March 18, 1941. W. J. TODHUNTER 2,234,990

ASSEMBLING AND PILING UNIT

Filed June 16, 1939 3 Sheets-Sheet 1

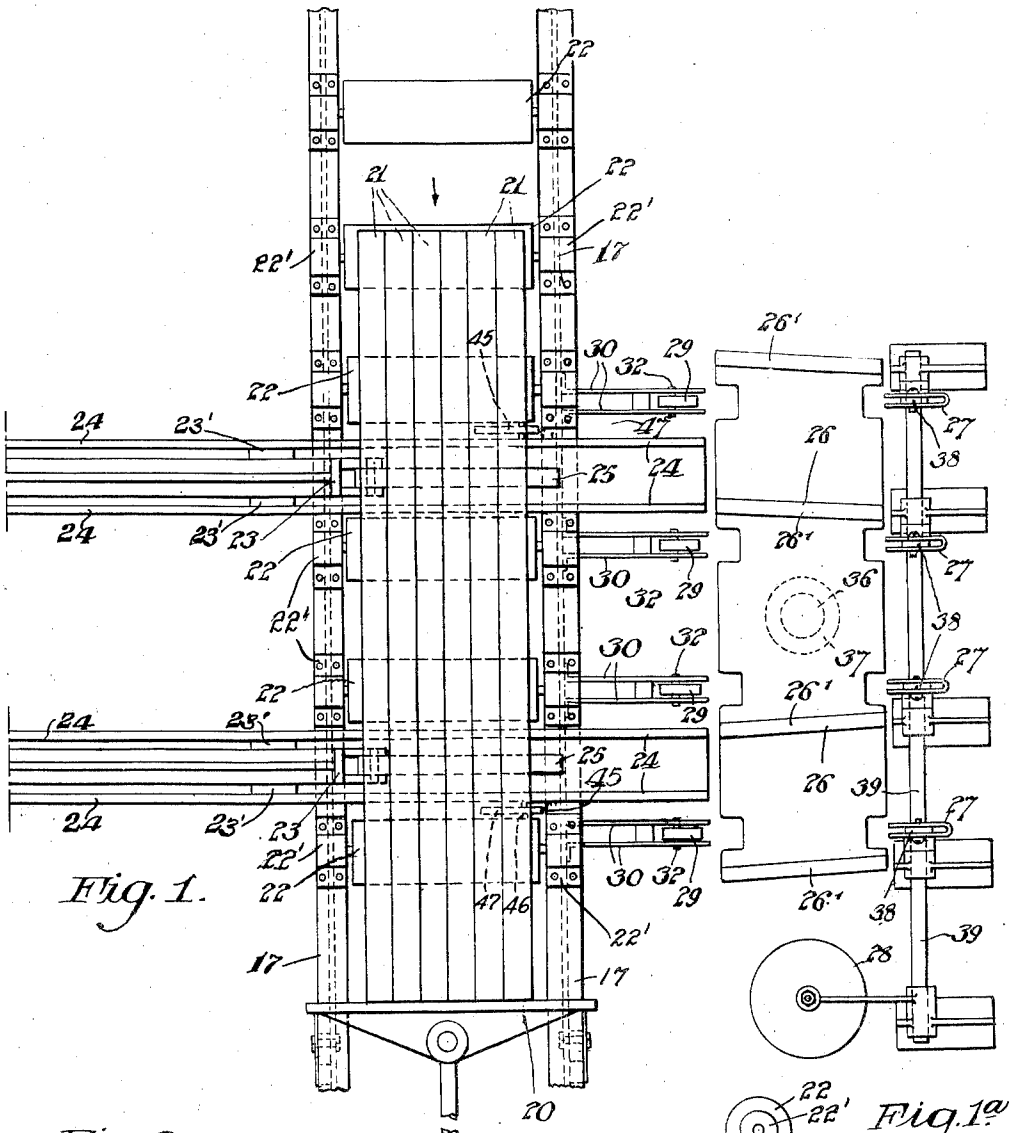


Fig. 1.

