J. S. PHIFER.

NAIL PACKING MACHINE.

APPLICATION FILED NOV. 19, 1912.

1,096,641.

Patented May 12, 1914.

4 SHEETS—SHEET 1.

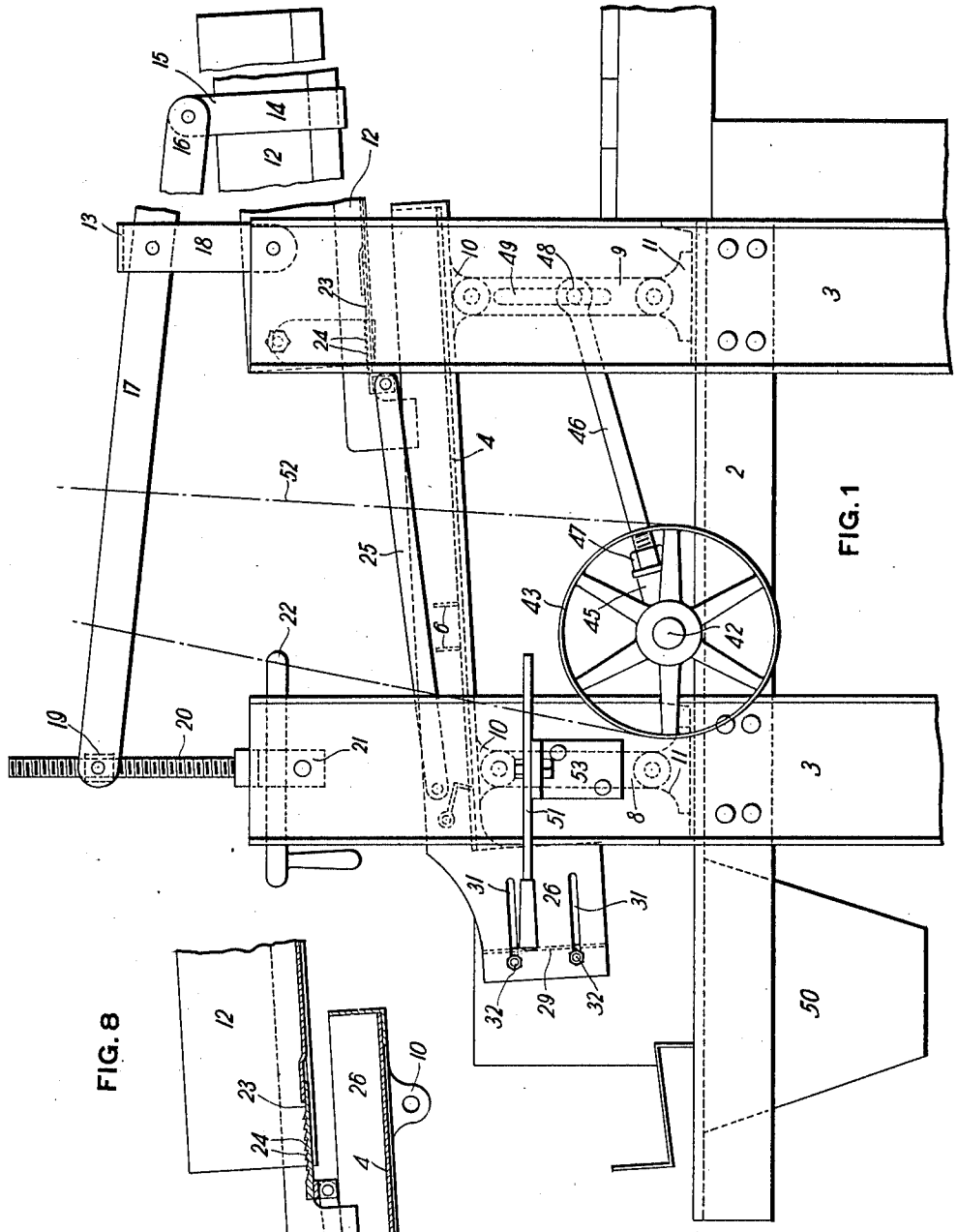


FIG. 1

FIG. 8

WITNESSES

A. D. Little

Chas. Foxterman

INVENTOR

James S. Phifer

by Linthicum Bell & Fuller

his Attorneys

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

