Sept. 21, 1965 A. J. GILBRIDE ETAL 3,207,362

NAIL DISTRIBUTORS

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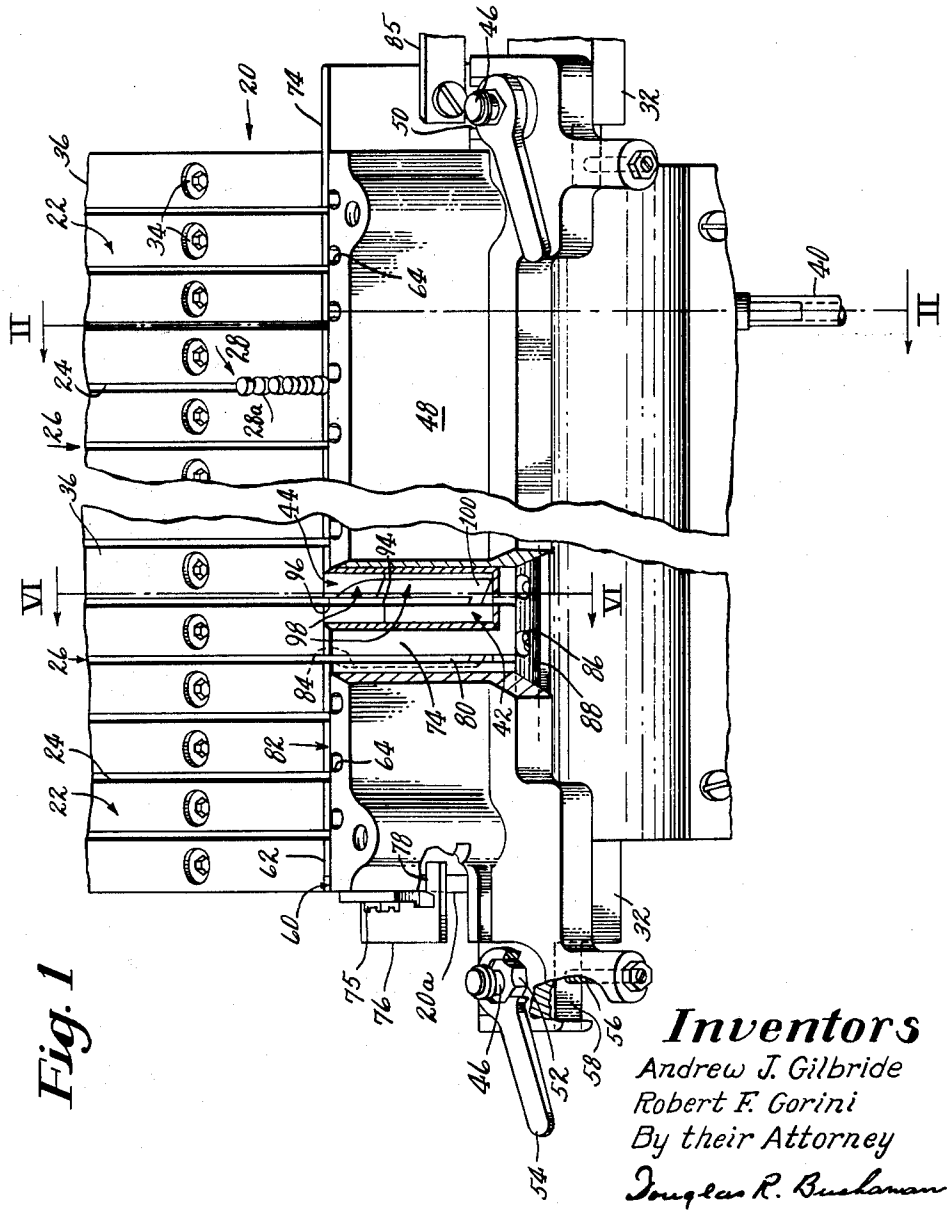
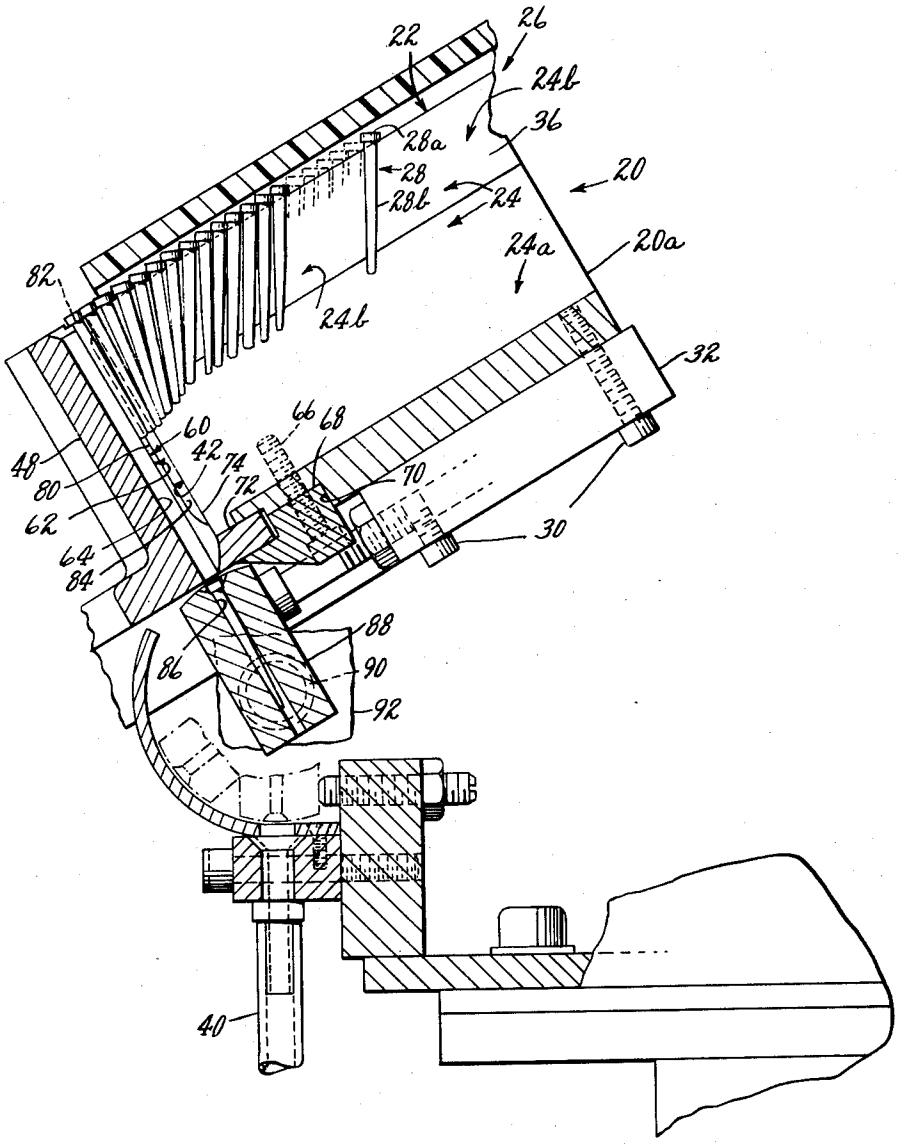


