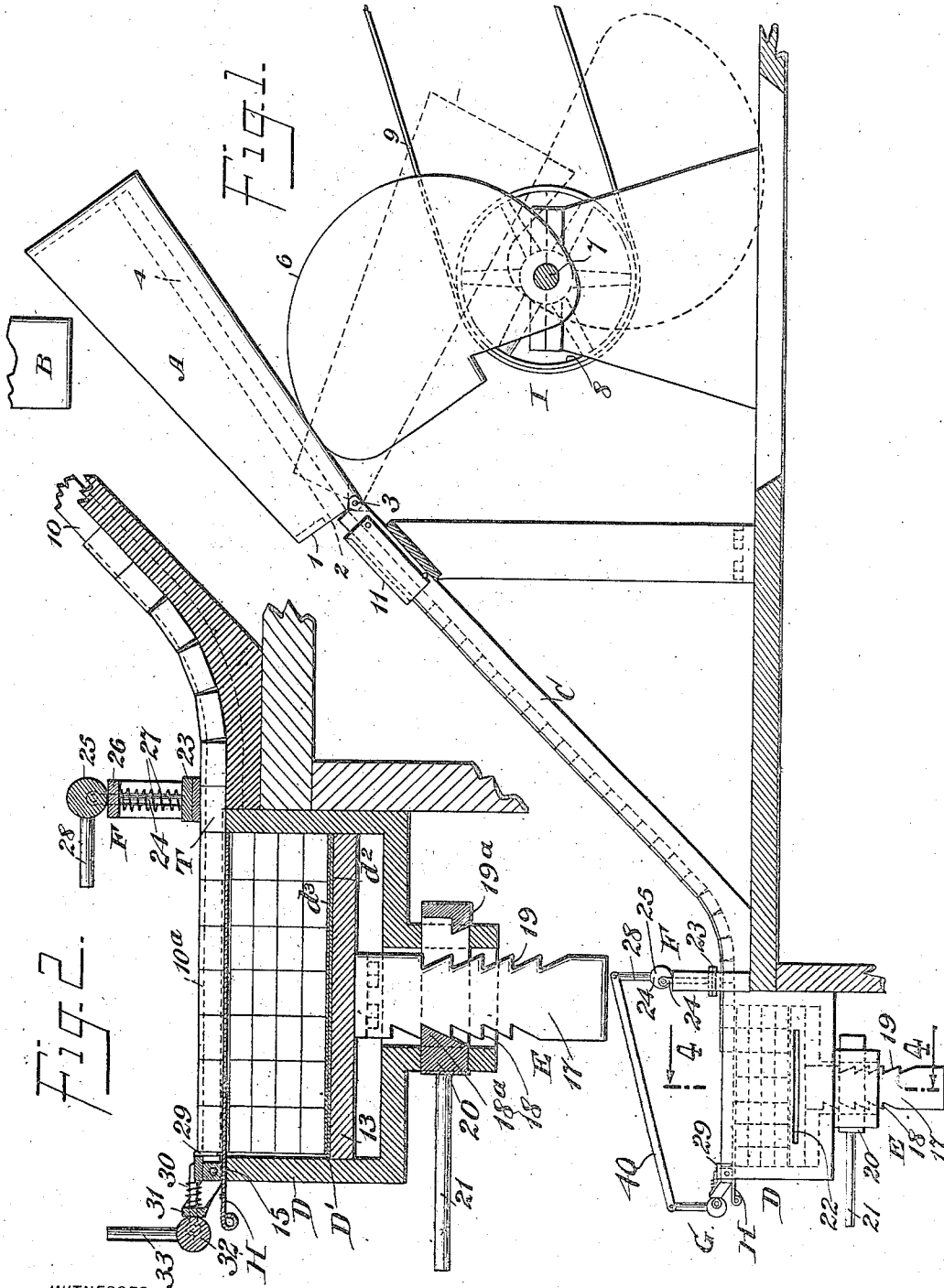


J. H. LIENAU & W. STEENKEN.  
 SUGAR TABLET OR CUBE BOXING MACHINE.  
 APPLICATION FILED APR. 16, 1914.

1,208,802.