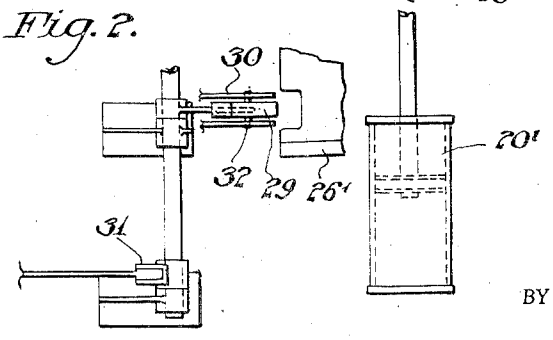


Fig. 2.

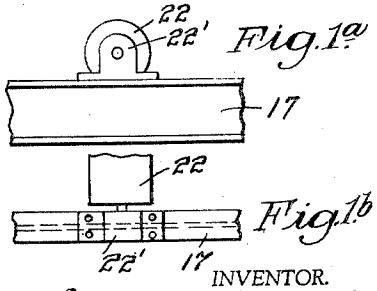


Fig. 1a

Fig. 1b

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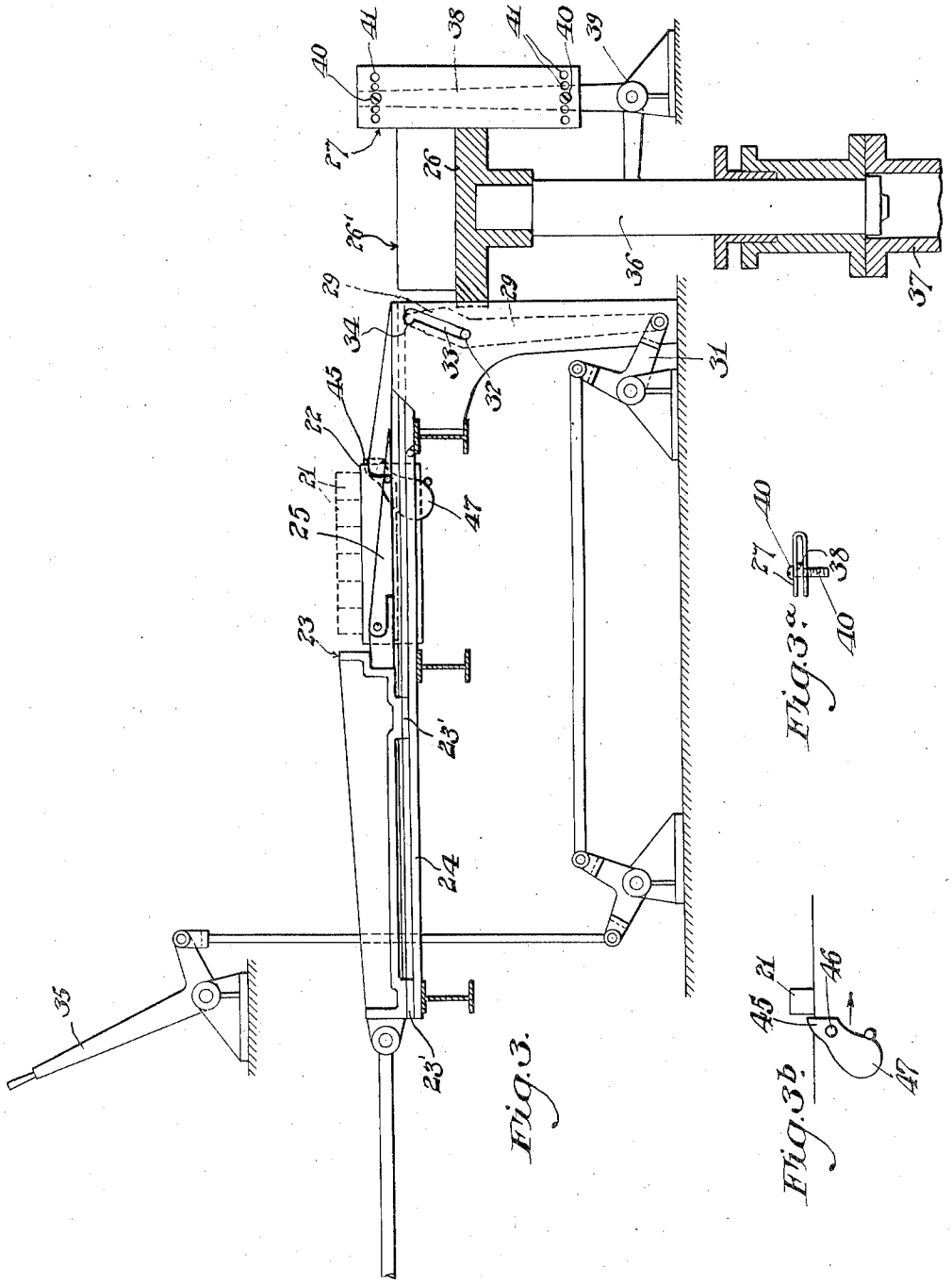


