Jan. 24, 1928.

1,657,182

L. T. SCHAEFER, SR

PACKING MACHINE

Filed Feb. 8, 1927

4 Sheets-Sheet 1

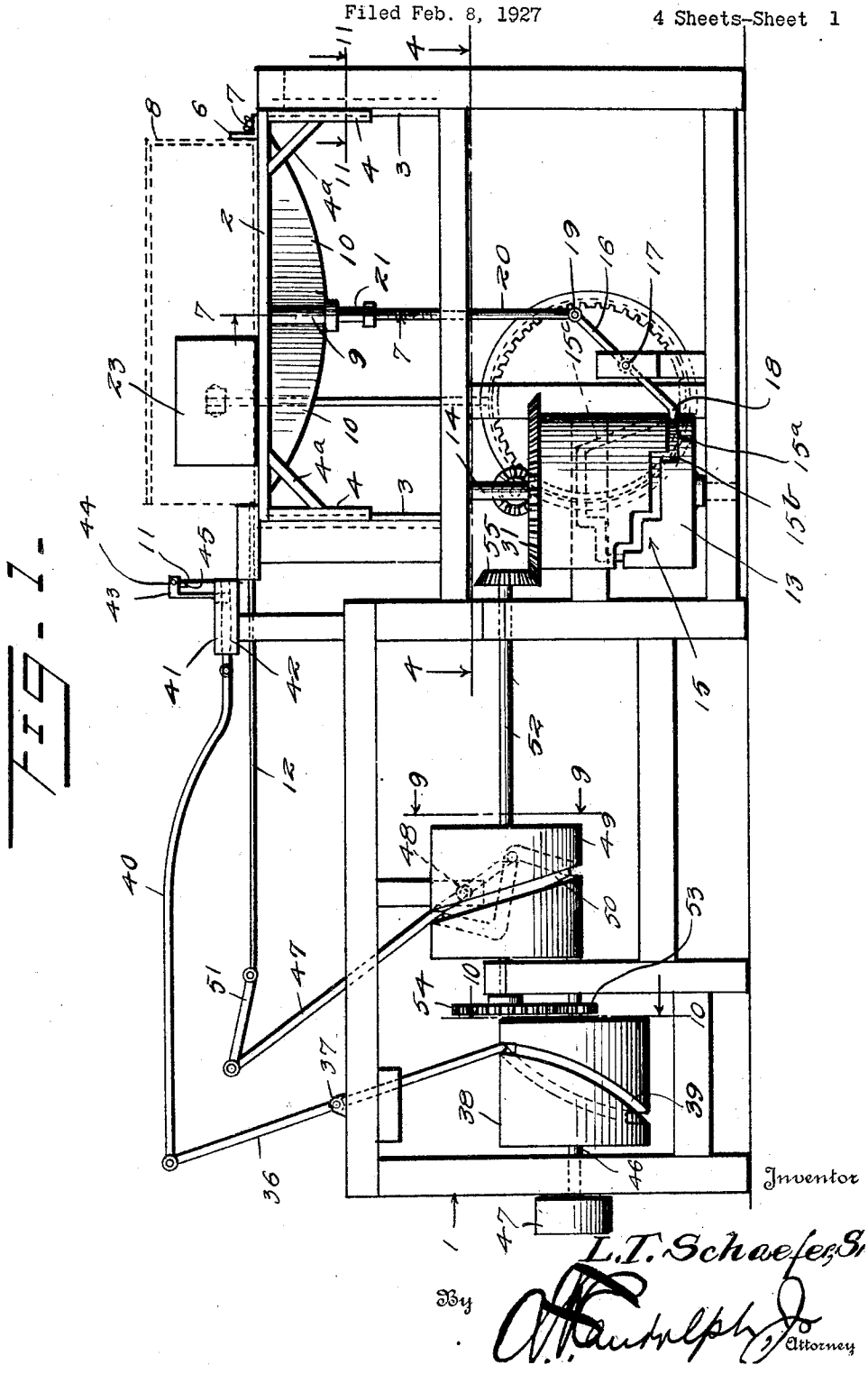


Fig. 1.