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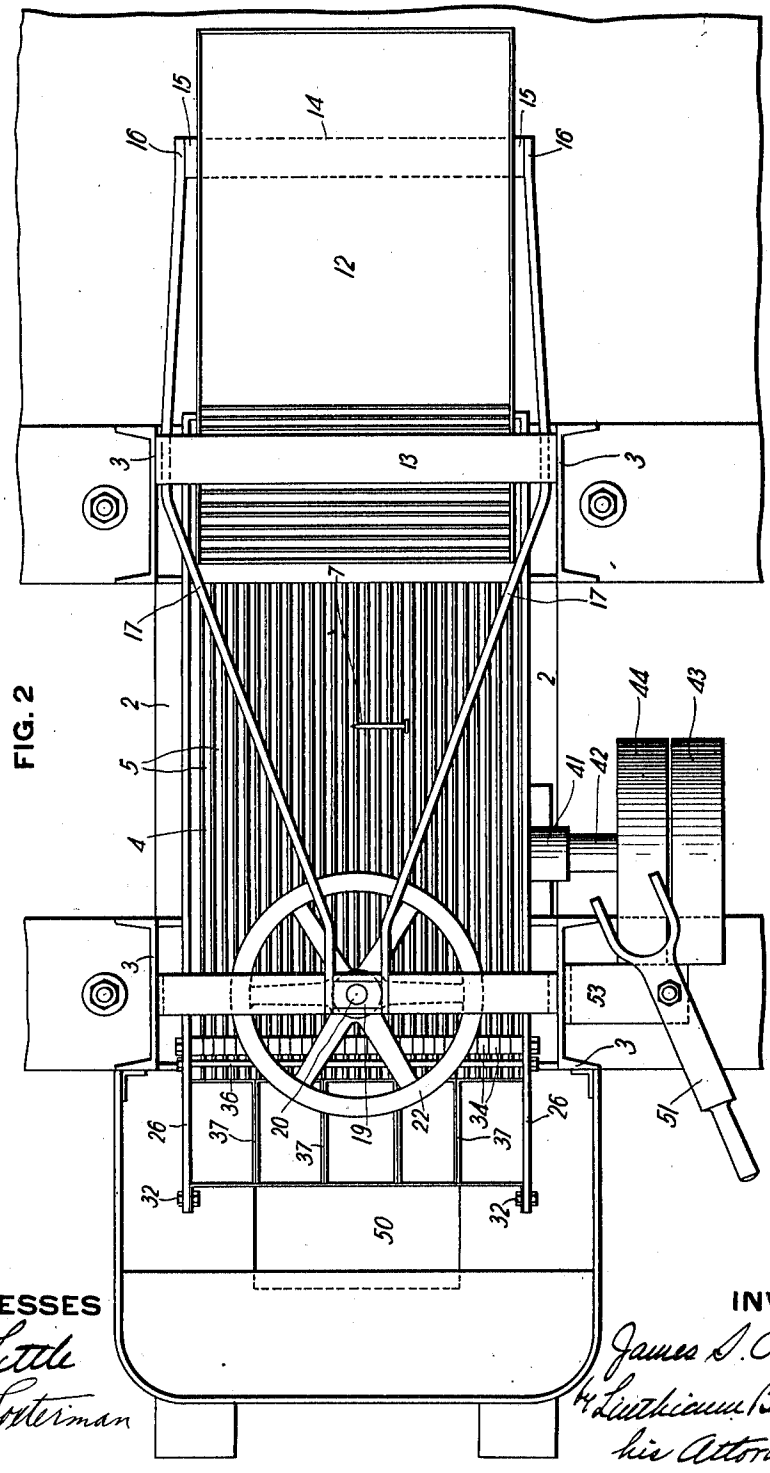


FIG. 2

WITNESSES

R. D. Little

Chas. Sotteriman

INVENTOR

James S. Phifer

by Lothrop, Bell & Fuller

his Attorneys

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

J. S. PHIFER.

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4 SHEETS—SHEET 3.

