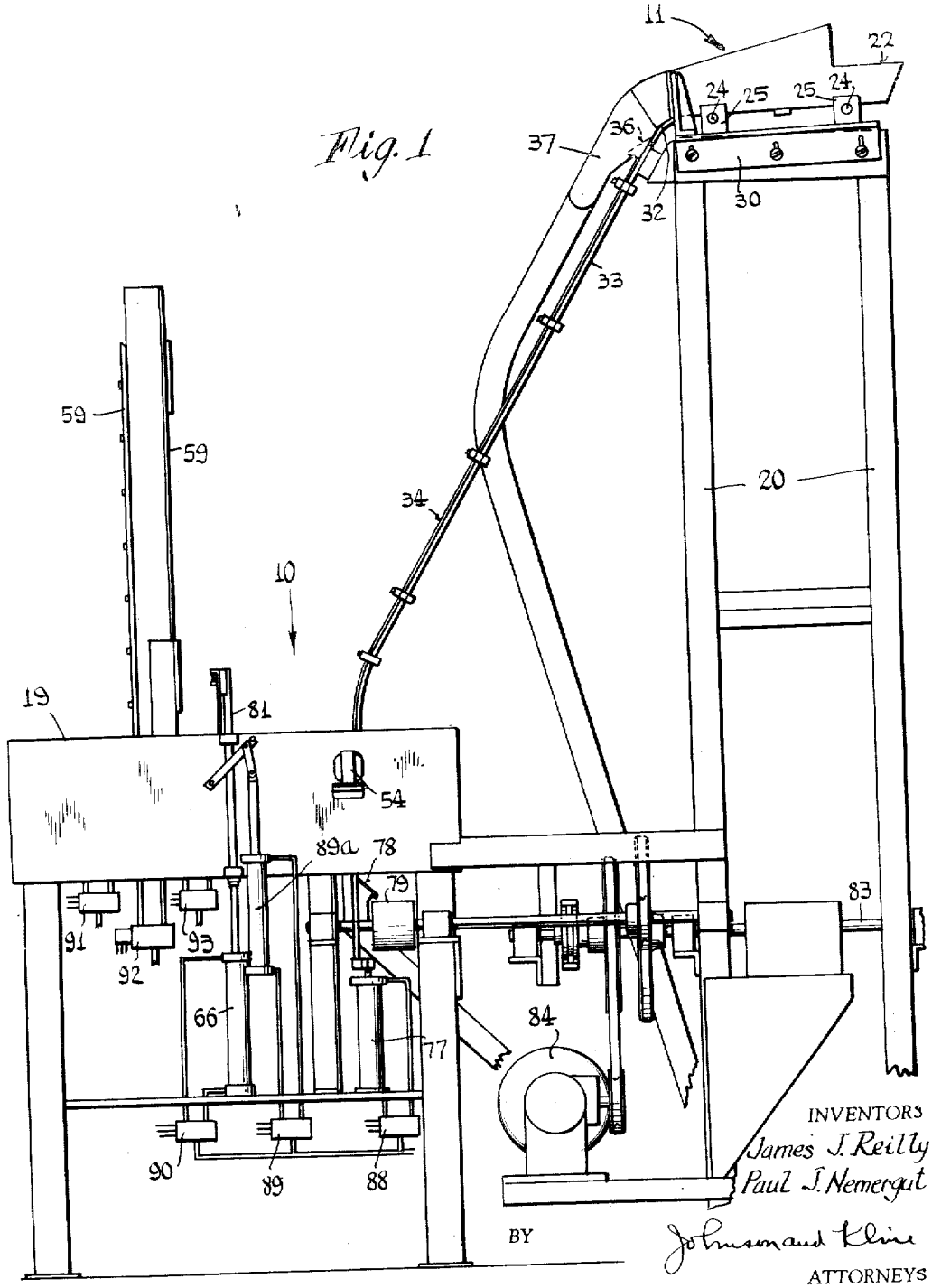
June 11, 1957 J. J. REILLY ET AL 2,794,980