Patented Dec. 19, 1916

2 SHEETS—SHEET 1.



WITNESSES  
*George L. Blume*  
*W. Bradway*

INVENTORS  
*Jacob H. Lienau*  
*William Steenken*  
 BY *Wm. Co.*  
 ATTORNEYS

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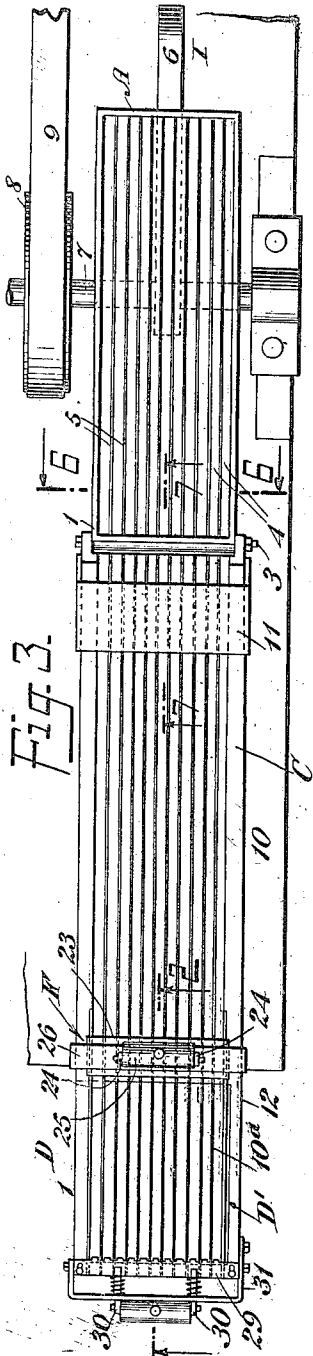


Fig. 3.

Fig. E.

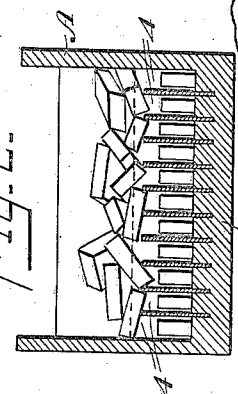


Fig. 7.

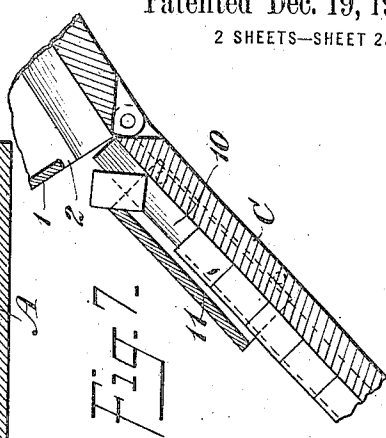


Fig. 5.

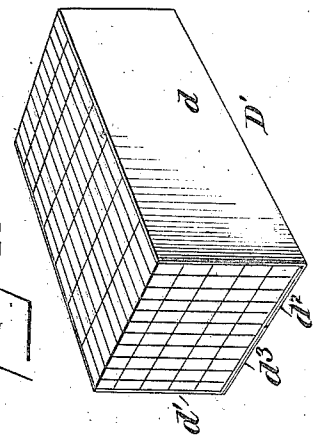
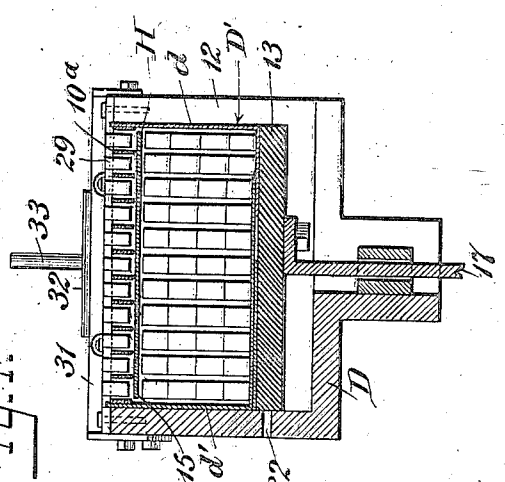


Fig. 4.



WITNESSES

George L. Blume.  
 B. Bradley.

INVENTORS  
 Jacob H. Lienau  
 William Steenken  
 BY  
 M. M. Co.  
 ATTORNEYS

# UNITED STATES PATENT OFFICE.

JACOB H. LIENAU AND WILLIAM STEENKEN, OF NEW YORK, N. Y.; SAID LIENAU ASSIGNOR OF HIS ONE-HALF TO THE NATIONAL SUGAR REFINING CO. OF NEW JERSEY, A CORPORATION OF NEW JERSEY.

## SUGAR TABLET OR CUBE BOXING MACHINE.

1,208,802.

Specification of Letters Patent.

Patented Dec. 19, 1916.