Fig. 3.

Fig. 3a.

Fig. 3b.

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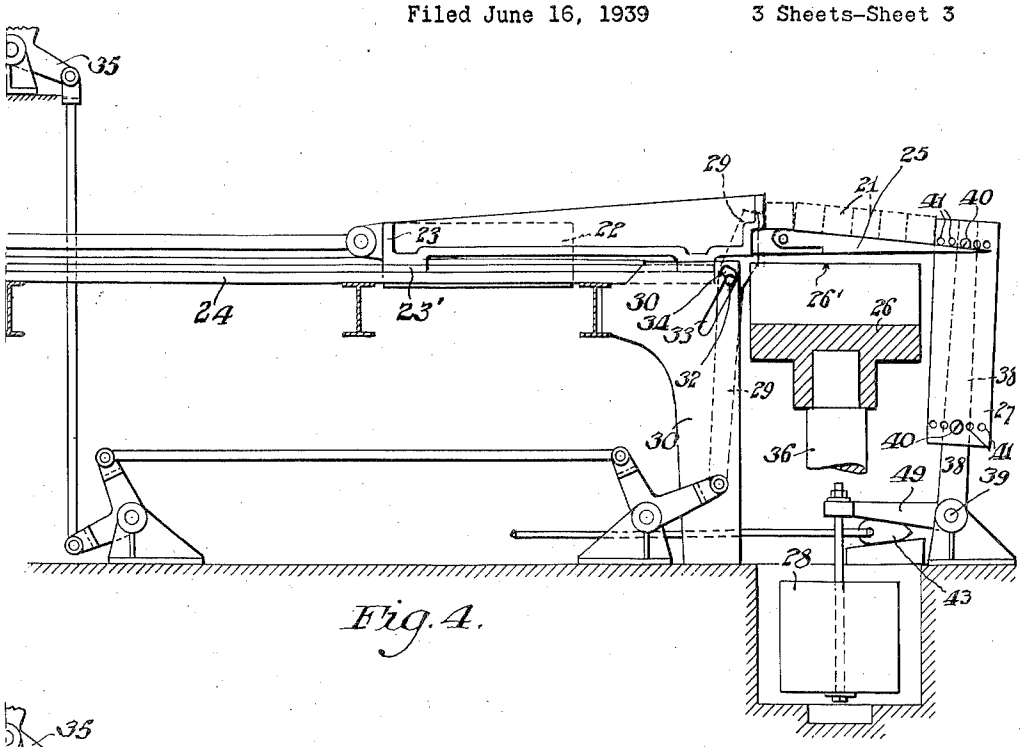


Fig. 4.