TACK PACKAGING

Filed April 10, 1953 5 Sheets-Sheet 1

Fig. 1



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TACK PACKAGING

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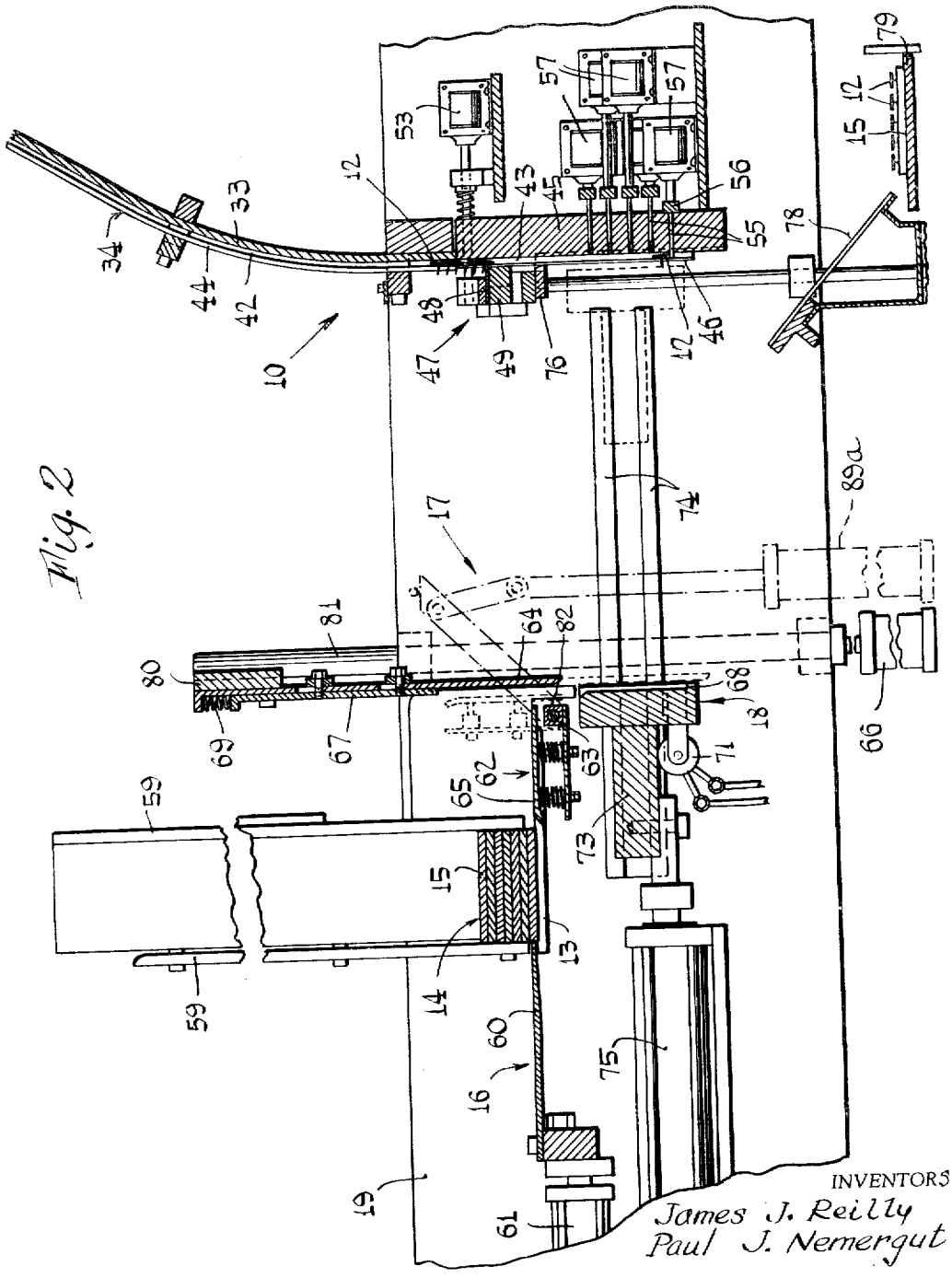


Fig. 2

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TACK PACKAGING

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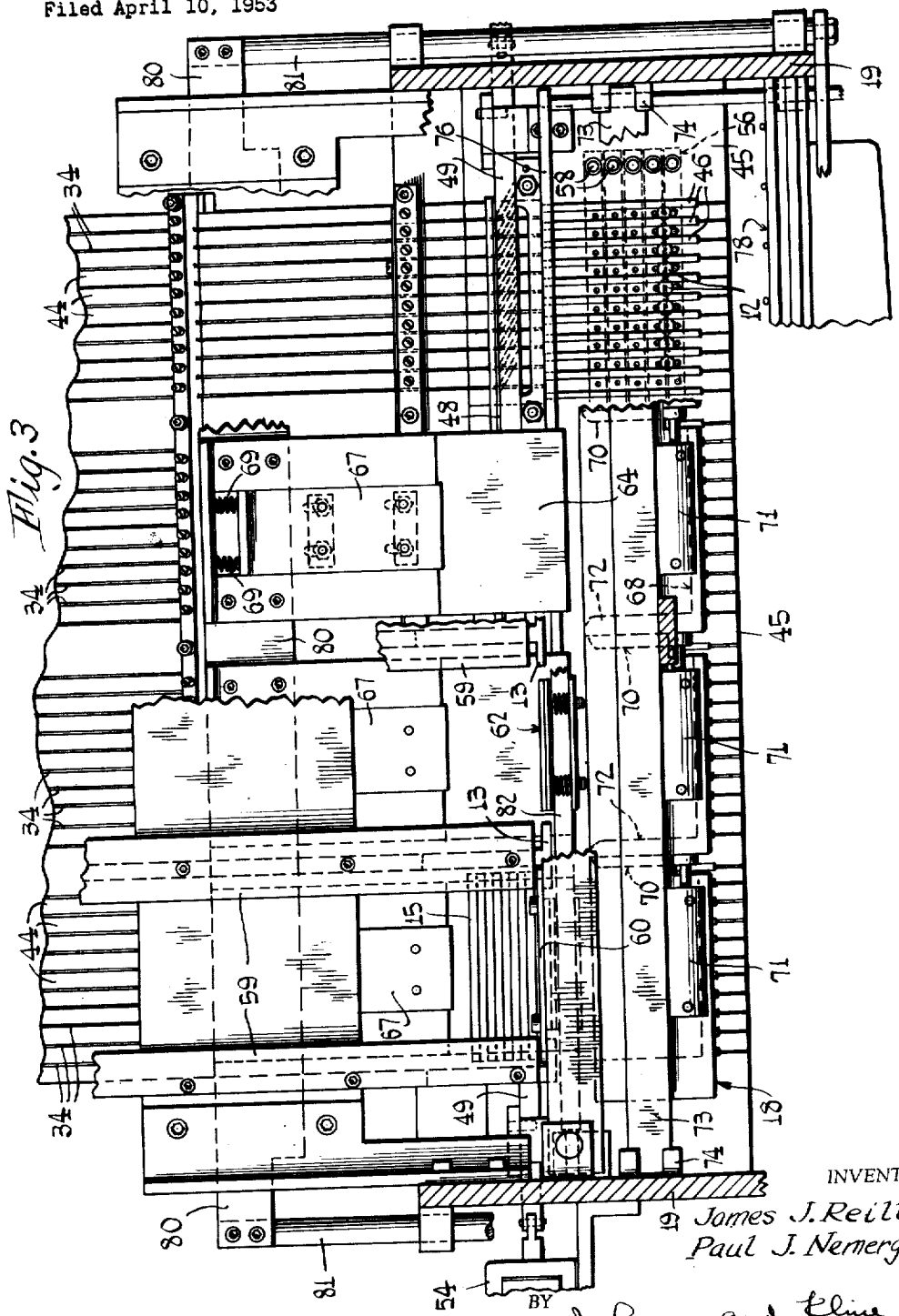