Application filed April 16, 1914. Serial No. 832,271.

*To all whom it may concern:*

Be it known that we, JACOB H. LIENAU, and WILLIAM STEENKEN, citizens of the United States, and residents, respectively, of the city of New York, borough of Manhattan, in the county and State of New York, and the city of New York, borough of Queens, in the county of Queens and State of New York, have invented a new and Improved Sugar Tablet or Cube Boxing Machine, of which the following is a full, clear, and exact description.

This invention relates to boxing machines of that type especially designed to facilitate the boxing of tablet sugar or other articles that are arranged evenly in rows and layers and finally boxed in this order.

The general objects of the present invention are to improve and simplify the construction and operation of boxing or packing machines of the character referred to, so as to be reliable and efficient in use, comparatively simple and inexpensive to construct and operate, and so designed as to be quick and positive in action.

Another object of the invention is the provision of a boxing or packing machine having a novelly constructed and arranged hopper that receives promiscuously the tablets to be packed. By means of longitudinal grooves in the bottom of the hopper; and by swinging the hopper in a vertical plane about the discharge end as an axis and through a considerable angle extending above and below the horizontal, the tablets are violently agitated and aline themselves automatically in the grooves so as to feed therefrom in a plurality of rows, the grooves being deeper than the height of the tablets so that when the grooves or gutters are filled, the promiscuously disposed tablets in the hopper will not interfere with the rows feeding out as the hopper is elevated.

An additional object is the combination with a feed hopper of the kind described, of a chute having grooves or gutters alining with those of the hopper and discharging into a stacking or pile-forming box in which the tablets are delivered in superimposed layers forming a pile, which pile is removed without disturbance and placed in a packing box.

Still a further object of the invention is

the employment of a holder within the stacking box for facilitating the removal of the pile of laid tablets, which holder is mounted on a follower or false bottom that is lowered step by step as the layers of tablets are delivered to the stacking box, and when the holder is filled, the same is removed laterally from the box with all the tablets maintained in their prearranged order.

As a further object the invention provides a removable plate at the top of the stacking box, so that the rows of tablets fed from the chute will pass thereover and form themselves into a layer which drops into the holder or onto the previous layer when the said plate is removed, such plate being employed to provide a smooth surface on which the tablets can travel in discharging from the chute without danger of being blocked, as would be the case if they traveled on the sub-layer of tablets in the holder.

A further object is the provision of a gate at the bottom of the chute which is closed to hold tablets in the latter after a layer has been discharged to the stacking box, whereby the arresting of the tablets in the chute will enable the follower with the layers of tablets thereon to be lowered one step to make way for the next layer to be supplied.

A further object is to provide means operable simultaneously with the gate or slightly thereafter to release the layer of tablets in the box from between the tablets arrested in the chute by the gate and the opposite side of the box, this releasing occurring just before the follower is lowered.

With such objects in view, and others which will appear as the description proceeds, the invention comprises various novel features of construction and arrangement of parts which will be set forth with particularity in the following description and claims appended hereto.

In the accompanying drawings, which illustrate one embodiment of the invention, and wherein similar characters of reference indicate corresponding parts in all the views, Figure 1 is a side view of the machine; Figure 2 is an enlarged sectional view of the stacking or pile-forming box, the section being taken on the line 2-2, Fig. 3; Figure 3 is a plan view of the machine without any tablets being shown therein; Figure 4 is a tran-

verse section of the stacking box taken on the line 4—4, Fig. 1; Fig. 5 is a perspective view of a holder with a pile of tablets filling the same; Fig. 6 is a transverse section of the hopper taken on the line 6—6 of Fig. 3, with tablets shown therein; and Fig. 7 is an upper sectional view on the line 7—7, Fig. 3, showing the upper part of the chute.

Referring to the drawing, A designates a swinging hopper; B a tablet supply spout disposed over the hopper to deliver tablets thereto; C an inclined chute down which individual streams or rows of orderly-arranged tablets are delivered; D a pile-forming or stacking box into which the tablets are fed from the chute; E a follower-actuating mechanism for permitting the forming of layers of tablets in the pile-forming box; F a gate or arresting device for maintaining the surplus tablets in the chute after a layer has been delivered to the pile-forming box; G a tension releasing device for unclamping the layer of tablets preparatory to their being lowered in the pile-forming box to make way for the next layer; H the removable layer-holding plate in the pile-forming box, and I the operating mechanism for the hopper.