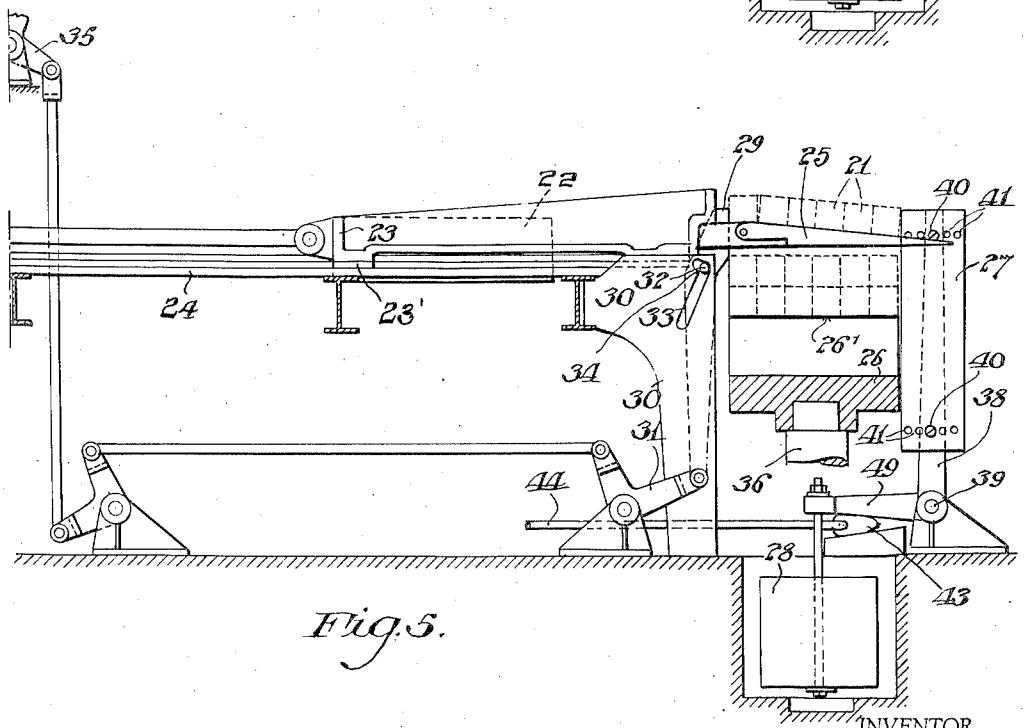


Fig. 5.

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UNITED STATES PATENT OFFICE

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ASSEMBLING AND PILING UNIT

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Application June 16, 1939, Serial No. 279,421

7 Claims. (Cl. 198—24)

The invention relates to method and means for piling units of rolled steel billets, plate slabs and the like.

The object is to provide improved method and means for assembling and piling said units in orderly manner so that the same may be readily handled for transportation and the like.

The invention comprises in combination—

An adjustable stop for alining the ends of the units, such as billets, as they are moved forward by the rollers.

A pusher for pushing each unit or a number of units sidewise to a loading table which is vertically movable, so that the same may be lowered after each layer of units is deposited thereon.

The tapered or wedge shaped tongue or tongues, is, or are pivotally attached to the pusher or pushers and adapted to guide the units onto the table and to be withdrawn with the pusher to lay the same onto the table. These tongues have knife-edged ends in order, as they are withdrawn from under each unit, to permit the depositing of each unit, one at a time, upon the table without jar, which might tend to mar the face of the unit or to distort the pile.

The counterweighted stops at the far side of the table for resiliently arresting the unit and then, responding to the action of the counterweight to bring the adjacent unit of the layer or pile into perfect vertical alinement.

The stops or trippers on the receiving side of the table adapted for holding the units in position as the tongues are being withdrawn from under the same.

These stops are arbitrarily operated to project into the path of travel of the units during the withdrawal of the tongues.

Supplemental or auxiliary latches may also be provided near the discharge ends of the rollers to restrain the billets when withdrawing the tongues from under them for preliminary positioning or assembly, before reaching the table.

The invention also comprises other improvements in details of construction.

Referring to the drawings which illustrate merely by way of example a preferred embodiment of the invention:

Fig. 1 is a plan view.