Fig. 1

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Robert F. Gorini
By their Attorney
Douglas R. Buchanan

Fig. 2


22
26
24b
36
28a
28
28b
24
20
24a
20a
82
24b
32
60
66
68
48
42
74
72
70
80
62
30
64
84
88
86
90
92
40

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NAIL DISTRIBUTORS

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Fig. 3

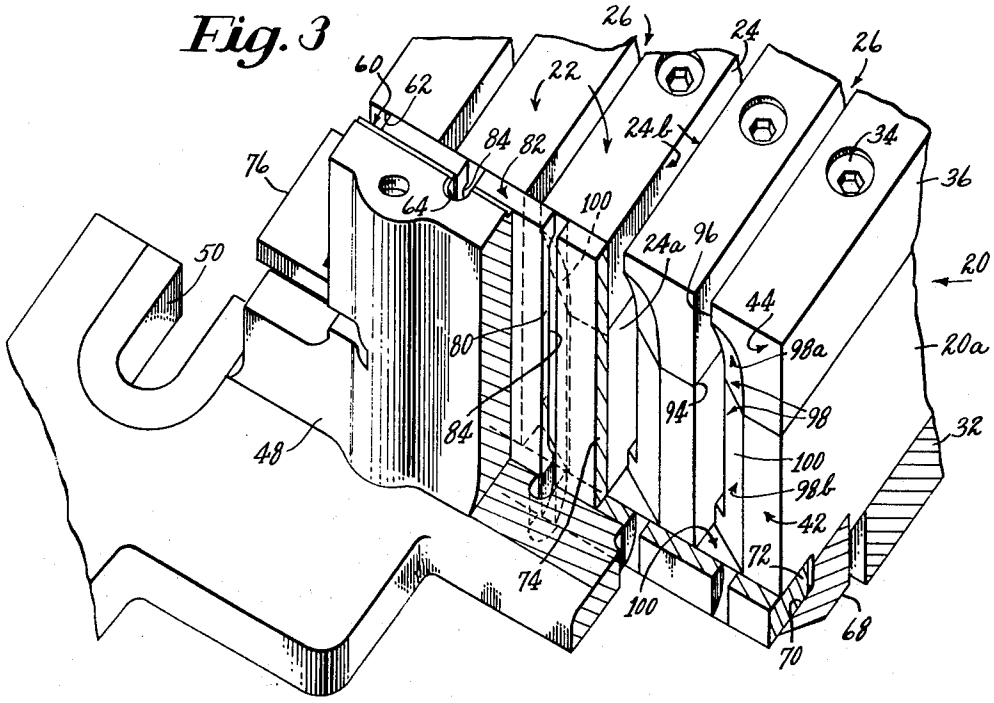
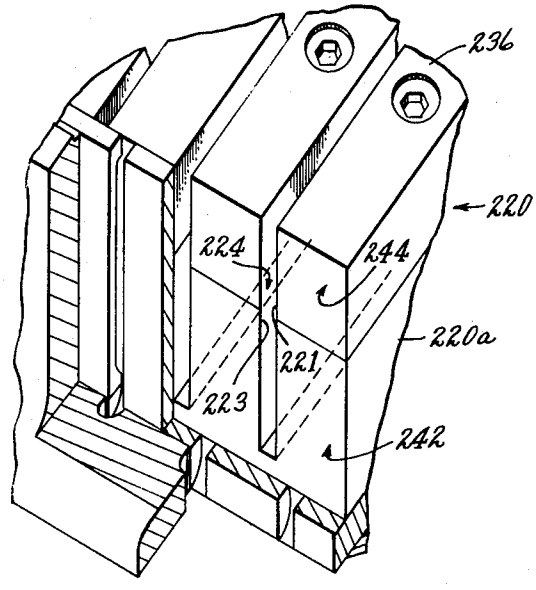