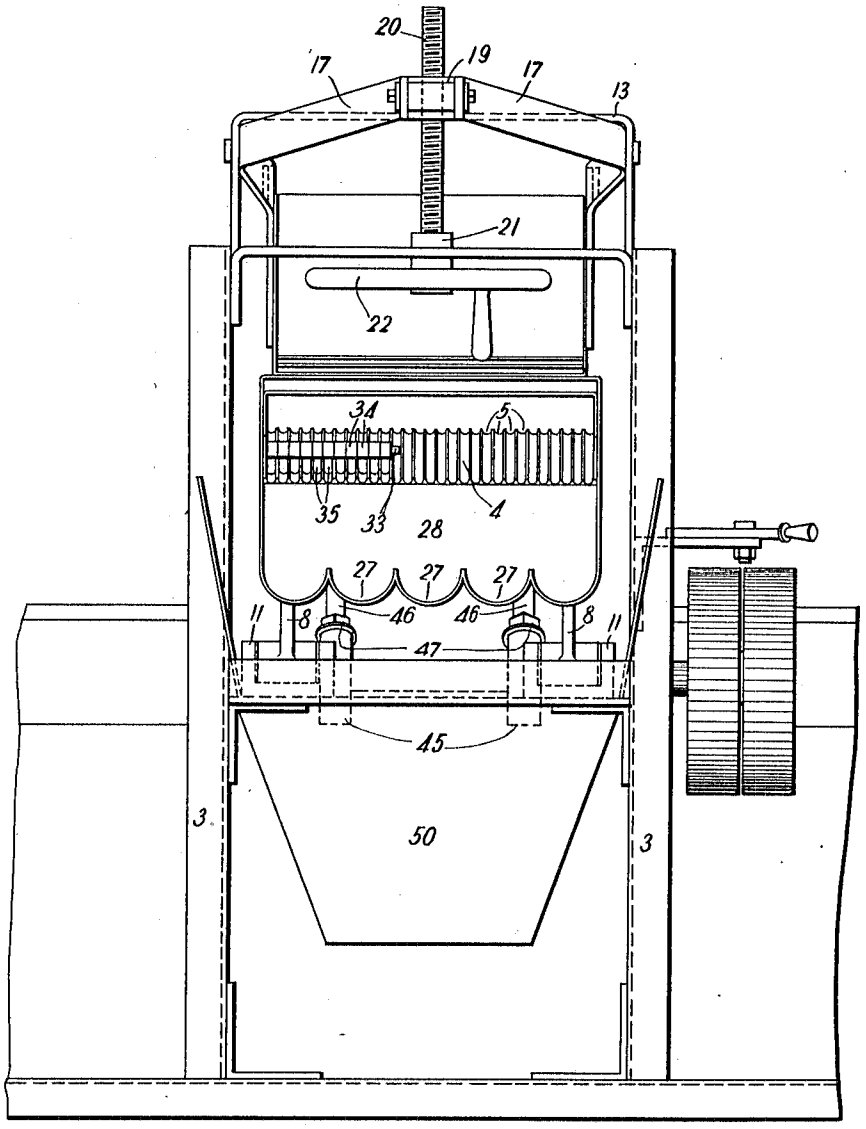


FIG. 3

WITNESSES

R. D. Little

Chas. Lostermann

INVENTOR

James S. Phifer

by Lauthieum Belt & Fuller

his Attorneys

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

J. S. PHIFER.

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4 SHEETS—SHEET 4.

