which are adapted to depress said table to provide clearance space over the table for the reception of the plate being delivered, said depressing means including a vertically swinging two armed lever having a gage member on one of its arms adapted to be engaged by the plate moving toward said table, a vertically swinging presser foot pivoted on the other arm of said lever capable of swinging forwardly out of a pendant normal position by engagement therewith of a plate moving over the table but incapable of swinging rearwardly from said position, and means for yieldingly holding said presser foot in its normal position.

5. A plate stacking mechanism comprising a frame, a stacking table guided for vertical movement on said frame, means for resisting downward movement of said table, means for delivering plates upon said table, and depressing means which are adapted to be engaged by the plates as they are delivered to said table and which are adapted to depress said table to provide clearance space over the table for the reception of the plate being delivered, said depressing means including a vertically swinging two armed lever having a gage member on one of its arms adapted to be engaged by the plate moving toward said table, a vertically swinging presser foot pivoted on the other arm of said lever capable of swinging forwardly out of a pendant normal position by engagement therewith of a plate moving over the table, cooperating stops on said foot and presser lever for preventing said

foot from swinging rearwardly from its normal position, and a weight projecting forwardly from said foot and operating to hold the same yieldingly in its normal position.

5 6. A plate stacking mechanism comprising a frame, a stacking table guided for vertical movement on said frame, means for resisting downward movement of said table, means for delivering plates upon said table, and depressing means which are adapted to be engaged by the plates as they are delivered to said table and which are adapted to depress said table to provide clearance space over the table for the reception of the plate being delivered, said depressing means including a vertically swinging lever having a short rear arm adapted to be engaged by the plates moving over said table and a long front arm adapted to press downward on the table or the plates thereon for lowering the same.

20 7. A plate stacking mechanism comprising a frame, a stacking table guided for vertical movement on said frame, means for resisting downward movement of said table, means for delivering plates upon said table and depressing means which are adapted to be engaged by the plates as they are delivered to said table and which are adapted to depress said table to provide clearance space over the table for the reception of the plate being delivered, said depressing means including a vertically swinging lever having a rear arm adapted to be engaged by the plates moving over said table and a front arm adapted to press downward on the table or the plates thereon for lowering the same, and means for turning said lever in the direction for bringing its rear arm into the path of said plates.

35 8. A plate stacking mechanism comprising a main frame, a stacking table guided for vertical movement on said frame, means for resisting downward movement of said table comprising belt wheels mounted on said frame, belts passing around said wheels and connected at one of their ends with said table and weights connected with the other ends of said belts, and means for depressing said table by motion derived from the plates while being delivered to said table and the extent of the lowering of said table being determined by the thickness of the respective plates.

50 9. A plate stacking mechanism comprising a main frame, a stacking table guided for vertical movement on said frame, means for resisting downward movement of said table comprising belt wheels mounted on said frame, belts passing around said wheels and connected at one of their ends with said table and weights connected with the other ends of said belts, ratchet wheels connected with said belt wheels, detent pawls mounted on said frame and engaging with said ratchet wheels, and means for depressing said table by motion derived from the plates delivered to said table and the extent of the lowering of said

table being determined by the thickness of the respective plates.

10. A plate stacking mechanism comprising a main frame, a stacking table guided on said frame for vertical movement, means for delivering plates to said table, and a stop device movably mounted on the front edge of the table and adapted to be engaged by said plates, said stop device including a hinge block pivoted on said table to swing vertically, a spring bolt for holding said block in its normal position, a stop arm pivoted on said block and capable of turning outward from its normal upright position but held against turning inwardly from such position, and a spring for yieldingly holding said arm in its normal position.

11. A plate stacking mechanism comprising a main frame, a supporting bed, a stacking table guided on said frame for vertical movement thereon, means for lowering said table progressively and means for delivering plates from said bed to said table, comprising rock levers, links connecting the lower ends of said levers with said frame, a rod connecting the upper ends of said levers, and feed dogs arranged on said rod and adapted to engage said plates.

12. A plate stacking mechanism comprising a main frame, a supporting bed, a stacking table guided on said frame for vertical movement thereon, means for lowering said table progressively and means for delivering plates from said bed to said table, comprising rock levers, links connecting the lower ends of said levers with said frame, a rod connecting the upper ends of said levers, feed dogs arranged on said rod and adapted to engage said plates and crank disks having cranks engaging slidably with said levers.

13. A plate stacking mechanism comprising a main frame, a supporting bed, a stacking table guided on said frame for vertical movement thereon, means for lowering said table progressively and means for delivering plates from said bed to said table, comprising rock levers, links connecting the lower ends of said levers with said frame, a rod connecting the upper ends of said levers, feed dogs arranged on said rod and adapted to engage said plates, crank disks provided with cranks engaging slidably with said levers, gear wheels connected with said crank disks, a shaft and gear pinions mounted on said shaft and meshing with said gear wheels.

14. A plate stacking mechanism comprising a main frame, a supporting bed, a stacking table guided on said frame for vertical movement thereon, means for lowering said table progressively and means for delivering plates from said bed to said table, comprising rock levers, links connecting the lower ends of said levers with said frame, a rod connecting the upper ends of said levers, feed dogs arranged on said rod and adapted to engage

said plates, crank disks provided with cranks
engaging slidably with said levers, gear
wheels connected with said crank disks, a
counter shaft, gear pinions mounted on said
5 counter shaft and meshing with said gear
wheels, a driving shaft upon which one of said
crank disks is mounted, a bracket on which
the other crank disk is mounted, and inter-
meshing gear wheels mounted on said driving
10 and counter shafts, respectively.

In testimony whereof I, hereby affix my
signature.

ANDREW R. KOEHLER.

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