Fig. 4



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Fig. 5

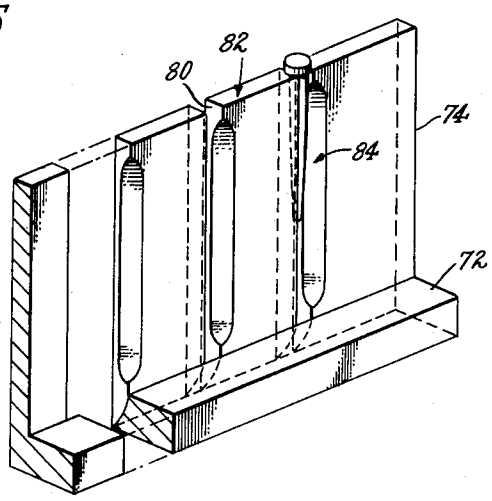


Fig. 6

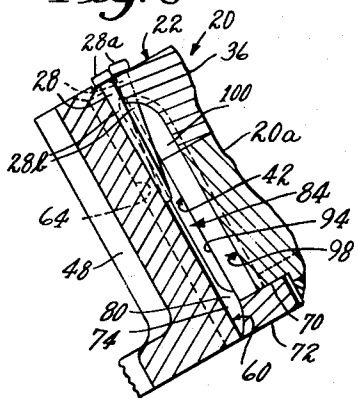


Fig. 7

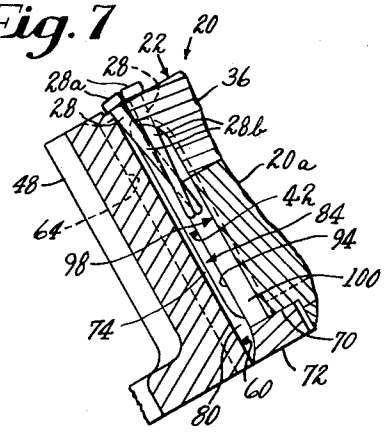


Fig. 8

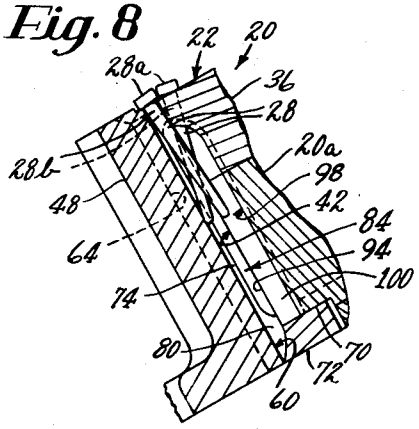
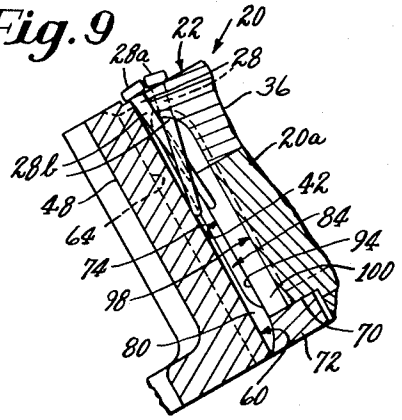


Fig. 9



United States Patent Office 3,207,362 Patented Sept. 21, 1965

3,207,362
NAIL DISTRIBUTORS

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Filed Apr. 29, 1963, Ser. No. 276,361
7 Claims. (Cl. 221—93)

This invention relates to improvements in a nail distributor of the type disclosed in an application for United States Letters Patent Serial No. 254,297, filed January 28, 1963, in the names of Fred T. MacKenzie et al., it being an object of the invention to reduce to a minimum the occurrence of nail jams between the lower ends of raceways and a separator plate of the distributor.

The illustrative distributor comprises a fixed ramp having one or more raceways down which nails hanging by their heads slide, a separator plate having an upper edge and one or more slots which extend through said plate and to said edge, a fixed member having one or more grooves, said separator plate being movable between a nail receiving position in which the one or more slots of the separator plate are in register with the lower ends of said one or more raceways respectively whereby to receive lowermost nails in the raceways from said raceways with the heads of the nails resting upon the upper edge of the separator plate, and a nail delivering position in which the one or more slots of the separator plate are arranged respectively opposite the one or more grooves of said member and are adapted to deliver said nails to the grooves, and in accordance with a feature of the invention, novel cam means for the nails is provided so spaced from the separator plate at the separation side of the forward end portion of each of the raceways as to permit free swinging movement of the associated separated nail in said plate and the lowermost nail remaining in the associated raceway about their respective heads whereby to disengage, if necessary, the shank portions of the nails from each other during movement of the separator to its nail delivering position.

The present invention consists in the above and hereinafter described features, reference being had to the accompanying drawings, which illustrate one embodiment of the invention selected for purposes of illustration, said invention being fully disclosed in the following description and claims.

In the drawings:

FIG. 1 is a front view, partly broken away and partly in section, of a lower portion of an illustrative nail distributor;

FIG. 2 is a section of the nail distributor on the line II—II of FIG. 1;

FIG. 3 is a view, partly broken away and partly in section, showing in perspective details of a ramp, a separator plate and front plate of the nail distributor;

FIG. 4 shows in perspective a portion of a lower end of a ramp of a prior distributor of the type disclosed in said application Serial No. 254,297;

FIG. 5 is a perspective view showing on an enlarged scale the separator plate of the illustrative machine; and

FIGS. 6 to 9 inclusive are perspective views taken on the line VI—VI of FIG. 1 and illustrating four different displaced nail conditions which, if the ramp shown in FIG. 4 is used, are likely to result in nail jams between the ramp and the separator plate of the distributor but which are usually corrected by the use of the present ramp shown in FIG. 3.

The illustrative nail distributor comprises a ramp or composite block **20** having an interrupted flat inclined upper surface **22** and slots or channels **24** (FIGS. 1, 2 and 3) which extend into said face and form with the face a plurality of parallel raceways which are inclined at a substantial angle to the horizontal and into the upper ends of which cut nails **28** having heads **28***a* are fed, for example, from a nail pot (**200**) such as disclosed for example in United States Letters Patent No. 2,178,615, granted November 7, 1939, on an application filed in the names of John J. Standish et al., or from tilt pot hoppers such as disclosed respectively in said application Serial No. 254,297 and in United States Letters Patent No. 3,072,913, granted January 15, 1963, on an application filed in the names of Paul E. Morgan, et al. The ramp **20** comprises a base **20***a* which is secured by screws **30** (FIG. 2) to a main frame **32** of the distributor and has formed on it a plurality of opposed faces **24***a* (FIGS. 2 and 3) constituting lower portions of the slots **24**, said base portion having secured to it by screws **34** (FIG. 1) a plurality of bars **36** having opposed faces **24***b* spaced from each other and forming upper portions of the slots **24**, said upper and lower portions of the slots being of the same width and in alinement with each other.