The hopper A is a box open at its top so that the tablets can be delivered thereto by the spout B, or in any other manner, and at the discharge end 1 of the hopper is an opening 2, best shown in Fig. 7, out of which the tablets after having been arranged in rows flow out as individual streams. The discharge end of the hopper is hingedly connected at 3 to the upper end of the chute C, or is in any other manner operatively related to the chute so as to swing up and down in a vertical plane and thus cause the tablets to flow back and forth from end to end of the hopper, and in so doing aline themselves in longitudinal gutters, runs or grooves 4 extending the full length of the hopper. This swinging motion of the hopper is produced by the mechanism I, which includes a cam 6 carried by a shaft 7 driven in any suitable manner, as, for instance, by a pulley 8 and belt 9, the cam being so shaped and having its axis of rotation so positioned that the hopper will swing through a suitable angle above and below the horizontal, as indicated by the full and dotted lines, Fig. 1. When the hopper moves to the dotted-line position, the tablets flow from the open to the closed end of the hopper with considerable agitation due to the shape of the cam, which permits the hopper to lower with almost a dropping suddenness. By this agitation the tablets aline themselves in the gutters or runs 4 so as to readily flow out of the hopper when the same is gradually raised from the dotted to the full-line position. The gutters 4 are formed by providing longitudinal partition

strips 5 which are rigidly mounted on the bottom of the hopper and are somewhat higher than the tablets, as clearly shown in Fig. 6, so that those promiscuously disposed tablets in the hopper will not interfere with the outflow of the tablets in the runs or gutters.

The chute C is suitably supported at an angle of forty-five degrees more or less, and at its lower or discharge end it gradually changes its inclination and lies in a horizontal plane. This chute is divided into runs, gutters or grooves by strips 10 which aline with the strips 5 of the hopper, and consequently the tablets will flow down the chute in the order in which they are received from the hopper. A guard 11 extends across the chute at the upper end, so that tablets are prevented from jumping out, due to the sudden motion the tablets take in passing out of the hopper and entering the chute. The particular form of chute is covered in a divisional application filed by us Aug. 9, 1916, Ser. No. 44,592.

At the lower or discharge end of the chute C is positioned a stacking or pile-forming box D which is adapted to contain a holder D' that is designed to receive the pile or stack of tablets, as shown in Fig. 5. This holder consists of two sections  $d$  and  $d'$  which fit together and form a metallic box open at both ends and the top. This holder is placed in the pile-forming box D through the open side 12, and is positioned on a follower or false bottom 13, as clearly shown in Fig. 4. The bottom members  $d^2$  and  $d^3$  of the sections  $d$  and  $d'$  overlap so as to insure the proper relation of the sections in placing or removing the holder. The lower ends of the strips 10 are formed into extensions  $10^a$  which are positioned in the top of the pile-forming box so as to guide the streams of tablets into the latter; and to facilitate the movement of the streams of tablets into the box a horizontal plate H is slid into the latter at a point immediately under the extensions  $10^a$  of the gutter-positioning strips 10, such plate H being inserted through an opening 15, Fig. 2, in the front of the pile-forming box.

The plate H will rest on the bottom of the holder D' at the beginning of the operation, and after a layer has been delivered the plate H is removed and is not re-inserted until after the said layer is lowered far enough to permit the next layer to be delivered; but before the next layer is delivered the plate H is replaced in the pile-forming box and rests on the first layer in the holder D'. This holder D' is moved downwardly step by step by a follower mechanism which includes the horizontal plate or follower 13 vertically movable in the pile-forming box D, and on the under side of the follower is a bar 17 having sets

of ratchet teeth 18 and 19 with which cooperate pawls 18<sup>a</sup> and 19<sup>a</sup>, respectively, which pawls are mounted on a horizontally movable slide 20 suitably supported and having a handle 21 whereby the operator can move the slide either back or forth each time the follower 16 is adapted to be lowered one step, it being understood that each step is equal to the height of a tablet. After the holder D' is filled and the follower 13 is in its lowermost position, the operator uses the plate H, or any other suitable device, as a means for ejecting the filled holder D', said plate H being inserted through an opening 22 in the box D, Figs. 1 and 2, and in so doing the section d' of the holder D' is moved to the right, Fig. 4, to thereby compress the tablets laterally together. The right section d remains stationary during this lateral compacting of the tablets, and thereafter continued pushing of the plate H in the opening 22 will remove the holder D' far enough to enable the operator to remove the filled holder from the open side of the box D.