Fig. 3

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TACK PACKAGING

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Fig. 4

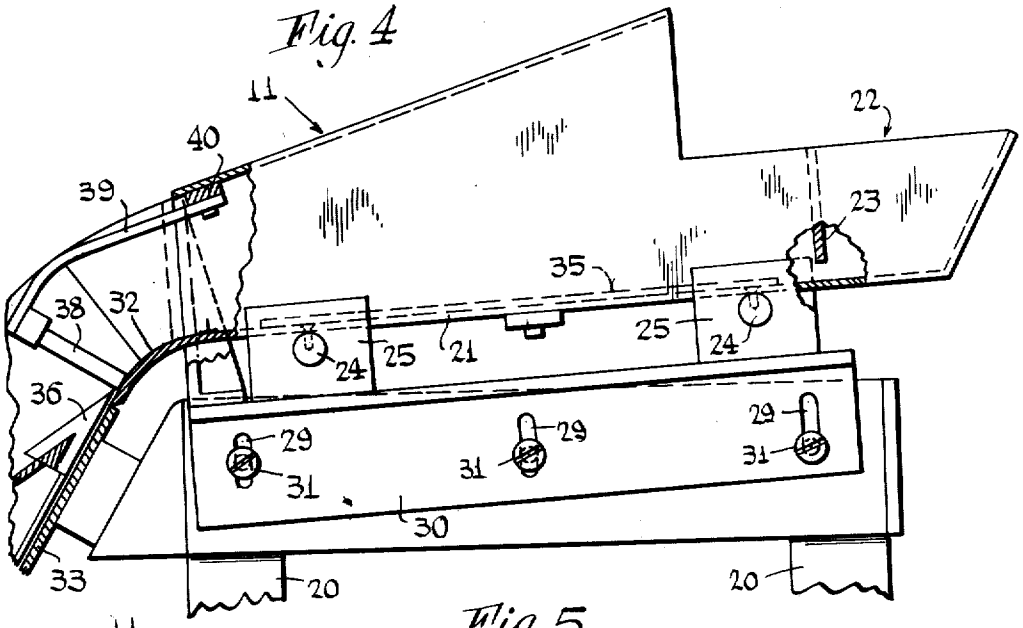


Fig. 5

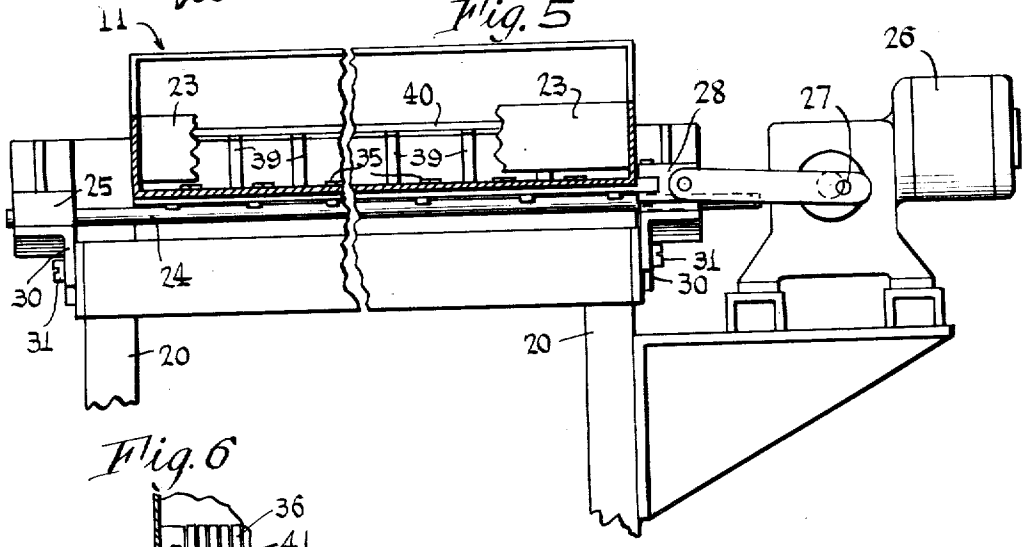
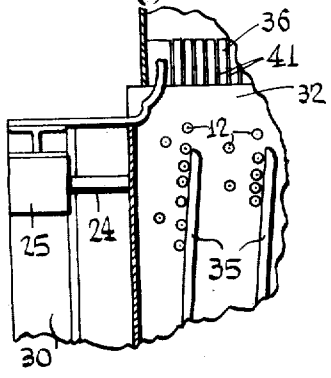