The slots **24** of the raceways **26** are somewhat wider than the upper ends of the shanks **28***b* of the nails **28** to be accommodated, said nails hanging by their heads **28***a* on the flat upper face **22** of the ramp or composite block **20**, which upper face constitutes the upper faces of the bars **36**, and being adapted to slide by gravity down the raceways **26**, the lowermost nails in the raceways being removed simultaneously from the lower or exit ends of said raceways and being transferred by mechanism hereinafter described to tubes **40** (FIGS. 1 and 2) for delivery to nail driving mechanisms (not shown) of the machine.

The base **20***a* and the bars **36** of the ramp or composite block **20** have flat forward or front faces **42**, **44** respectively which are in alinement with each other, said faces being arranged in a common plane disposed at right angles to the upper face **22** of the ramp which is disposed at approximately 30° to the horizontal. The angle formed between the upper face **22** and the front face **44** of the ramp **20** may be somewhat more than 90°.

Secured to forward laterally projecting portions of the main frame **32** of the distributor are upstanding screws **46** (FIG. 1) and mounted on said portions of the main frame is a front plate **48** having formed in it notches **50** through which the respective screws pass. Nuts **52**, on which are mounted hand wrenches **54**, serve to secure to the main frame **32** the front plate **48** in its proper operating position determined by the initial settings of screws **56** secured to the front plate and normally in engagement with faces **58** of the main frame. The front plate **48** has a planar rear face **60** which is normally spaced from the front faces **42**, **44** of the base **20***a* and the bars **36** of the ramp or composite block **20** to form a guideway **62** and has formed in it a plurality of upstanding grooves or channels **64** offset laterally from associated lower or exit ends of the raceways **26**.

Secured by screws **66** (FIG. 2) to the base **20**a of the ramp **20** are a pair of gibs **68** provided with rabbets, forming with rabbets in the base of the ramp, guideways **70** for slidingly receiving flange portions **72** of a separator plate **74** fitting in the guideway **62** formed between the rear face **60** of the front plate **48** and the faces **42**, **44** of the base **20***a* and the bars **36** of the ramp **20**. Secured by screws **75** (FIG. 1) to the left end of the base **20***a* of the ramp, as viewed from the front of the machine, is an L-shaped guide bracket **76** (FIGS. 1 and 3) which forms with the front face **42** of said base **20***a* a guideway **78** along which the separator plate **74** moves, this guideway serving mainly to retain the separator plate in its upright operating position when the front plate **48** is removed from the distributor.

Extending through the separator plate **74** between its opposite sides or front and rear faces are a plurality of vertical slots **80** which terminate at an upper edge **82** of the plate and are adapted to receive the lowermost nails in the raceways **26** from said raceways with the heads of these nails overlying the upper edge of the separator plate. The rear face of the separator plate **74** along a trailing edge face of each of its slots **80** (the term "trailing" being used with relation to movement of the separator plate from its nail receiving to its nail delivering position) is slabbed off to provide a beveled surface or cam **84** which extends nearly to the bottom of the slot and terminates at a point just below the upper edge **82** of the separator plate as best shown in FIG. 5. The purpose of the bevel surface or cam **84** will appear later.

Pivotally connected to the right end of the separator plate **74**, as viewed from the front of the machine is a link **85** (FIG. 1) operatively connected to mechanism which is described in said application Serial No. 254,297 and is adapted to move said plate along the associated guideways **62**, **70** between a nail receiving position in which the slots **80** are in register with the lower or exit ends of the raceways **26** and a nail delivering or dumping position in which the slots are in register with the grooves or channels **64** of the front plate **48**.