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4 Sheets-Sheet 2

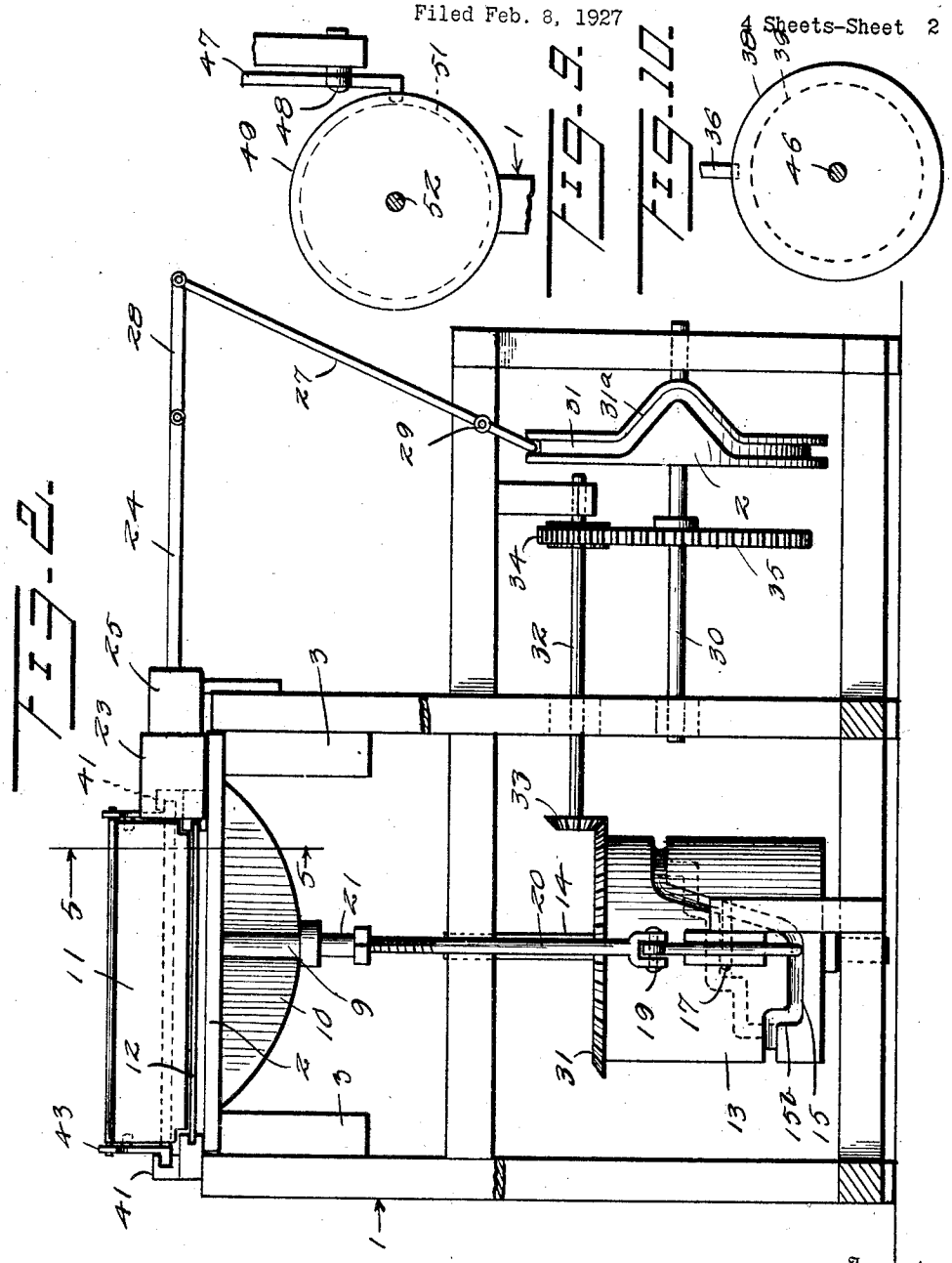


Fig. 2.

Fig. 9.

Fig. 10.

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Fig. 3.