Fig. 6



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TACK PACKAGING

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Fig. 7

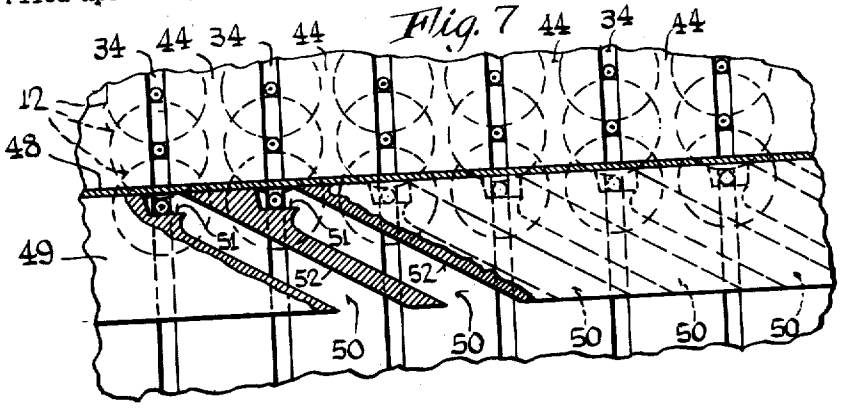


Fig. 8

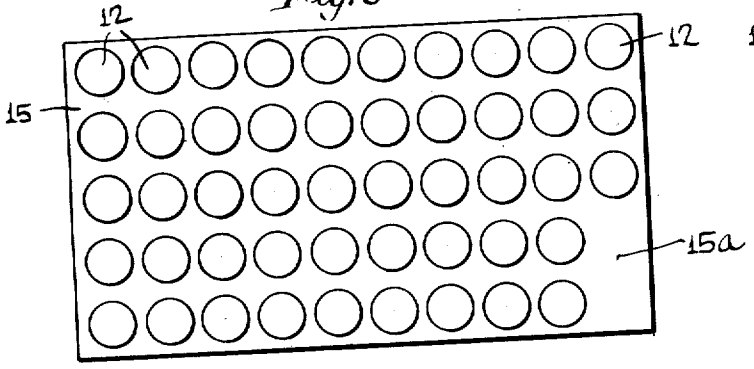


Fig. 9

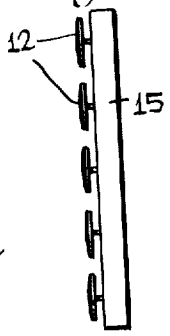
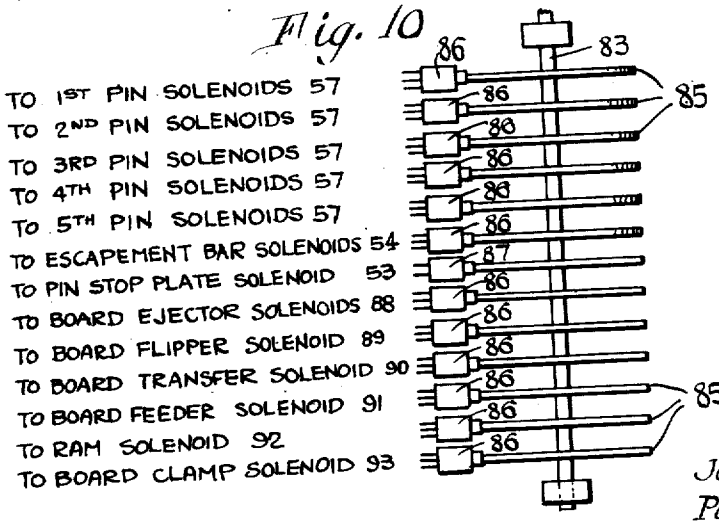


Fig. 10



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United States Patent Office 2,794,980 Patented June 11, 1957

2,794,980

TACK PACKAGING

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Application April 10, 1953, Serial No. 348,084

13 Claims. (Cl. 1—1)

This invention relates to packaging, for distribution and sale, tacks, thumb tacks for instance, and other elongated, pointed articles, and particularly to improved methods and apparatus for assembling a determinate number of such articles on boards to form a package.

It will be understood that herein the term "thumb tack" is used to include an entire class of elongated, pointed, headed articles.

Heretofore it was the practice to place an indefinite number of thumb tacks on a plate having spaced cavities to receive the heads of the tacks. The plate was then shaken by hand until the cavities were filled with tacks lying points upward. Then the plate was tilted to permit the excess tacks to slide off. Then a cut board, such as binder's board, was held by hand over the tack points and in that position the board was struck with a mallet to drive the points more or less into the board. Then the board with the impaled tacks was removed from the plate, wrapped and stored for shipment. These operations had to be performed with considerable skill and care, and required much practice and experience before they could be performed at economical speeds to produce a sufficiently-uniform, commercially-acceptable package. Care had to be exercised to assure that the cavities in the plate were all filled, and that the blow delivered by the mallet to the board was just that necessary to drive the tacks sufficiently into the board so that the heads would not be flush with the surface of the board making the tacks difficult to remove, and so that the points of the tacks would not project through to the other side of the board.

The present invention solves the problem of packaging tacks by improved methods and apparatus which avoids the necessity of employing skilled or experienced operators, which assures a uniformly acceptable package of tacks, and which produces a package at substantially reduced cost.

The methods disclosed herein are further advantageous in that they lend themselves to complete mechanical operation and control by cyclic mechanism or to semiautomatic operation under manual control.

According to the present invention the tacks are arrayed in a plurality of spaced rows of spaced tacks. While this is being done, a tack board is moved into position with its face opposite the points of the tacks. Then the tack board and tacks are pressed together, forcing the points of the tacks a predetermined distance into the board and finally the package of board-impaled tacks is discharged for wrapping, etc. The tacks are preferably arrayed in parallel rows of tiers, one tier at a time, until the plurality of rows of spaced tacks has been arrayed.

According to the present invention, in its more specific aspects, the tacks are placed indiscriminately in a hopper and the precut tack boards are stacked ready for successive use. The tacks are positioned with the points extending all in one position and are fed into chutes, one chute for each row of tacks to be arrayed. The chutes have two portions, a tack-receiving portion and a tack-arraying portion, and between these two portions, escape means is provided which, when operated, permits one tack in each receiving portion to pass into the arraying portion of each of the chutes. In the arraying portion there are means for arresting each tack so that its head is spaced a predetermined distance from the adjacent tack in the row. When the rows are filled, the feeding of the tacks to the arraying portion of the chutes is interrupted. While the tacks are being arrayed, a tack board is taken from a stack and moved to a position opposite the place where the tacks are being arrayed. When the arraying of the tacks has been completed, the arrayed tacks and board are pressed together to force the tacks a determinate distance into the board.

The chutes preferably have their fronts closed except for a slot through which the pointed shanks of the tacks project so as to hold the heads of the tacks substantially in one plane and the points of the tacks in substantially parallel planes at right angles to the heads.

After the tacks are impaled on the board, the tack positioning means are withdrawn, thereby permitting the tacks to pass through the open ends of the chutes, thus freeing the board and tacks.