Arranged beneath the grooves **64** of the front plate **48** are bores **86** (FIGS. 1 and 2) formed in an inverting bar **88** which is journaled at its opposite ends in bearings **90** (FIG. 2) mounted in lugs **92** secured to the main frame **32**. As explained in application Serial No. 254,297, the inverting bar **88** is operated in time relation with the separator plate **74** and is adapted to deliver the nails which have been dropped into and are hanging by their heads in the bores **86** of the bar, to the tubes **40** through which the nails are delivered to a nailing die of the machine disclosed in application for United States Letters Patent Serial No. 256,885, filed February 7, 1963, in the name of Fred T. MacKenzie et al. Instead of dropping the nails from the grooves **64** of the front plate **84** into the bores **86** of the inverting bar **88** the nails may be dropped into funnel-shaped openings (**484**) which are formed in a fixed block (**470**) and are connected to tubes (**197**) as disclosed in United States Letters Patent No. 3,072,913 or may be dropped into openings (**290**) which are formed in a fixed supporting member (**270**) and register with passages of tubes **296** as disclosed in patent No. 2,178,615. As above explained, nail distributors of this general type are well known and are used in various types of heel attaching machines.

The separator plates of the various types of distributors referred to herein are moved between their nail receiving and their nail delivering positions respectively in time relation with other operating parts of the distributors by mechanism well known in the art. Accordingly it is not necessary in the present application to describe in detail the mechanism for operating the separator plate **74**. The nails **28** may be delivered to the upper ends of the raceways **26** by different types of hoppers or nail pots well known in the art.

In prior nail distributors (FIG. 4) of the type under consideration opposite side walls of slots **224** of a ramp or composite block **220** of the distributor, which slots are of the same width as the slots **24**, terminate at the flat forward or front faces **242**, **244** of a base **220***a* and bars **236**, respectively, of the ramp to form right and left edges **221**, **223** which extend heightwise along the full depth of the slots **224**. In the present construction shown in FIG. 3 however as will be explained in detail later, the left wall (as viewed from the front of the machine) of each of the slots **24** intersects the front faces **44**, **42** to form an edge **94** identical with the left edge **223** of the ramp **220** (FIG. 4) and the right wall of each of the slots **24** intersects the front wall **44** of the associated bar **36** to form an edge **96** which extends only a slight distance downwardly from the flat upper face **22** of the ramp **20**

by reason of the fact that ramp edges formed by the right side wall of each of the slots **24** on the one hand and the front faces **42**, **44** of the ramp on the other hand are slabbed off to form a cam or surface **98** which will be hereinafter referred to.

It will be noted that the width of the slot **224** of the conventional ramp **220** shown in FIG. 4 is somewhat greater than the thickness of the upper part of the shank **28***b* of the nail **28** and accordingly a short lowermost nail hanging by its head on the ramp **220** has a substantial degree of lateral tilting movement in the slot **224**. It will be apparent, however, that if the nail is long only a small amount of lateral tilting movement of the nail in the slot **224** is possible because of the engagement of the lower end of said long nail with the parallel side walls of the slot.

In nail distributors which are of the general type herein disclosed and have ramps **20** (FIG. 3) it frequently happens that the shank end of a lowermost nail in one of the raceways **26** is tilted forward into an associated slot **80** in the separator plate **74** behind (FIG. 6) (with relation to the nail delivering movement of the separator plate) or in front of the shank of a nail which has been transferred to said slot and is hanging by its head on said plate. It also frequently happens that the shank of the nail, which has been transferred to the slot **80** of the separator plate **74** and is hanging by its head on the upper edge of the separator plate, is tilted backward into the lower end of the slot **24** of the associated raceway **26** in back of (FIG. 7) or in front of the lowermost nail in the raceway. Furthermore, the shanks of the associated lowermost nail in the raceway **26** and the nail in the separator plate **74** cross each other, the shank of the nail in the separator plate sometimes being in front of the nail in the raceway, as shown in FIG. 8, and sometimes behind such nail, as shown in FIG. 9. The above conditions, as well as other conditions not mentioned, are caused partly by the pressure interaction of the heads of the cut nails with one another.

When the nail distributor is provided with the ramp **220** (FIG. 4) and one of the above-mentioned nail displaced conditions exist, a jam is likely to occur between the ramp and a separator plate (similar to the separator plate **74**) of the machine as said plate moves from its nail receiving to its nail delivering position.

With the above considerations in view, the left forward edge of each of the bars **36** of the ramp **20** has been cut away to form a cam or cam surface portion **98***a* and the forward left edge of the base **20***a* of the ramp have been cut away to form a cam or cam surface portion **98***b* which is continuous with the face portion **98***a* and forms therewith the above-mentioned surface or cam **98**. The upper end of the cam **98** terminates at the edge **96** of the associated bar **36** at a point spaced slightly from the flat nail head supporting upper face **22** of the ramp, horizontal elements of the cam being disposed at between 30° and 45°, for example, to the front faces **42**, **44** of the base and the associated bar of the ramp.