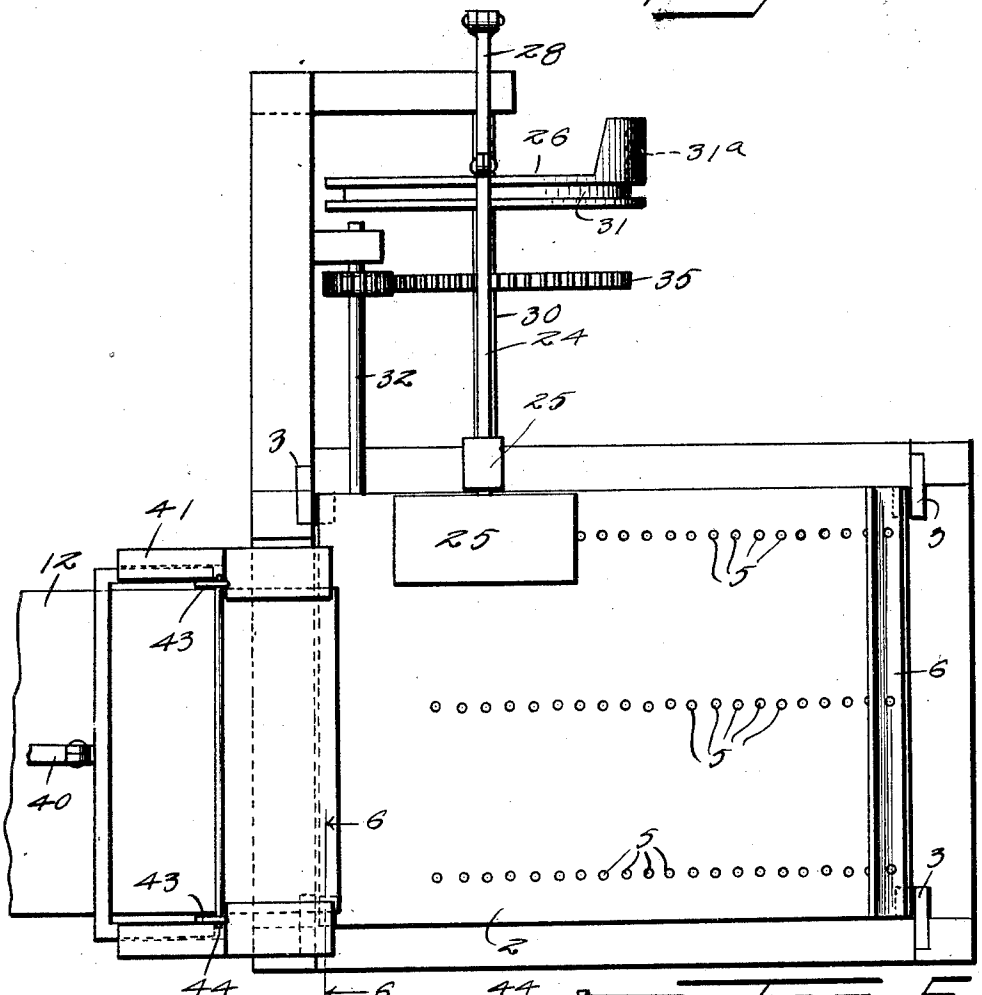


Fig. 5.

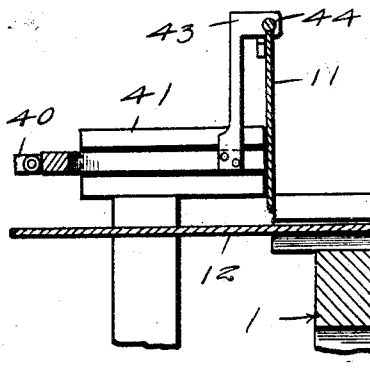
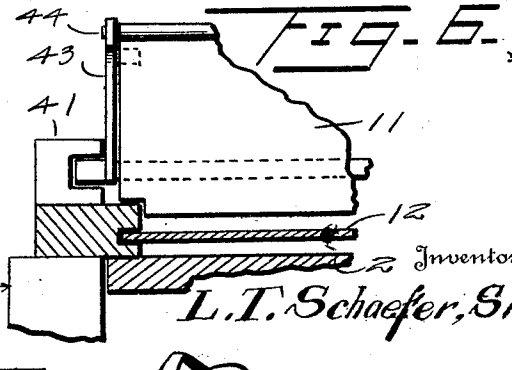


Fig. 6.



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PACKING MACHINE

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Fig. 4.