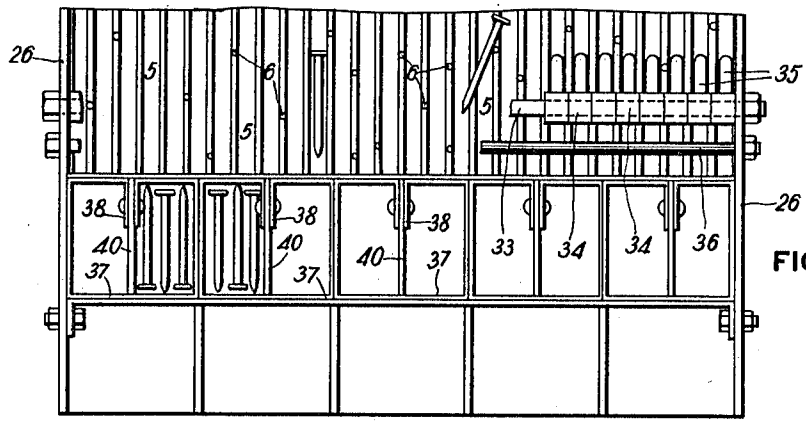


FIG. 4

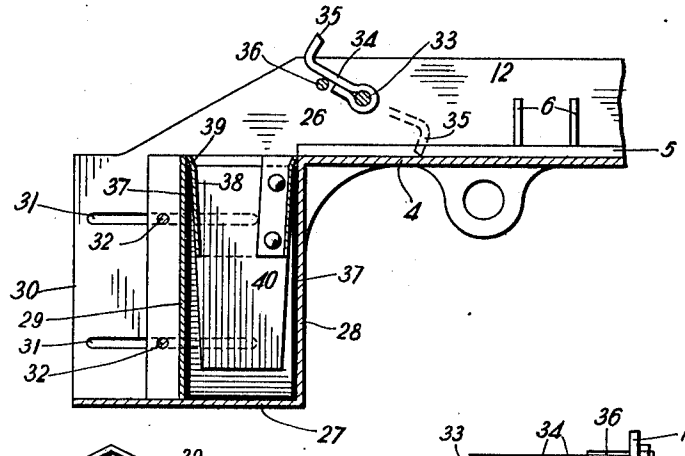


FIG. 5

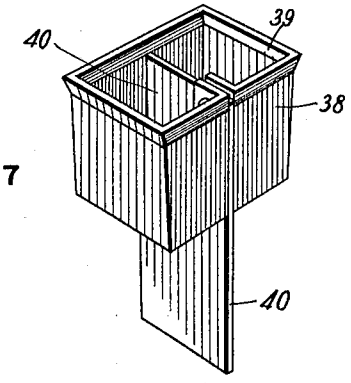


FIG. 7

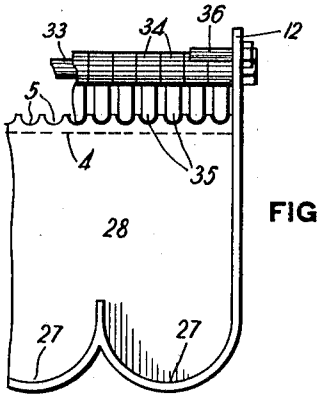


FIG. 6

WITNESSES

R. D. Little

Chas. Fosterman

INVENTOR

James S. Phifer

by Lindheimer Belts & Fuller

his Attorneys

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES STUART PHIFER, OF ALLENTOWN, PENNSYLVANIA, ASSIGNOR TO THE AMERICAN STEEL & WIRE COMPANY OF NEW JERSEY, OF HOBOKEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

NAIL-PACKING MACHINE.

1,096,641. Specification of Letters Patent. Patented May 12, 1914.

Application filed November 19, 1912. Serial No. 732,281.

To all whom it may concern:

Be it known that I, JAMES STUART PHIFER, a citizen of the United States, and resident of Allentown, in the county of Lehigh and State of Pennsylvania, have invented a new and useful Nail-Packing Machine, of which the following is a specification.

My invention relates to apparatus for packaging nails, and more particularly relates to the construction and arrangement of apparatus by the use of which quantities of nails in bulk are distributed and are deposited in parallel rows within a carton or other container so as to form a compact package.

One object of this invention is to provide a nail packing machine of simple and durable construction having novel means whereby nails placed thereon in bulk are separated and arranged in lengthwise parallel relation and are delivered in such lengthwise relation into cartons or other containers in which the nails are packaged.

Another object of the invention is to provide a nail packing machine by which nails of various sizes and kinds are mechanically fed from the hopper or chute in which they are deposited in bulk to the distributing table and are then caused to traverse the distributing table and assume a relative lengthwise parallel alinement in traversing the table from which they are discharged while in alinement.

Still further objects of my invention will appear hereinafter as the invention is more fully described and claimed.

Referring to the drawings forming part of this specification Figure 1 is a side elevation showing a nail packing machine constructed and arranged in accordance with my invention. Fig. 2 is a plan of the apparatus shown in Fig. 1. Fig. 3 is an end elevation of the nail packing machine illustrated in Figs. 1 and 2. Fig. 4 is a detail plan showing the construction of the delivery end of the nail packing machine. Fig. 5 is a sectional side elevation of the delivery end of the machine showing the manner in which the nails are packed in cartons or boxes. Fig. 6 is a detail end elevation showing a portion of the delivery end of the separating table forming part of my improved nail packing machine. Fig. 7 is a detail perspective view showing the construction of the funnels employed in packing the nails, in the carton or container filling operations. Fig. 8 is a sectional side elevation showing a detail of the construction of the discharge end of the inclined nail receiving hopper or chute which receives the nails in bulk.