It will be noted that the cam **98**, a rear edge of which terminates along an adjacent side wall of associated raceway slot **24** at a substantial distance rearwardly of the forward or exit end of the raceway, forms with the separator plate **74** a space or cavity **100** at a separation side of the forward portion of the raceway, said cam and accordingly the cavity being spaced from the inclined nail supporting face **22** of the ramp **20** and being arranged opposite the path of movement of the associated slot **80** of the separator plate **82**.

When the nails **28** are in their positions illustrated in FIG. 6 and the separator plate **74** moves from its nail receiving to its nail delivering position, the lowermost nail in the raceway **26** will swing about its head into the cavity **100** as its lower shank portion moves with the separator plate **72**, and after being cammed out of the slot **80** by reason of such motion, the shank portion of said lower-

most nail in the raceway will swing back through the cavity to its vertical position in the raceway. In order further to insure that when the nails are arranged as shown in FIG. 6, the shank of the lowermost nail in the raceway **26** shall be returned fully to the raceway and not interfere with the nail delivering movement of the separator plate **74**, said plate is provided with the above-mentioned beveled face or cam **84** which during said movement of the plate cams the shank portion of the lowermost nail in the raceway back into the raceway.

When the lower end of the nail **28** carried by the separator plate **74** is tilted back into the raceway **26** behind the lowermost nail in the associated raceway, as shown in FIG. 7, and the separator plate moves from its nail receiving to its nail delivering position, the lower shank ends of the nails will swing into the cavity **100** and the lower end of the nail on the separator plate will be cammed back into its associated slot of the separator plate by its camming action against the lowermost nail in the raceway. The nail in the separator plate **74** is commonly released from the nail in the raceway **26** before the nails reach the cam face **98**, but if for any reason the lower end of the nail on the separator plate has not returned to its associated slot **80**, such nail will engage the cam face **98**, causing the lower end of said nail to be cammed back into said slot.

When the shanks of the lowermost nail in the raceway **26** and the associated nail on the separator plate **74** are crossed over each other, as shown in FIG. 8, nail transferring movement of the separator plate will cause the cam **84** to move the shank of the lowermost nail in the raceway back fully into the raceway and the cam **98** will be engaged by the lower end of the nail on the separator plate to cause this nail to be moved fully forwardly into the slot of the separator plate before said plate reaches its nail delivering position.

When the shanks of the lowermost nail in the raceway **26** and the nail in the associated slot **80** of the separator plate **74** cross each other but said lowermost nail in the raceway is in front of the nail on the separator plate as shown in FIG. 9, it has been found that if the nails are not too long they will cam each other back to their proper positions during movement of the separator plate to its nail delivering position, the engagement of the cam **84** with the shank of the nail on the lower end of the raceway and the engagement of the shank of the nail on the separator plate with the cam **98** further insuring, if the nails have been swung around each other by their camming action upon each other, that these nails are moved to their desired positions and out of their jam causing relation.

It will be noted at this point that the machine illustrated herein will effectively handle headed cut nails of short to medium lengths, that is, from four-eighths in length to nine-eighths in length, the distributor being relatively free from jams as compared to distributors which have a ramp **220** such as is illustrated in FIG. 4.

The ramp **20** may be described as having a cam or surface **98** which is adapted to be engaged by the end of the shank of the nail in the separator plate **74** as said plate moves from its nail receiving to its nail delivering position, in the event that said shank at this time is tilted rearwardly out of the slot **80** of said plate, whereby to swing the shank of the nail back into the slot. The cam or surface **98** may also be described as having a height approximately that of the raceway **26** and having an upper end terminating at a forward separation edge of the raceway at a point spaced slightly from the nail supporting face **22** of the ramp, the rear end of the cam terminating at the separation side wall of the raceway along a line spaced a substantial distance from the forward end of the raceway and the forward end of said cam terminating at the forward end of the ramp opposite the groove **64** in the front plate **84**.