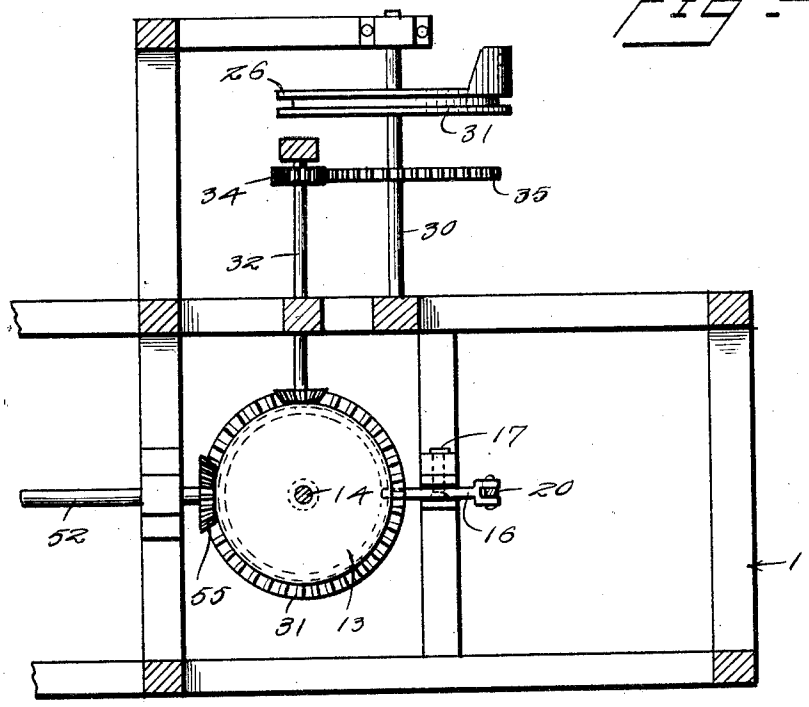


Fig. 7.

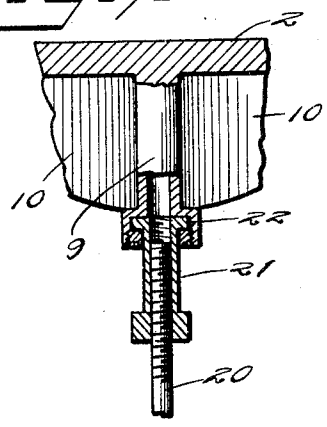


Fig. 8.

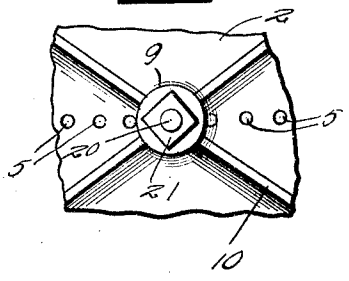
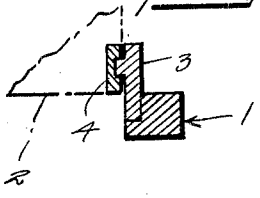


Fig. 11.



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Patented Jan. 24, 1928. 1,657,182

UNITED STATES PATENT OFFICE.

LOUIS T. SCHAEFER, SR., OF GLENDALE, OHIO.

PACKING MACHINE.

Application filed February 8, 1927. Serial No. 166,733.

This invention relates to and has for one of its objects to provide a novel, simple and highly efficient machine through the medium of which boxes may be rapidly packed with their full complement of such articles as soap, canned or other packaged goods.

With the foregoing and other objects in view, the nature of which will become apparent as the description proceeds, the invention consists of the construction, combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, wherein:

Figure 1 is a view in side elevation of the packing machine,

Figure 2 is a view in end elevation of the machine with parts of the frame in vertical section,

Figure 3 is a top plan view of the forward portion of the packing machine,

Figure 4 is a sectional view taken on the horizontal plane indicated by the line 4—4 of Figure 1,

Figure 5 is a sectional view taken on the vertical plane indicated by the line 5—5 of Figure 2,

Figure 6 is a sectional view taken on the vertical plane indicated by the line 6—6 of Figure 3,

Figure 7 is a sectional view taken on the vertical plane indicated by the line 7—7 of Figure 1,

Figure 8 is a bottom plan view of the parts shown in Figure 7,

Figure 9 is a sectional view taken on the vertical plane indicated by the line 9—9 of Figure 1,

Figure 10 is a sectional view taken on the vertical plane indicated by the line 10—10 of Figure 1, and

Figure 11 is a similar view taken on the horizontal plane indicated by the line 11—11 of Figure 1.