In the accompanying drawings the numeral 2 designates the frame of the nail packing machine, having vertical standards 3—3 on each side thereof to secure or support the apparatus upon a suitable base or foundation. Mounted between the standards 3—3 on opposite sides of the frame is a lengthwise reciprocating or vibrating distributing table 4, which is inclined at an angle to the horizontal with its discharge end lowermost, this table having a series of corrugations or grooves 5 which extend lengthwise parallel from end to end of the table and a series of upwardly projecting pins 6—6 are positioned at intervals between adjacent grooves 5, which serve to engage with and cause any nails moving across the table in a lengthwise angular position relative to the length of the grooves 5 (as shown for example by the nail 7 in Fig. 2) to gradually turn until such nails are moved into a position lengthwise parallel with the length of the grooves 5. Links or arms 8 and 9 are employed on each side of the table 4 to secure the table to the frame 2, the upper ends of the arms 8 and 9 being pivotally connected to lugs or ears 10—10 on the table 4 and the lower ends of these arms being pivoted to bearings 11 secured on the frame 2.

Located above the distributing table 4, with its discharge end overlapping the rear end of the table, is an angularly adjustable tilting chute or hopper 12, the lowermost or discharge end of this hopper being supported by a U-strap 13 pivotally connected by its bent ends to the upper ends of the rear pair of standards 3. The swinging rear end of the angularly adjustable or tilting hopper 12 also is supported by a U-strap 14, the bent ends 15 of which are pivotally secured to the ends 16 of the bent levers 17—17 and the levers 17, which are pivoted at an intermediate point in their length to a bracket 18 fastened to the upper ends of the rear pair of standards 3, are pivotally connected to a swivel nut 19 having an in-

ternally threaded opening therein through which the hopper adjusting screw 20 extends. The lower end of this adjusting screw is rotatably secured to a bracket 21 which extends between and is fastened to the upper ends of the front pair of standards 3 and a hand wheel 22 is provided on the lower end of the screw 20 to turn the screw in tilting or adjusting the nail receiving hopper 12.

The lower or discharge end of the tilting hopper 12 is provided with a reciprocating slide 23 which moves angularly therewith and has a series of serrations 24 in its upper surface extending lengthwise across the width of the slide 23 as will be clearly seen in Fig. 8. The discharge end of the hopper 12 overlaps the inner edge of the reciprocating slide 23 at all times and the slide 23 is pivotally connected to one end of the links 25—25, the other end of these links being pivoted to the sides 26 of the distributing table 4 which extend upwardly above the top surface of this table, in this way the slide 23 being caused to reciprocate with the separating table 4 when the nail packing machine is in operation.

The front or discharge end of the reciprocating or vibrating table 4 is provided with a step or shelf 27 having a fixed side wall 28 and an adjustable side wall 29, extensions 30 to the marginal sides 26 of the distributing table 4 forming the end walls of the shelf. Slots 31 in the end walls 30 of the shelf provide a convenient means for securing the movable side wall 29 in adjusted position, the bolts 32 extending through the slots, the side walls 29 being made adjustable to enable cartons or containers of different widths being employed, at different times, in packaging nails of various sizes.

Pivotally secured on a rod 33 which extends from one side 12 to the other above the upper face of the table 4 is a series of links 34, these links, which have a bent end 35, being arranged to swing or turn on the rod 33 to move the bent end 35 of each link into one of the grooves 5 in the upper surface of the distributing table 4. A second rod 36 provides a convenient means for holding the links 34 in their raised position as shown in Fig. 5, the position of the links with the end 35 turned downwardly into the groove 5 also being shown in dotted lines in this figure of the drawings.

The side wall 29 of the shelf 27 is adjusted to suit the particular size of nails being packaged and heavy cardboard cartons 37 are then placed in position on the shelf as is illustrated in Figs. 1, 4 and 5. Funnels 38 are removably placed within the upper portion of the cartons 37, these funnels being constructed with an outwardly flaring upper end 39 and with a central partition 40, the partition being made longer than the funnel 38 so as to extend downwardly into proximity to the bottom of the cardboard cartons 37, in this way the partition forming relatively narrow openings through which the nails are caused to pass as they drop through the funnel into the cartons. As the width of the funnel between the partition and the ends of the funnel is less than the length of the nails being packaged, the nails are caused to drop into the cartons 37 in the lengthwise parallel relation they are caused to assume in passing over the distributing table.