The ramp **20** may be described as having formed in it an undercut cavity **100**, which is arranged at a separation side of the exit portion of the raceway **26** of the ramp and is spaced from the inclined face **22** of the ramp, and may also be described as having at its forward end a cavity which is defined by an undercut cam or surface **98** extending forwardly and laterally from the separation side of the raceway **26** at a location spaced from the forward end of the raceway and arranged opposite the path of movement of the slot **80** of the separator plate **74**, said cavity being adapted to allow the shank of the lowermost nail in the raceway to swing about its head in the direction of movement of the separator plate **74** in the event that the shank of this nail extends into the slot **80** of the separator plate or the shank of the nail in the separator plate is swung across and behind the shank of said lowermost nail in the raceway whereby to allow the nails to cam themselves back to their normal positions in the raceway and in the slot respectively during movement of the separator plate to its nail delivering position.

The front face **42**, **44** of the ramp **20** may be described as having formed in it an undercut cavity **100** which opens into a portion of the raceway spaced from the inclined face **22** of the raceway and which is arranged opposite the path of movement of the slot **80** of the separator plate, said cavity being adapted to allow the shank portion of the lowermost nail in the raceway, which shank portion may be displaced so as to lie in the slot **80** of the separator plate **74**, to move with the slot as the separator plate is moved to its nail delivering position whereby to allow the lowermost nail in the raceway to free itself from the slot and from the shank portion of the nail being transferred in the separator plate during movement of said plate.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. In a nail distributor the combination of a ramp including an inclined raceway on which a supply of nails including a first nail and a second nail is intended to be received suspended by their heads as they slide downwardly and forwardly, a fixed member spaced from the raceway and formed with a groove, a separator plate interposed between the ramp and the fixed member and having an upper edge formed with a slot extending to the edge and through the thickness of the plate, movable from a nail receiving station in which the slot is in register with the lower end portion of the raceway to receive the first nail from the raceway with the head of the first nail resting upon the upper edge of the plate to a nail delivering station in which the slot is aligned with the groove in the fixed member to deliver the first nail to the groove and means including an angularly oriented surface formed in the forward face of the ramp for engagement by the shank of the first nail in the separator plate as the plate moves toward the delivering station to orient the shank of the nail in the slot within the thickness of the plate.

2. A nail distributor according to claim **1** further characterized in that the angularly oriented surface is spaced below the raceway in the forward face of the ramp.

3. A nail distributor according to claim **1** further characterized in that the separator plate is also formed with a cam surface adjacent the slot, engageable by the shank of the second nail to repel the second nail completely into the raceway as the plate moves from the receiving station to the delivering station.

4. In a nail distributor the combination of a ramp including a set of inclined raceways on each of which a supply of nails including a first nail and a second nail is intended to be received suspended by their heads as they slide downwardly and forwardly, a fixed member spaced from the raceway and formed with a set of grooves, a separator plate interposed between the ramp and the fixed member and having an upper edge formed with a set of slots extending to the edge and through the

thickness of the plate, movable from a nail receiving station in which each slot is in register with the lower end portion of one of the raceways to receive the first nail from the raceway with the head of the first nail resting upon the upper edge of the plate to a nail delivering station in which each slot is aligned with one of the grooves in the fixed member to deliver the first nail to the groove and means including an angularly oriented surface corresponding to each slot formed in the forward face of the ramp for engagement by the shank of the first nail in the separator plate as the plate moves toward the delivering station to orient the shank of the nail in the slot within the thickness of the plate.

5. A nail distributor according to claim 4 further characterized in that the angularly oriented surfaces are spaced below the raceways in the forward face of the ramp.

6. A nail distributor according to claim 4 further characterized in that the separator plate is also formed with a cam surface adjacent each slot, engageable by the shank of the second nail to repel the second nail completely into the raceway as the plate moves from the receiving station to the delivering station.

7. In a nail distributor the combination of a ramp including an inclined raceway on which a supply of nails

including a first nail and a second nail is intended to be received suspended by their heads as they slide downwardly and forwardly, a fixed member spaced from the raceway and formed with a groove, a separator plate interposed between the ramp and the fixed member and having an upper edge formed with a slot extending to the edge and through the thickness of the plate, movable from a nail receiving station in which the slot is in register with the lower end portion of the raceway to receive the first nail from the raceway with the head of the first nail resting upon the upper edge of the plate to a nail delivering station in which the slot is aligned with the groove in the fixed member to deliver the first nail to the groove and means including an angularly oriented surface formed in the separator plate adjacent the slot and engageable by the shank of the second nail as the plate moves toward the delivering station to repel the second nail completely into the raceway.

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GRANVILLE Y. CUSTER, JR., *Primary Examiner.*