The packing machine comprises a frame 1 in the forward portion of which a box supporting table 2 is mounted for vertical movement by means of guides 3 secured to the frame 1 and slides 4 secured to the table. The slides 4 are secured at their upper ends to the under side of the table 2, and their connection with the table is reenforced by braces 4^a. The table 2 is of elongated rectangular contour, and is provided with longitudinally extending rows of openings 5. A stop 6 of angular formation in cross section, is positioned upon and extends transversely of the table 2. The stop 6 is secured to the table 2 by bolts 7 which extend therethrough and through certain of the openings 5, and it may be adjusted toward and from the inner end of the table as the rows of openings extend longitudinally of the table. The box 8 shown in dotted lines in Figure 1, is positioned upon the table 2 with its open side facing rearwardly and its opposite or forward closed side in contact with the stop 6. The box 8 is held by the stop 6 against forward displacement from the table 2 while the articles are being packed therein, and the adjustability of the stop adapts the table for supporting boxes of different sizes. The table 2 is provided at its under side with a centrally located and vertically disposed sleeve 9, and reenforcing ribs 10 are formed integrally with the table and sleeve.

The articles that are to be packed in the box 8 are fed to the machine in front of the pusher plate 11 and above an assembling plate 12. The pusher plate 11 is vertically arranged and the assembling plate 12 is horizontally arranged, and the former is positioned above and extends transversely of the latter and is arranged in parallel relation to the open rearward side of the box 8. The feeding means, not shown, may consist of an endless belt upon which the articles are arranged in close association one in rear of the other. The length of the pusher plate 11 and the width of the assembling plate 12 are similar and slightly less than the distance between the lateral sides of the box 8, and the length of the assembling plate 12 is greater than the distance between the open rearward side and the closed forward side of the box. The pusher plate 11 is reciprocated forwardly and backwardly with respect to the assembling plate 12, while the latter, which normally projects for a short distance forwardly beyond the former but does not enter the box 8, is being gradually advanced into the box. During each forward thrust thereof, the pusher plate 11 moves a number of the articles from the feeding means onto the assembling plate 12, and the length of each row of articles thus deposited on the assembling plate is slightly less than the distance between the lateral sides of the box 8. During its rearward thrust the pusher plate 11 passes freely over and will not displace any articles on the feeding means that may be in its path. The assembling plate 12 continues to advance into the box 8 until there

has been deposited thereon a layer of articles equal in horizontal dimensions to the internal horizontal dimension of the box 8. The assembling plate 12 is then rapidly withdrawn from the box 8 to deposit the layer of articles on the bottom wall thereof, and immediately after the withdrawal of the assembling plate, the table 2 is lowered for a distance equal to the vertical dimension of the layer of articles. The assembling plate 12 is again advanced into the box 8 while a layer of articles is being arranged thereon. After it completes its movement into the box 8, the assembling plate 12 is again quickly withdrawn from the box to deposit the layer of articles therein. The table 2 is again lowered immediately after the withdrawal of the assembling plate 12. These operations continue until the box 8 is full, with the exception that the table 2 is not moved downwardly after the last layer of articles has been deposited in the box 8, but is raised into its initial position and supported in such position while the packed box is being automatically moved off of the same and until a fresh box has been placed thereon and a layer of articles has been deposited in the fresh box, whereupon it is again lowered for a distance equal to the vertical dimension of the layer of articles:

The means for supporting the table 2 at rest during the formation and depositing of each layer of articles in the box 8, lowering it step by step after the depositing of all but the final layer of articles in the box, and then raising it into and supporting it in initial position until the packed box has been removed therefrom, a fresh box placed thereon and a layer of articles deposited in the fresh box, comprises a vertical cam drum 13 which is fixed to a vertical shaft 14 journaled in the frame 1. The groove 15 of the cam drum 13 consists of horizontal portions 15^a arranged one above the other, vertical portions 15^b, and an inclined portion 15^c. A lever 16 which is pivoted intermediate its ends as at 17 to the frame 1, is provided with an angular lower end 18 travelling in the groove 15. The lever 16 is pivotally connected at its upper end as at 19 to the lower end of a rod 20 which is connected at its upper end to the table 2. The connection between the table 2 and rod 20 is established by a nut 21 which is swivelly connected as shown at 22 to the sleeve 9 and threadedly engaged with the rod. During the rotation of the drum 13, the lower angular end 18 of the lever 16 travels slowly from the lowest to the highest horizontal portion 15^a of the groove 15, and thence rapidly from the highest to the lowest horizontal portion of the groove. The table 2 is held at rest while the lever 16 is travelling in the horizontal groove portions 15^a, moves downwardly while the lever is travelling from one horizontal groove to another, and will be returned to its initial position while the lever is travelling from the highest to the lowest horizontal groove portion. The number of horizontal portions 15^a of the groove 15 will depend solely on the number of layers of articles required to fill the box. As the rod 20 is adjustably connected to the table 2 by the nut 21, the machine may be adjusted for receiving boxes of which the walls are or different thicknesses.