To further economize on the cost of packaging the tacks, the present invention, in its preferred form, provides for simultaneously packaging a plurality of groups of rows of spaced tacks so that in each complete cycle of operation a plurality, four for instance, of tack-impaled boards may be produced. Thus the same mechanism which operates the tack-escape means, the tack-locating means, and the means for pressing the tacks and board together may be employed for simultaneously producing a plurality of packages. In fact, such means may be common to several groups of tacks.

In packaging tacks, for economy sake, the tack boards are no larger in dimensions than necessary to support the desired number of tacks. Should it be desired to assemble other means on a tack board, such as a tack lifter, one or more tacks may be omitted from the regular array of parallel rows of tacks, and for this purpose, the present invention provides means for permitting one or more of the tacks to escape from the arraying chute or chutes before the board and tacks are pressed together.

Other features and advantages will hereinafter appear.

In the accompanying drawings which illustrate one form of apparatus made according to the present invention:

Figure 1 is a side elevation showing the several units employed and the means for operating them according to a predetermined plan.

Fig. 2 is a side view partly in section which shows the mechanism for arraying the tacks, moving a tack board from a stack to a position opposite the arrayed tacks, and the ram for pressing the tack board against the arrayed tacks.

Fig. 3 is a vertical, sectional view taken across the machine in progressive steps from the board-stacking device to the tack-arraying chutes.

Fig. 4 is a side view partly in section showing the tack hopper and the upper end of the tack chute.

Fig. 5 is a cross-section of the hopper and showing the hopper-operating mechanism.

Fig. 6 is a fragmentary view of a part of the hopper floor and divider bars.

Fig. 7 is an enlarged view of part of the tack-escape mechanism.

Fig. 8 is a plan view of the package of tacks made according to the present invention.

Fig. 9 is an edge view of the assembled tacks and board shown in Fig. 8.

Fig. 10 is a diagrammatic view showing a series of

cams and switches with legends indicating the solenoids which the switches control.

The apparatus shown in the accompanying drawings to carry out the various steps of the methods of this invention includes a tack-arraying frame **10**; a hopper **11** from which the tacks **12** are fed to the arraying frame; a support **13** for holding in horizontal position a stack **14** of precut broards **15**. a feeder **16** for removing one board at a time from the stack; a transfer device **17** for upending a board **15** and placing it in a position opposite the tack-arraying frame **10**; and a ram **18** for pressing the tack board and arrayed tacks together to force the tack points a predetermined distance into the board.

The feeding of the tacks to the arraying frame **10**, the operation of the tack board positioning device **17**, and the operation of the ram **18** may be performed by hand or may be controlled by the operator according to a predetermined plan or sequence. However, as shown, these devices and their various components may be operated automatically by cyclic mechanism making it necessary for the operator merely to maintain a sufficient supply of tacks and tack boards for the apparatus to assemble.

The present invention provides for simultaneously mounting a predetermined number of tacks on each of a plurality of tack boards. The following description will be directed for the most part to the assembling of one group of tacks on one board, the mechanism being duplicated for the other tack boards except where there are parts in common to the several groups.

Tack feeding and arraying

The apparatus of the present invention has a suitable framework comprising a horizontal frame **19** and a vertically extending framework **20** at the upper end of which the tack hopper **11** is mounted. The tack hopper comprises a tray **21** (Figs. 4, 5 and 6) having a mouth **22** to receive a supply of thumb tacks. In the tray there is a transverse baffle **23** under which the tacks must pass from the mouth **22** a few at a time and as one horizontal layer. The tray is mounted on rods **24** which are slidably mounted in bearings **25** so that the tray can be agitated in a horizontal plane. This agitation may be conveniently accomplished by means of a motor **26** having an eccentric and pitman connection **27** to a block **28** secured to the tray.

The tray is tipped forward slightly to a discharge end so that as the tray is agitated the tacks rest on their heads with their points upward and gradually slide to the discharge end of the tray. The inclination of the tray may be varied by means of slots **29** in a tray supporting plate **30** and clamping screws **31** mounted at the upper end of the frame **20**. The discharge end of the tray has a forwardly and downwardly curved portion **32**, co-extensive with plates **33** forming part of the tack chutes **34**.

During the agitation of the hopper tray the lateral movement of the tacks on the tray is impeded by a series of ribs **35** so that the tacks are not piled up at one side of the tray and so that there will always be some tacks in position to pass over the entire rounded section **32** and into the chutes **34**.

Those tacks which have their heads lying flat against the rounded section **32** pass under a stationary slotted separator bar **36** and then along the plates **33** of the chutes. The tacks whose heads have not been placed in proper position pass over the upper surface of the separator bar and into a tube or conduit **37** through which they pass into a suitable receptacle to again be loaded into the hopper. To avoid the tacks lodging on the leading edge of the separator bar **36**, flexible fingers **38** carried by brackets **39** and attached to the hopper at **40** sweep across the leading edge periodically and push the tacks laterally so that the shanks of the tacks enter the slots **41** in the divider bar.

As a result of the presence of the baffle **23**, the bars **35**, the operation of the flexible fingers **38**, and the agitation in a horizontal plane of the tray, a mass of tacks dumped into the hopper through the mouth **22** will be distributed over the whole surface of the tray and sufficient tacks will be fed to the upper ends of the chutes **34** to keep the latter substantially full. When the chutes and the slots **41** of the divider bar are filled the surplus tacks simply pass over the separator bar **36** into the return conduit **37**, and the chutes are sufficiently long to keep an ever-ready supply of tacks to be arrayed.

Each chute **34** has a tack receiving and storing portion **42** and a tack arraying portion **43**. The back of the portion **42** of the chute is formed by the plate **33** while the front is formed by a series of spaced bars **44** forming between the slots through which the shanks of the tacks may extend with their points facing in the same general direction. The space between the plate **33** and the bars **44** is sufficient to freely pass the heads of the tacks.