Fig. 1[a] and Fig. 1[b] are fragmentary elevation and plan views showing the bearings for the table rollers.

Fig. 2 is a fragmentary plan view showing the elements in different relative positions.

Fig. 3 is a side elevation of the device as shown in Fig. 1.

Fig. 3[a] is a fragmentary plan view of the top of one of the counterweighted stops.

Fig. 3[b] is a detail in elevation of a supplemental trip latch.

Figs. 4 and 5 are views similar to Fig. 3 with the parts in relatively different positions.

Similar numerals refer to similar parts throughout the several views.

The device herein described, and illustrated in the drawings by way of example, is especially adapted for handling hot and cold steel billets and slabs. It will be understood however, that the invention is equally adapted for handling a wide range of materials or objects.

In the present example the billets **21** are brought into position by the rollers **22** to be operated upon by the pushers **23**.

As shown in the drawings, the assembling table comprises the frame or I-beams **17** upon which are journaled the table rollers **22** in bearings **22'** mounted upon said I-beams. This frame also supports the horizontal transversely extending guide-ways or rails **24**, which support the reciprocating bar **23**, having associated with the front end thereof a pusher area or face, and having the side extensions or wings **23'**, which engage with said guide-ways **24**.

As shown in Fig. 1, the advancing ends of the billets are brought to rest in alinement by engagement with the adjustable stop **20**, suitably controlled as for example, by the hydraulic cylinder **20'**.

When one or more billets have come into position of rest against the stop **20**, the pushers or bars **23** having portions of their forward ends projecting above the plane of the tops of the rollers and moving on the guides **24**, are moved from left to right to push the billets off the rollers **22** onto the tongues **25** toward the table **26**. This operation may be caused by any prime mover, such as hydraulic, pneumatic, steam or electric.

To the front ends of the pushers **23** are pivotally secured the tapered or wedge-shaped tongues **25** which project beneath the billets and move forwardly with the pushers until the billets rest upon the tongues, which may be before or after their arrival above the table **26**. These tongues normally rest in approximately horizontal position, but are pivotally secured to the pushers so that they may move to the ver-

tical position above the pivot when the occasion so requires.

This horizontal position of the tongue 25 is normally maintained by the engagement, with the overlying front end of bar 23, of the extension of the tongue to the left of its pivot, see Fig. 3.

The table 26 includes a number of spaced apart plates in vertical planes, the top margins 26' of which form the supporting surfaces for receiving the billets. The said supporting surfaces are preferably arranged diagonally as shown in Fig. 1. This arrangement is provided to permit the fingers of the crane hook to project beneath the pile of billets, in balancing position, when the pile is to be lifted from the table.

At the outer side of the table 26 are provided a number of counterweighted stops 27, arranged to yield slightly upon pressure against them by the billets, but to react to bring the outer margin of each layer into alinement as herein described and shown in Fig. 5.

As indicated in Figs. 4 and 5, each layer of billets is brought into position over the table, while resting upon the tapered tongues 25 and are brought to rest by the engagement with the stops 27.

While a layer is in this position, the trippers or abutments 29 are actuated, in any suitable way, as for example by the hand lever 35 and connecting mechanism, to project into the path of travel of the billets, that is above the upper surfaces of the tongues 25, to engage the rear or left hand side of the layer of billets, as shown in Fig. 5, to hold the same in place during the withdrawal of the tongues 25 from beneath the billets.

This tripper element 29 operates in a housing 30, and is pivoted at its lower end to the bell lever 31 operated by the hand lever 35. Element 29 is provided near its upper end with a pin or stud 32 which projects into slots 33 formed in the adjacent walls of the housing. These slots are inclined to the perpendicular so that, when in the lower or inactive position, as shown in Fig. 3, the billet-engaging face of element 29 is spaced away from the vertical plane of the billet, and also inclined away from said plane, due to the slot and pin action.

This arrangement permits the preliminary upward movement of the tripper head without danger of engagement with the lower edge of the adjacent billet, and so that, upon the completion of its upward movement, said face will engage said billet squarely as shown in Fig. 5.