Mounted in suitable bearings 41, which are secured on the frame 2 beneath the table 4, is a rotary shaft 42 having on one end thereof a fast pulley 43 and loose pulley 44, and also secured on the shaft 42 are the eccentrics 45 by which the distributing table 4 is caused to reciprocate or vibrate. A connecting rod 46 is adjustably secured by one end to each eccentric 45, a jam nut 47 locking the rods 46 in adjusted position, and the other ends of the connecting rods 46 are pivotally connected each to a wrist-pin 48, in this way operatively connecting the driving shaft 42 to the distributing table 4. The wrist-pins 48 are adjustably secured in slots 49 in the rear pair of arms 9 supporting the distributing table 4 upon the frame 2 so as to permit the length of vibratory movement imparted to the distributing table to be varied as is found necessary or desirable.

At the front end of the nail packing machine below the step 27 supporting the cartons a hopper 50 is provided which collects any nails spilled during the operation of the nail packing machine. A lever 51 having a fork on one end to embrace the driving belt 52 and having a handle on its other end, is pivoted to the angle bracket 53 conveniently located on the side on one of the standards 3, this lever providing means for shifting the belt 52 leading from a suitable motor or motor driven line shaft to the pulleys on the shaft 42 by which the shaft 42 is driven, from the fast pulley 43 to the loose pulley 44, or vice versa, in stopping and starting the nail packing machine.

In the operation of my improved nail packing machine the driving belt 52 is shifted to the fast pulley 43 so as to drive the eccentric shaft 42. The wrist-pins 48 having been adjusted in the slots 49 to cause the distributing table 4 to vibrate for the desired distance, a quantity of nails to be distributed and packaged is then placed in a heap upon the tilting hopper 12. The hand wheel 22 is then turned to tilt or adjust the hopper 12 until at an angle greater than the angle of repose for the nails, when a portion of the nails on the hopper are caused to slide forwardly to the reciprocating slide 23. The serrations 24 in the upper surface of the reciprocating slide 23 then engage with and

cause the nails to travel forwardly to the discharge end of the slide 23 and then, at various points in its width, drop to the distributing table. The reciprocating distributing table, the upper surface of which is inclined with its discharge end lowermost, causes the nails as delivered thereto by the reciprocatory slide 23 on the hopper 12 to enter one or another of the series of parallel grooves 5 in the upper surface of the table 4 and gradually move lengthwise toward the discharge end thereof. Such nails as become positioned on the distributing table 4 so as to extend lengthwise angularly to the length of the grooves will, during their passage across the length of the table, engage with one or another of the pins 6 projecting above the surface of the table and by engagement with such pin will be caused to turn on the upper surface of the table until in a lengthwise position parallel with the length of the grooves and finally caused to enter one or another of the grooves 5. The nails which traverse the distributing table 4 are caused to first assume lengthwise parallel positions and finally are discharged lengthwise from the table into one or another of the cartons 37 positioned in the nail receiving pockets formed on the shelf 27 at the discharge end of the table 4 and are delivered into the cartons in lengthwise parallel relation so as to in this way form a compact package in which a given quantity of nails requires very much less space than when placed therein promiscuously. When a carton or series of cartons has been filled with nails the fingers 34, or such of them as are required, are turned from the position shown in full lines in Fig. 5 into that shown by dotted lines in this figure, so that the bent end 35 of the turned fingers 34 each enters the groove 5 immediately below it and stops further progress of nails in such groove. The reciprocatory movement of the distributing table meanwhile continues so that the nail separating operations are not interrupted. The funnels 38 are then removed from the filled cartons and the cartons are then removed and replaced with empty ones. The fingers 34 or such of them as are turned downwardly are then again lifted and the carton filling operations are immediately resumed and continued until the new cartons are filled. The tilting hopper 12 is tilted from time to time by the operator through the medium of the hand wheel 22 as is required to keep the serrated slide 23 supplied with nails, the nails sliding from the hopper 12 by gravity, and the above described operations are continued as long as desired, additional quantities of nails in bulk being placed on the hopper 12 to always maintain a supply of nails thereon.

The advantages of my invention will be apparent to those skilled in the art. The tilting hopper provides a convenient and readily operated means for receiving the nails in bulk and delivering them as required. The serrated slide on the discharge end of this hopper affords a simple means for removing the nails from the hopper to the distributing table, while the reciprocatory distributing table arranges the nails while traversing the length of the table in lengthwise parallel position into the receiver, and in this way compact packages of nails are formed by mechanical means with a minimum amount of manual labor. A single attendant can operate two or more of the machines and the cost of packaging the nails is reduced, while the nails are assembled within the cartons in the most convenient manner for removing singly or in groups when being used.