The back of the portion **43** of the tack chutes is formed by an arraying plate **45** and the front of the chutes is formed by a plurality of spaced bars **46** forming between them slots through which the shanks of the tacks may extend. Between the portions **42** and **43** of the chutes there is an escape mechanism **47**. This is illustrated in Figs. 2 and 3 and in detail in Fig. 7 and comprises two relatively movable parts, a stop plate **48** and an escape bar **49**. The escape bar **49** has diagonal slots **50** open at both ends and each having at its upper end a ledge **51** on which the shank of the tack rests when the parts are in the position shown in Fig. 7. There is one slot **50** for each tack chute. When the bar **49** is moved to the left as viewed in Fig. 7, the ledge **51** moves from under the shank of the tack and allows the tack to descend into the traying portion **43** of the chute.

In the receiving portion **42** of the chutes, the tacks are stored with their heads in overlapping positions and it may be that when a shank of a tack is released from the ledge **51**, the tack would not descend because of being bound by the next tack in the row. To assure the descent of the tack, the slots are shaped so that the edges **52** of the slots **50** sweep across the tack slots and engage the shanks and positively moves them into the arrying portion of the chute. When this has been accomplished and the shank of the tack moves clear of the slot **50** the bar **49** returns to the position shown in Fig. 7. As this occurs the succeeding tack in each row has descended in the chute so that its shank rests on the stop plate **48** and is held in that position. After the bar **49** has been returned to the position shown in Fig. 7, the stop plate **48** is horizontally moved forward to release the lowermost tack in each row and allow it to come to rest on the ledge **51**. This operation of the plate **48** and bar **49** is continued alternately until the desired number of tacks has been permitted to escape into the tack arraying chute. In the form of the invention shown, the stop plate **48** is operated by a solenoid **53** while the escape bar is operated by a solenoid at each end, the solenoid **54** being shown at the left hand end of Fig. 3.

As above indicated in the form of the apparatus herein illustrated, there are a plurality of groups of chutes **34** so that a plurality of assembled boards and tacks may be simultaneously produced. These chutes are preferably aligned transversely of the machine and hence the stop plate **48** and the escapement bar **49** may extend clear across the machine and be common to all the groups of chutes. From what has been said above it will be understood that the tacks are released tier after tier to form vertical rows.

Tack arraying

To array the tacks in each row with their points facing the same direction and with their heads spaced predetermined distances apart, the arraying plate **45** is provided with a series of stop pins **55**, one for each tack to be arrayed. These pins project outwardly from the arraying plate so as to each intercept and hold one tack in its position to be impaled on the board. The pins

55 for each tier of tacks are secured to a bar 56 located at the back of the plate 43 and each bar is provided with a pair of solenoids 57, one for pushing the bar forward to project the pins and the other for pulling the bar back to withdraw the pins. When, as is shown, a plurality of groups of rows of tacks are arrayed, the bars 56 are common to all the groups of rows and they may be guided in their in-and-out movement on rods 58 shown in Fig. 3.

Starting with the parts in the position shown in Fig. 2, the lowermost tier of pins 55 is in operative position arresting the lowermost tack in each row. Then the second tier of pins from the bottom is projected into the chutes. Then the escapement is operated to release the next tier of tacks and these are arrested by the second pin and so on until the row is filled at which time the operation of the escapement is interrupted and the tacks are in a position to be impaled on the tack board.

While the tacks arrayed by the apparatus herein shown are in straight vertical rows and horizontal tiers, it should be understood that this arrangement need not be followed. Instead, the stop pins 55 may be positioned to stagger the tacks in the tiers.

As shown in Fig. 8 which illustrates the package of tacks, it is sometimes desired to leave a clear marginal portion such as the portion 15*a* on which to mount a tack lifter for instance. This is accomplished according to the present invention by omitting the bottom and the next to the bottom pins on one of the rows so that the tacks which would otherwise be stopped by these pins fall into a container, the bottoms of the slots being opened.

Tack board feeding and positioning

As shown in the accompanying drawings, particularly Figs. 2 and 3, the tack boards 15 rest on supports 13 and are held in a vertical stack by plates 59. The lowermost board 15 is removed from the stack by an ejector plate 60 which may be operated by an air or hydraulic cylinder 61. It is pushed from the stack onto a flipper 62 pivoted at 63 so as to swing upwardly and carry the board from a horizontal to a vertical position. In this vertical position the face of the board is brought into firm contact with a plate 64, the flipper having a spring-urged plate 65. When the board is in vertical position against the plate 64, the latter is caused to descend, by operation of an air cylinder 66, for instance. As the plate descends a pressure plate 67 engages the upper edge of the tack board and slides the board over the plate 65 of the flipper and into position in front of a ram 18 until the lower edge of the board engages an abutment 68 on the ram. The pressure plate 67 is slidably mounted on the plate 64 and is held in position by a spring 69 so that it may yield in the event a board is slightly oversized and thus avoid crumbling of the edge of the board. While the board is held against the face of the ram by the plate 64, a movable lateral guide 70 is pressed against one vertical edge of the board by operation of an air cylinder 71 so that the board is confined between this movable lateral guide and an opposite fixed lateral guide 72 and held by such guides against accidental displacement. The plate 64 is then retracted and the board, supported on the ram in front of the tack arraying plate, is ready to be advanced toward the tacks in the chutes.

Tack and board assembling

The ram 18 has a carriage 73 riding in a track 74 and it is operated by a hydraulic cylinder 75 which moves the ram forwardly to the dotted line position in Fig. 2 where the board is gradually but forcibly pressed against the tacks arrayed in the slots 43. The stroke of the ram is so controlled that the pointed shanks of the tacks are driven into the board a predetermined distance leaving the heads of the tacks spaced from the face of the board, as shown in Fig. 9. This is done to facilitate the easy, intentional removal of the tacks from the board in use. During the impaling of the tacks on the board, the heads of the tacks engage and are backed up by the surface of the arraying plate 45.