To prevent the tripper head 29 from being depressed prematurely, an offset recess 34 is provided at the upper end of the slot into which the pin is held as long as pressure from the billets, tending to depress the tripper, is being exerted.

It will be noted that the forward or right hand edges of the tongues are brought approximately to a knife-edge, so that as the tongues are withdrawn from under each billet, the billet is laid evenly and squarely upon the table elements 26', or upon the preceding layer, without shock or jar, thus assuring the association of the several billets in an orderly assembly, without injury or distortion.

It will be understood that after each layer of billets is laid upon the table as described, the table is lowered, in any suitable way, a distance equal to the thickness of said layer, so that succeeding layers may be evenly placed upon a preceding layer.

As an example of the means for raising and lowering the table 26, a hydraulic plunger 36 and cylinder 37 are shown in Fig. 3.

The specific construction of stops 27 is as follows:

The formation 27 is U-shaped, in horizontal cross-section, as shown in Fig. 3a, and is adapted to fit over or embrace the lever arm 38 on shaft 39, having the counterbalance 28.

The body 27 may be adjustably positioned on arm 38 by means of the screws or bolts 40 selectively positioned in the holes 41. The downward movement of lever arm 49, which supports the weight 28, may be controlled in any suitable way, as for example by the adjustable wedge 43, and operating rod 44.

The purpose of these two adjustments is to provide for different widths of the pile while maintaining the edges of the stop 27 which engage the pile, in substantially vertical lines.

It is sometimes desirable to provide additional or supplemental latches near the discharge ends of the rollers 22 in order to restrain the billets 21 while withdrawing the tongues 25 from beneath the same, prior to discharging the same upon the table 26. For this purpose I have provided the latches 45, (see Fig. 1 and Fig. 3b) pivoted at 46 to the frame of the machine, and having the counterbalances 47. This latch 45 will act automatically to engage and restrain a billet 21 when it is desired to withdraw the tongues 25 from under the billets, before they have reached the table 26.

In the present example, a space is shown between the discharge end of the rollers 22 and the table 26. This arrangement is sometimes desirable and permits a preliminary assembly of billets before pushing the complete layer onto the table. It will be understood however that this space may be eliminated, and the discharge of billets may be directly from the rollers to the table or to the tongues while extending over the table.

By the term "units" and "units of material," in the specification and claims, I mean to include billets, blooms, slabs, plates, sheets, strip, rods, rails, beams, channels and angles of steel or alloy steel, also nonferrous metals, I also mean to include boxes or crates, lumber or timber, or any other material that it may be desired to pile, and which are to be assembled in orderly piles for transportation.

I would like to emphasize that this device is particularly adaptable for piling or stacking steel plates without scratching same, which the present plate piling devices are not capable of doing.

The device lends itself for using shims between the layers of billets or slabs, and which may be used advantageously in connection with discharging means from the original pile into reheating furnaces.

The term "loading table" will obviously include any suitable unit-receiving surface, or place of discharge, which is removed from the roller table.

What I claim is:

1. In a device of the character described, the combination of a roller table comprising a stationary frame and spaced-apart unit-supporting rollers journaled therein, horizontally extending guide-ways secured to the frame, transversely thereof and in a plane below the tops of the rollers, a reciprocating bar supported by the guide-ways, and having a pusher area at its forward

end and projecting above the plane of the roller tops, a tongue secured to and projecting from the forward end of the reciprocating bar, having a receiving surface below the tops of the rollers for receiving the units from the roller table upon reciprocation of said bar, and for carrying the same to a place of discharge, and abutment means connected to the stationary frame and engageable with said units to permit withdrawal of said tongue from therebeneath.