After the table 2 is returned to its initial position, the packed box 8 is automatically discharged therefrom by the pusher block 23 which is mounted above the table 2 at a lateral side of the box. The pusher block 23 is carried by a rod 24 which is slidably mounted in a bearing 25 carried by the frame 1. The pusher block 23 is operated to discharge the packed box from the table 2 by a wheel 26 and a lever 27 associated with the wheel and connected to the rod 24 by a link 28. The lever 27 is pivoted between its ends as at 29 to the frame 1. The cam wheel 26 is fixed to a horizontal shaft 30 journaled in the frame 1, and is provided in its periphery with a groove 31 having a laterally offset V-shaped portion 31^a. The lower end of the lever 27 travels in the groove 31, and the lever remains at rest except when it is traveling in the offset portion 31^a of the groove. When traveling in said offset portion, the lever 27 is rocked first in one direction to effect the operation of the pusher block 23 in a direction to cause it to discharge the packed box from the table 2 and then moved in the opposite direction to effect the return of the pusher block 23 to its normal position. The cam wheel 26 is driven from the cam drum 13 at such a speed that the cam drum will move the table downwardly to its full extent and then return it to and hold it in its initial position before the cam wheel 26 actuates the pusher 23 to effect the discharge of the packed box. The means for establishing a driving connection between the cam drum 13 and cam wheel 26 comprises a gear wheel 31 fixed to the upper end of the cam drum, a shaft 32 journaled in the frame 1, a pinion 33 fixed to the shaft and meshing with the gear wheel 31, and a pinion 34 fixed to the shaft 32 and meshing with a gear wheel 35 fixed to the shaft 30.

The pusher plate 11 is reciprocated through the medium of a lever 36 pivoted intermediate its ends as at 37 to the frame 1, and a horizontally disposed cam drum 38 in the slot 39 of which the lower end of the lever travels. The upper end of the lever 26 is connected by a link 40 to a head 41 which is slidably mounted in the guides 42 fixed to the frame 1. The head 41 is provided with upwardly and forwardly extending bracket arms 43 to which the upper edge of the pusher plate 12 is pivoted as at 44. The pusher plate 11 is held against rearward

movement by stops 45 carried by the bracket arms 43 and against which it rests. The pusher plate 11 is free to swing forwardly during the rearward movement thereof so as to pass freely over and not displace the articles on the feeding mechanism. The cam drum 38 is fixed to a horizontal shaft 46 journaled in the frame 1 and provided with a pulley 47.

The assembling plate 12 is gradually moved forwardly into the box 8 while the pusher plate 11 is arranging a layer of articles thereon, and the plate is moved rearwardly with a quick thrust to effect the deposit of the layer of articles in the box, by means of a lever 47 pivoted intermediate its ends as at 49 to the frame 1, and a horizontally disposed cam drum 49 in the slot 50 of which the lower end of the lever travels. The upper end of the lever 47 is connected to the plate 12 by a link 51. The cam drum 49 is fixed to a horizontal shaft 52 which is journaled in the frame 1 above the cam drum 13 and shaft 46. The shaft 52 is driven from the shaft 46 by a pinion 53 fixed to the latter and meshing with a gear wheel 54 fixed to the former. The cam drum 13 is driven from the shaft 52 by a bevel pinion 55 fixed to the shaft and meshing with the bevel gear 31 of the cam drum.

The machine may be provided with a number of sets of cams having different grooves in order to enable it to be used for packing boxes of different sizes.

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

What is claimed is:—

1. A box packing machine comprising a vertically movable box supporting table, means for imparting a step by step movement to the table and for automatically returning it to initial position after the completion of said step by step movement, and means for forming layers of articles and depositing them in the box during the intervals between the movements of the table.