During each step of the follower downwardly so as to remove a deposited layer of tablets out of the path of the next layer it is necessary to arrest the tablets in the chute so as to prevent them from sliding down by their own weight, and for this purpose the gate or stopping device F is employed. This comprises a horizontal bar 23 which extends across the lower end of the chute and is adapted to be lowered into engagement with the tablets. This plate is connected by rods 24 with a cam 25 which rides on a fixed bar 26 disposed over the gate bar 23, and on the rods 24 are springs 27, which, when the cam 25 is in the position shown in Fig. 2, will hold the gate bar 23 in engagement with the lowermost sugar tablets T in the discharge end of the chute. By turning the handle 28 of the cam half way around from the position shown in Fig. 2, the gate 23 is raised out of engagement with the tablets, and consequently the streams of tablets will move into the pile-forming box. The foremost tablets of the various streams strike a movable abutment 29, Fig. 2, which abutment is carried by rods 30 movable in a fixed guide 31, and these rods are connected with a cam 32 which has a handle 33. When the plate H, Fig. 2, is removed from the pile-forming box, the operator turns the handle 33 in an anti-clockwise direction to thereby remove the abutment 29 from the tablets, so that the tablets in the layer are loosened from each other sufficient to drop on the sub-layer and move down with the pile as the follower is lowered. Without the abutment 29 the tablets on the plate H would be clamped between the front wall of the box D and the tablets held arrested by the gate 23, since it will be understood that the tablets fed into

the pile-forming box are subjected to the pressure of the tablets in the chute. This pressure or tension is released by moving the abutment 29 to the left, Fig. 2, before the follower is lowered a step. The various operations performed by the operator are simple and quickly carried out, so that the packing or boxing of the tablets requires no special skill. The handles 28 and 33 may be connected by a link 40, Fig. 1, for simultaneous operation.

From the foregoing description taken in connection with the accompanying drawings, the advantages of the construction and method of operation will be readily understood by those skilled in the art to which the invention appertains, and while we have described the apparatus which we now consider to be the best embodiment thereof, we desire to have it understood that the apparatus shown is merely illustrative and that such changes may be made when desired as are within the scope of the appended claims.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. A machine of the character described, comprising a stationary chute, for guiding in regular order articles to be packed, a pile-forming mechanism at the lower end of said chute, the said articles adapted to flow into the said pile-forming mechanism by the descending weight of all the articles in the chute, to form a layer of a predetermined number in said pile-forming mechanism, the said articles in the chute and said layer of articles in the pile-forming mechanism adapted to remain in continuous adjacent relation before removal of said layer, means at the lower end of said chute adapted to engage the lowermost articles in said chute to arrest the remaining articles therein during said continuously adjacent relation, and during removal of said layer in the pile-forming mechanism from the path of the next layer.

2. A machine of the character described, comprising a stationary chute adapted to guide articles to be packed in a plurality of separate streams, the said articles being arranged evenly in transverse rows, a pile-forming mechanism at the lower end of said chute, the said articles adapted to flow into the said pile-forming mechanism by the descending weight of all the articles in the chute, to form a layer of a predetermined number in said pile-forming mechanism, the said articles in the chute and the said layer of articles in the pile-forming mechanism adapted to remain in continuous adjacent relation before removal of said layer, means at the lower end of said chute adapted to engage the lowermost articles in said chute during said continuously adjacent relation and during removal of said layer in the pile-

forming mechanism out of the path of the next layer.

3. A machine of the character described, comprising a pile-forming box, a chute arranged to supply articles to be packed in layers to the said box from one side thereof, an abutment at the side of the box opposite from the point of entrance of the articles, adapted to engage the foremost row of articles in the box to limit the movement of the said articles and to maintain the same in relatively tight engagement with each other, and means for moving the said abutment out of engagement with said foremost row of articles to loosen the engagement of the said articles with each other to permit removal of the same out of the path of the next succeeding layer of articles.

4. A machine of the character described, comprising a pile-forming box, a chute arranged to supply articles to be packed to the said box from one side thereof, means for arresting articles in the chute after a predetermined number have been supplied to the said box from one side thereof, an abutment at the side of the box opposite from the point of entrance of the said articles, adapted to engage the foremost row of articles in the box to limit the movement of the said articles and to maintain the same in relatively tight engagement with each other, and means for moving the said abutment out of engagement with said foremost row of articles in the box to loosen the engagement of the said articles with each other after the arresting of the articles in the said chute, to permit removal of the same out of the path of the next succeeding predetermined number of tablets.