After the tacks have been impaled on the boards by the ram, the stop pins 55 are withdrawn from the chutes, the ram is returned to its normal position shown in Fig. 2, and the tack-impaled board is free to descend, the heads of the tacks moving through the open end of the chutes. To insure this movement of the tack board and tacks impaled thereon, an ejector 76 overlying the board is caused to descend by operation of an air cylinder 77 and push the tack-impaled board downwardly and out of the way. As shown in Fig. 2, the assembled board falls onto an incline 78 by which it is guided onto a conveyor belt 79 which may carry it to a position outside of the machine where it may be wrapped or otherwise disposed of.

As stated above, when the apparatus is constructed to assemble groups of tacks on a plurality of boards, the mechanism for operating the respective parts of the different groups may be common to all the groups. For instance, the plates 64 for transferring the boards from the flipper to the ram are shown as attached to a single transverse operating bar 80 mounted on rods 81 (Fig. 3) for vertical movement; the rams 18 are mounted on a single transverse operating bar forming the carriage 73; and the flippers 62 are mounted on a common transversely extending rod 82.

Each of the units of the apparatus disclosed herein may be operated by hand or under the control of an operator, but, in order to increase the speed of production, it is preferable that they be automatically operated in proper coordination.

For this purpose, solenoids and solenoid controlled air or hydraulic valves may be employed—the solenoids themselves being electrically controlled by a cyclic mechanism such as shown in Fig. 10. This cyclic mechanism may be made up of a shaft 83 connected by suitable driving connections to a motor 84. The shaft may be provided with a series of cams 85 controlling double-throw switches 86 and a single pole switch 87. As indicated in Fig. 10, these switches are connected to the various solenoids. The first five cams are connected to the solenoids 57 for controlling the projection and retraction of the tack stop pins 55. The next cam controls the switch leading to the solenoids 54 for the escape bar 49. The next cam operates the switch to control the solenoid 53 for the pin stop plate 48. The next cam controls the switch for the solenoid 88 for the air cylinder 77 operating the board ejector 76. The next cam is for operating the switch connected to the solenoid 89 for the air cylinder 89*a* for operating the board flipper 62. The next cam controls the switch for operating the solenoid 90 controlling the cylinder 66 for the board transfer device 64. The next cam controls the switch for the solenoid 91 for the cylinder 61 operating the board feeder 60. The next cam controls the switch for the solenoid 92 for the hydraulic cylinder 75 which operates the ram. The last cam controls the solenoid 93 for the cylinders 71 operating the board clamps 70.

These cams 85 are so arranged that while the stop plate 48 and escapement bar 49 and the stop pins 55 are being operated in proper sequence to array the tacks on the arraying plate 45, the ram 18 is being returned from the dotted line position shown in Fig. 2 to the full line position, a board is fed from the stack, placed on the flipper, upended, and transferred to the ram. Before the tacks are completely arrayed on the plate 45, the ram has advanced so that when the last tier of tacks has been arrayed the ram has but a short distance to move to impale the tacks on a board, which it does by moving the board against the points of the tacks and immediately receding so that the ejector 76 may push

the assembled board downwardly and discharge it from the arraying board.

Thus, by having certain of the operations progress while other operations are being performed, the elapsed time for the complete cycle may be substantially reduced and greater production obtained from the apparatus. In spite of the seeming complexity of the operations, the apparatus may be operated successfully at the rate of 12½ cycles per minute, and each cycle producing 4 assembled boards, or at the rate of about 50 a minute.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

We claim:

1. Apparatus for packaging tacks which includes means arraying a plurality of groups of tacks, each group comprising a plurality of rows of spaced tacks arranged points outward; means placing a plurality of tack boards with one board opposite the points of each group of tacks; and means pressing each board and its group of arrayed tacks together to force the points of the tacks into the boards a determinate distance to removably anchor the tacks therein.

2. Apparatus for packaging tacks which comprises means arraying the tacks in spaced rows of spaced tacks, said means including tack-head confining channels having slots through which the shanks of the tacks extend points outward; means placing a tack board opposite the points of the tacks; means pressing the board and arrayed tacks together to force the points of the tacks into the board a determinate distance to removably anchor the tacks therein; and means releasing the assembled tacks and board from the tack confining channels.

3. Apparatus for packaging tacks which comprises a plurality of spaced tack-head confining chutes having slots through which the shanks of the tacks extend points outward to accessible position; means feeding tacks to said chutes; means advancing in each of said chutes a determinate number of tacks, one tack at a time, to determinate positions in the chutes in which the heads of the tacks in each row are spaced from each other; means placing a tack board opposite the points of the spaced tacks; means pressing the board and tacks together to force the points of the tacks into the board a determinate distance to removably anchor the tacks therein; and means releasing the confined heads of the board-carried tacks from the chutes and the shanks from the slots in the chutes.

4. Apparatus for packaging tacks which comprises a tack-head confining chute having a slot through which the shanks of the tacks in the chute extend points outward; means arresting successive tacks traveling in said chute in successively spaced positions in which the tacks form a row with the tack-heads spaced from each other; means placing a tack board opposite the points of the tacks; means pressing the board and row of tacks together to force the points of the tacks into the board a determinate distance to removably anchor the tacks therein; and means releasing the confined heads of the tacks from the chutes and the shanks from the slots in the chutes.

5. Apparatus for packaging tacks which comprises a plurality of adjacent spaced chutes each having a receiving portion and a tack arraying portion, the latter having a head-confining portion and a slot through which the shanks of tacks in the chute may extend outwardly with their points projecting a determinate distance to accessible position; means continuously feeding a quantity of tacks to said chutes; means intermittently passing a predetermined number of tacks, one at a time, from the receiving portion to the arraying portion of each chute; means arresting successive tacks entering each arraying portion in successively spaced positions in which the tacks form arrayed rows with the tack heads in each row out of contact with each other and with the tack heads in adjacent rows; means placing a tack board opposite the points of the tacks; means pressing the board and arrayed rows of tacks together to force the points of the tacks into the board a determinate distance to removably anchor the tacks therein; and means releasing the heads of the board-carried tacks from the chutes and the shanks of the tacks from the slots in the chutes.