2. In a device of the character described, the combination of a roller table comprising a stationary frame and spaced-apart unit-supporting rollers journaled therein, horizontally extending guide-ways secured to the frame transversely thereof and in a plane below the tops of the rollers, a reciprocating bar having flanking supporting wings for cooperation with the guide-ways, and having a pusher area associated with its forward end and projecting above the plane of the roller tops, a tongue secured to and projecting from the forward end of the reciprocating bar, having a receiving surface below the tops of the rollers for receiving the units from the roller table, upon reciprocation of said bar, and for carrying the same to a place of discharge and abutment means connected to the stationary frame engageable with said units to permit withdrawal of said tongue from therebeneath.

3. In a device of the character described, the combination of a roller table comprising a stationary frame and spaced-apart unit-supporting rollers journaled therein, an adjustable power operated stop for alining the units upon the roller table, horizontally extending guide-ways secured to the frame, transversely thereof and in a plane below the tops of the rollers, a reciprocating bar supported by the guide-ways, and having a pusher area associated with its forward end and projecting above the plane of the roller tops, a tongue secured to and projecting from the forward end of the reciprocating bar, having a receiving surface below the tops of the rollers for receiving the units from the roller table upon reciprocation of said bar, and for carrying the same to a place of discharge, and abutment means connected to the stationary frame and engageable with said units to permit withdrawal of said tongue from therebeneath.

4. In a device of the character described, the combination of a roller table comprising a stationary frame and spaced-apart unit-supporting rollers journaled therein, horizontally extending guide-ways secured to the frame, transversely thereof and in a plane below the tops of the rollers, a reciprocating bar supported by the guide-ways, and having a pusher area associated with its forward end and projecting above the plane of the roller tops, a tongue secured to and projecting from the forward end of the reciprocating bar, having a receiving surface below the tops of the rollers for receiving the units from the roller table upon reciprocation of said bar, and for carrying the same to a place of discharge, a counterbalanced stop for engaging the discharging units, and an adjustable element for arbitrarily limiting the downward movement of the counterbalance.

5. In a device of the character described, the combination of a roller table comprising a stationary frame and spaced-apart unit-supporting rollers journaled therein, horizontally extending guide-ways secured to the frame, transversely thereof and in a plane below the tops of the rollers, a reciprocating bar supported by the guide-ways, and means forming a pusher area associated with its forward end and projecting above the plane of the roller tops, a tongue secured to and projecting from the forward end of the reciprocating bar, having a receiving surface below the tops of the rollers for receiving the units from the roller table upon reciprocation of said bar, and for carrying the same to a place of discharge, and arbitrarily operated abutment means, engageable with said units, to permit withdrawal of the tongue from therebeneath.

6. In a device of the character described, the combination of a roller table comprising a stationary frame and spaced-apart unit-supporting rollers journaled therein, horizontally extending guide-ways secured to the frame, transversely thereof and in a plane below the tops of the rollers, a reciprocating bar supported by the guide-ways, and means forming a pusher area associated with the forward end of the bar and projecting above the plane of the roller tops, a tongue secured to and projecting from the forward end of the reciprocating bar, having a receiving surface below the tops of the rollers for receiving the units from the roller table upon reciprocation of said bar, and for carrying the same to a place of discharge, abutment means connected to the stationary frame and engageable with said units to permit withdrawal of said tongue from therebeneath, and automatically operating means for preventing accidental depression of the abutment means.

7. In a device of the character described, the combination of a roller table comprising a stationary frame and spaced-apart unit-supporting rollers journaled therein, horizontally extending guide-ways secured to the frame, transversely thereof and in a plane below the tops of the rollers, a reciprocating bar supported by the guide-ways, and means forming a pusher area associated with the forward end of the bar and projecting above the plane of the roller tops, a tongue secured to and projecting from the forward end of said bar, having a receiving surface below the tops of the rollers for receiving the units from the roller table upon reciprocation of said bar, and for carrying the same to a place of discharge, abutment means engageable with said units to permit withdrawal of said tongue from therebeneath, and automatically operating means for preventing accidental depression of the abutment, comprising cooperating pin and slot formations, said slot having an offset portion into which the pin may be forced upon abnormal pressure upon the abutment.

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