5. A machine for boxing tablets and the like, comprising a pile-forming box, a chute arranged to supply tablets to the box from one side thereof, a gate for arresting tablets in the chute after a predetermined number have been supplied to the box, a movable abutment at the side of the box opposite from the point of entrance of the tablets, adapted to engage the foremost row of tablets in the box to limit the movement of the tablets, and to maintain the same in tight engagement with each other, means for moving the abutment out of engagement with the foremost row of tablets to loosen the engagement of said tablets with each other after the arresting of the tablets in the chute, and a follower in the box adapted to move downwardly for removing the tablets from the path of the next supply of tablets from the chute.

6. A machine for boxing tablets and the like, comprising a pile-forming box, a chute arranged to supply tablets to the box from one side thereof, a gate for arresting tablets in the chute after a predetermined number have been supplied to the box, a movable

abutment at the side of the box opposite from the point of entrance of the tablets, means for moving the abutment to release the tablets supplied to the box, a follower in the box adapted to move downwardly for removing the tablets from the path of the next supply of tablets from the chute, and a plate removably mounted in the box to form a supporting surface on which the tablets slide in entering the box from the chute.

7. A machine of the character described, comprising a pile-forming box, a chute adapted to discharge articles to be packed laterally into said box, bars disposed in the chute and extending across the top of the box to form channels through which the tablets flow to the box, and adapted to maintain the tablets in regular order in said box, said box adapted to be filled by the descending weight of all the articles in the chute and to determine the number of articles received therein, a device at the discharge end of the chute for arresting the foremost row of articles in the chute after a supply has been delivered to the box, and an element movable step by step in the box for receiving layers of tablets delivered thereto by the chute, the said element adapted to lower the said articles successively from between the said bars of the chute, and maintain the same in the order received between the said bars.

8. A machine for boxing tablets and the like, including a pile-forming box, a chute discharging laterally into the box, bars disposed in the chute and extending across the top of the box to form channels through which the tablets flow to the box, a device at the discharge end of the chute for arresting the tablets in the latter after a supply has been delivered to the box, an element moving step by step in the box for receiving successive layers of tablets delivered thereto by the chute, and a plate removably mounted in the box at a point under the said bars to form a supporting surface on which the tablets slide in passing from the chute to the box, and the said plate being removable to permit the tablets to be supported by the said element.

9. A machine of the character described, comprising a pile-forming box open at one side, a vertically movable follower therein, a holder resting on the follower engaging the bottom and ends of the pile forming in said box, one of said ends corresponding to the open side of said box, said holder adapted to be removed from said box through the open side thereof, means for supplying successive layers of articles to be packed to the holder, and means for lowering the follower and holder step by step for receiving the layers successively.

10. A device of the character described, comprising a stationary chute for guiding

in regular order articles to be packed, a pile forming mechanism at the lower end of said chute, adapted to receive successive layers of said articles from said chute, arresting means at the entrance end of said pile forming mechanism, abutment means adapted to engage the foremost row of articles in the said pile forming mechanism, the weight of the articles in the chute adapted to pack the articles in said pile forming mechanism, means adapted to be operated to actuate the said arresting means to engage the lowermost row of articles in the chute to arrest the flow of the remaining articles in the chute during the removal of a layer of said articles from the path of the next layer, and means cooperating with said means for actuating said arresting means for removing said abutment out of engagement with the foremost row of articles after the arresting means has been actuated, to loosen the contact of said layer of articles to permit removal thereof.

11. A machine of the character described, comprising a pile-forming box open at one side, a vertically movable follower therein, a holder resting on the follower engaging the bottom and ends of the pile forming in said box, one of said ends corresponding to the open side of said box, means for supplying successive layers of articles to be packed to the holder, means for lowering the fol-

lower and holder step by step for receiving the layers successively, and means in said box adapted to permit engagement of one end of said holder to force the same from said box through the open side thereof.

12. A machine of the character described, comprising a stationary pile-forming box, open at one side, a vertically movable follower therein, a holder resting on the said follower and removable from the box through the open side thereof, and comprising a pair of telescoping end and bottom engaging members adapted to engage the ends and bottom of the pile of articles formed in the said box, the said members adapted to retain the said articles in packed relation during insertion of the same in a permanent receptacle, and to be removed therefrom without disturbing the order of packing in the said receptacle, means for supplying successive layers of articles to the said holder, and means for lowering the follower and holder step by step for receiving the layers successively.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JACOB H. LIENAU.  
WILLIAM STEENKEN.

Witnesses:

VOORHIES S. BEST,  
JULIUS SCHWARZ.