2. A box packing machine comprising a vertically movable box supporting table, means for imparting a step by step movement to the table and then returning it to its initial position, means for forming layers of articles and depositing them in the box during the intervals between the movements of the table, and means for discharging the box from the table on the return of the latter to its initial position.

3. A box packing machine comprising a vertically movable box supporting table, means for imparting a step by step movement to the table, an assembling plate, means for slowly moving the assembling plate into and rapidly withdrawing it from the box during the intervals between the movements of the table, a pusher plate, and means for reciprocating the pusher plate with respect to the assembling plate.

4. A box packing machine comprising a vertically movable box supporting table, means for imparting a step by step movement to the table, a horizontally disposed assembling plate, means for advancing the assembling plate into and withdrawing it from the box during the intervals between the movements of the table, a support slidably mounted above the assembling plate, a vertically arranged pusher plate pivoted at its upper edge to the support, means carried by the support and associated with the pusher plate to prevent the latter from moving in one direction with respect to the support, and means for reciprocating the support.

5. A box packing machine comprising a vertically movable box supporting table, means for imparting a step by step movement to the table, said means including a cam drum, a pivoted lever having one of its ends riding in the groove of the cam drum and a rod connected to the table and lever, and means for forming layers of articles and depositing them in the box during the intervals between the movements of the table.

6. A box packing machine comprising a vertically movable box supporting table, means for imparting a step by step movement to the table and then returning the table to its initial position, said means comprising a vertically arranged cam drum, a lever pivoted intermediate its ends and having one of its ends riding in the groove of the cam drum and a rod connected to the table and other end of the lever, means for forming layers of articles and depositing them in the box during the intervals between the movements of the table, and means for discharging the box from the table after the return of the latter to its initial position, said last named means including a cam wheel driven at a reduced speed from the cam drum, a lever pivoted intermediate its ends and riding in the groove of the cam wheel, a slidably mounted pusher block and means connecting the pusher block to the lever.

7. A box packing machine comprising a vertically movable box supporting table, means for imparting a step by step movement to the table and then returning it to its initial position, a horizontally disposed

assembling plate, a cam drum, a lever pivoted between its ends and having one end riding in the groove of the cam drum, a link connecting the other end of the lever to the assembling plate, a pusher plate mounted above the assembling plate, a slidably mounted support for the pusher plate, a second cam drum, a second lever pivoted between its ends and having one end riding in the groove of said second cam drum, a link connecting the other end of said second lever to the support, means through the medium of which said second cam drum may be rotated, means for driving said first cam drum at a reduced speed from said second cam drum, means for driving the table operating means at a reduced speed from said first cam drum, and means operated from the table operating means for discharging the box from the table on the return of the latter to its initial position.

8. A box packing machine comprising a vertically movable box supporting table, means for imparting a step by step movement to the table and then returning it to its initial position, an assembling plate, means for advancing the assembling plate into the box and thence withdrawing it during the intervals between the movements of the table, means driving the table operating means from the assembling plate operating means at a reduced speed, a pusher plate reciprocably mounted above the assembling plate, means for reciprocating the pusher plate, means for driving the assembling plate operating means from the pusher plate operating means at a reduced speed, means discharging the box from the table on the return of the latter to its initial position, and means driving the last named means from the table operating means at the same speed.

9. A box packing machine comprising a vertically movable box supporting table, means for imparting a step by step movement to the table and for automatically returning it to and holding it for a fixed period in initial position after the completion of said step by step movement, and means for forming layers of articles and depositing them in the box during the intervals between the movements of the table.

10. A box packing machine comprising a vertically movable box supporting table, means for imparting a step by step movement to the table, an assembling plate mounted for movement into and out of the box on the table, means for slowly moving the assembling plate into the box and then rapidly withdrawing it from the box during the intervals between the movements of the table, and means for depositing articles on the assembling plate.

11. A box packing machine comprising a vertically movable box supporting table, means for imparting a step by step movement to the table and including a cam drum, a pivoted lever having one of its ends riding in the groove of the cam drum and a rod positioned between the table and lever and having an adjustable connection with one of said parts, and means for forming layers of articles and depositing them in the box during the intervals between the movements of the table.

In testimony whereof I affix my signature.

LOUIS T. SCHAEFER, SR.