Various modifications in the construction and arrangement of the parts which may be made without departing from my invention as defined in the claims will suggest themselves to those skilled in the art.

I claim:—

1. A nail packing machine comprising in combination a lengthwise inclined, vibratory distributing table having lengthwise parallel grooves in the upper surface thereof, an inclined hopper or chute at the rear end of the table arranged to receive nails in bulk for delivery to said distributing table, means for vibrating the distributing table, and means for tilting said hopper or chute at an angle to the horizontal to discharge nails thereon upon the rear end of said distributing table.

2. A nail packing machine comprising in combination a lengthwise inclined, vibratory distributing table having lengthwise parallel grooves in the upper surface thereof, means for receiving in lengthwise parallel relation nails discharged from the delivery end of said table, an inclined hopper or chute at the rear end of the table arranged to receive nails in bulk for delivery to said distributing table, means for vibrating the distributing table, and means for tilting said hopper or chute at an angle to the horizontal to discharge nails thereon upon the rear end of said distributing table.

3. A nail packing machine comprising in combination a lengthwise inclined, vibratory distributing table having a grooved upper surface, means for vibrating said table to cause nails thereon to move to the discharge end thereof, an angularly adjustable inclined chute or hopper to receive nails to be distributed on the distributing table, a reciprocatory plate at the discharge end of said hopper whereby nails discharged thereon are delivered to said table, and means for inclining said chute or hopper at an angle to the horizontal to discharge nails thereon upon said distributing table.

4. A nail packing machine comprising in

combination a lengthwise inclined vibratory distributing table having a grooved upper surface, an angularly adjustable chute or hopper arranged to receive nails in bulk for delivery to the distributing table, a reciprocating plate at the discharge end of said hopper having a serrated upper surface whereby nails delivered thereon from the hopper or chute are discharged upon the distributing table, means for vibrating said table to cause nails deposited thereon to move to the discharge end thereof, means for inclining said chute or hopper to deliver nails thereon to said reciprocating plate, and means on the lower end of the distributing table into which the nails are discharged lengthwise from said distributing table.

5. A nail packing machine comprising in combination a lengthwise inclined vibratory distributing table having a series of lengthwise parallel grooves in the upper surface thereof, means for vibrating said table to cause nails thereon to move to the discharge end thereof, an angularly adjustable chute or hopper at the rear of said distributing table to receive nails for delivery to the distributing table, vibratory means at the discharge end of said hopper whereby the nails received from the hopper are discharged upon said table, means for inclining said chute or hopper at an angle to the horizontal to discharge nails thereon upon said reciprocatory means, means on the lower end of the distributing table into which the nails are discharged lengthwise, and means for regulating the vibratory movement of said table.

6. In a nail packing machine the combination with a vibratory distributing table having a series of lengthwise parallel grooves extending lengthwise on the upper surface thereof, and means on the lower end of said table into which the nails are discharged lengthwise, of an adjustable hopper arranged to receive nails in bulk, and a plate having a notched upper surface arranged to discharge nails deposited thereon from the hopper upon said distributing table.

7. In a nail packing machine the combination with a reciprocating distributing table having a series of lengthwise parallel grooves extending lengthwise on the upper surface thereof, and means on the lower end of said table into which the nails are discharged lengthwise, of an inclined hopper angularly adjusted to a horizontal plane and arranged to receive nails in bulk, a reciprocating plate having a serrated upper surface arranged to discharge nails deposited thereon from the hopper upon said distributing table, and means connecting said plate and table whereby the plate is reciprocated in unison with said table.

8. In a nail packing machine the combination with a vibratory distributing table having a series of lengthwise parallel grooves on the upper surface thereof, and means on the lower end of said table into which the nails are discharged lengthwise, of an angularly adjustable hopper at the rear end of said table to receive nails in bulk, a vibratory notched plate arranged to deliver nails discharged thereon by said hopper upon said distributing table, said plate having a serrated upper surface, means for vibrating said table, and means connecting the plate and distributing table to cause movement of said plate in unison with said table.

In testimony whereof, I have hereunto set my hand.

JAMES STUART PHIFER.

Witnesses:
JOHN I. BAKER,
HARRY R. BRADER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."