6. Apparatus for packaging tacks which comprises means arraying a plurality of groups of tacks, each group comprising a plurality of rows of spaced tacks arrayed points outward and in substantially one plane; means removing from stacks one board for each group of tacks; means bringing the boards and arrayed groups of tacks into juxtaposed position; and means pressing the boards and arrayed groups of tacks together to force the points of the tacks into the boards a determinate distance to removably anchor the tacks therein.

7. Apparatus for packaging tacks which comprises a tack-head confining chute having a slot through which the shanks of tacks extend points outward; means including a hoper and feed control means for feeding a determinate number of tacks to said chute; stops arraying the tacks in said chute spaced from each other; a carrier placing a tack board in position facing the chute; a plunger movable to press said board and arrayed tacks together to force the points of the tacks into the board a determinate distance to removable anchor the tacks therein; and retractable stops for releasably holding the board-carried tacks from the chute.

8. Apparatus for packaging tacks which comprises a plurality of adjacent spaced chutes each having a receiving portion and a tack arraying portion, the latter having a head-confining portion and a slot through which the shanks of the tacks may extend outwardly with their points projecting a predetermined distance to exposed position; a hopper for continuously feeding a quantity of tacks to said chutes; escape means intermittently passing a predetermined number of tacks, one at a time, from the receiving portion to the arraying portion of each chute; spaced stops arresting successive tacks entering each arraying portion in successively spaced position in which the tacks form arrayed rows with the tack heads in each row out of contact with each other and with the tack heads in adjacent rows; a carrier placing a tack board in position opposite and facing those portions of the chutes in which the tacks are being arrayed; and means operated after the tacks are arrayed for pressing the board against the exposed tack points to force the same into the board a predeterminate distance with the heads of the tacks spaced from each board to removably anchor the tacks in the board.

9. Apparatus for mounting on a board a plurality of spaced rows of headed tacks with the heads of the tacks in each row spaced from each other and from the heads of the tacks in adjacent rows comprising a plurality of spaced tack-head confining, vertical, row-forming chutes each having a receiving portion in which tacks are collected in a vertical pile with their heads more or less aligned in overlapping relation and their shanks more or less horizontal; a hopper feed for supplying tacks to the receiving portions of the chutes; escape-means successively releasing the lowermost tack in each vertical pile to permit it to descend in its chute, while retaining the next tack in the pile; a vertical slot in each chute guiding the descent of the the tack with its shank extending through said slot and its point end extending a predeterminate distance beyond the slot to exposed position; a plurality of stops, one arresting each succeeding tack descending in each chute in a position in which its head is spaced from the preceding tack; means supporting the arrested tacks with their shanks substantially horizontal; means interrupting the releasing of successive lowermost tacks when a predetermined number of tacks has been released and arrayed in the chute; means pressing a board and the pointed ends of the arrayed tacks together to force the points of the tacks into the board a deter-

minate distance with the heads of the tacks spaced from the face of the board to removably anchor the tacks in the board; and means releasing the assembled board and tacks from the chutes.

10. The apparatus defined in claim 9, in which there are means common to corresponding tack-arresting stops associated with the several chutes for operating said stops.

11. The apparatus as defined in claim 9, in which there are means common to said tack-escape means associated with the several chutes for operating said escape means simultaneously.

12. Apparatus for mounting on a board a plurality of spaced rows of headed tacks with the heads of the tacks in each row spaced from each other and from the heads of the tacks in adjacent rows, comprising means for stacking a plurality of tack boards cut to size to receive an array of tacks; a plurality of spaced tack-head confining, vertical, row-forming chutes each having a receiving portion in which tacks are collected in a vertical pile with their heads more or less aligned in overlapping relation and their shanks more or less horizontal; a hopper feed for supplying tacks to the receiving portions of the chutes; escape-means successively releasing the lowermost tack in each vertical pile to permit it to descend in its chute, while retaining the next tack in the pile; a vertical slot in each chute guiding the descent of the tack with its shank extending through said slot and its point end extending a predeterminate distance beyond the slot to exposed position; a plurality of stops, one arresting each succeeding tack descending in said chute in a position in which its head is spaced from the preceding tack; means supporting the arrested tacks with their shanks substantially horizontal; means interrupting the releasing of successive lowermost tacks by said escape-means when a predetermined number of tacks has been released and arrayed in the chute; means removing a tack board from the stack of boards and placing it in a vertical position with its face in front of the arraying portions of the chutes; a plunger operated when the predetermined number of tacks are arrayed in the chutes for pressing the board and the pointed ends of the arrayed tacks together to force the points of the tacks into the board a determinate distance with the heads of the tacks spaced from the face of the board to removably anchor the tacks in the board; and means releasing the assembled boards and tacks from the chutes.

13. Apparatus for mounting on each of a plurality of boards a plurality of spaced rows of headed tacks with the heads of the tacks in each row spaced from each other and the heads of the tacks in adjacent rows, comprising means for supporting a plurality of stacks of tack boards each cut to size to receive an array of tacks; means for arraying a plurality of groups of tacks, one for each board, and each group comprising a plurality of spaced rows of spaced tacks with the points outward in accessible position; means for removing from the stacks one board for each said group of arrayed tacks and placing the same in position facing the group of arrayed tacks; and means for pressing the boards and groups of arrayed tacks together to force the points of the tacks into the boards a determinate distance to removably anchor the tacks in the boards.

References Cited in the file of this patent

UNITED STATES PATENTS

1,941,992	Makenny	Jan. 2, 1934
1,944,360	Meyer	Jan. 23, 1934
2,200,385	Eich	May 14, 1940
2,599,283	Price	June 3, 1952
2,621,824	Gookin	Dec. 16, 1952