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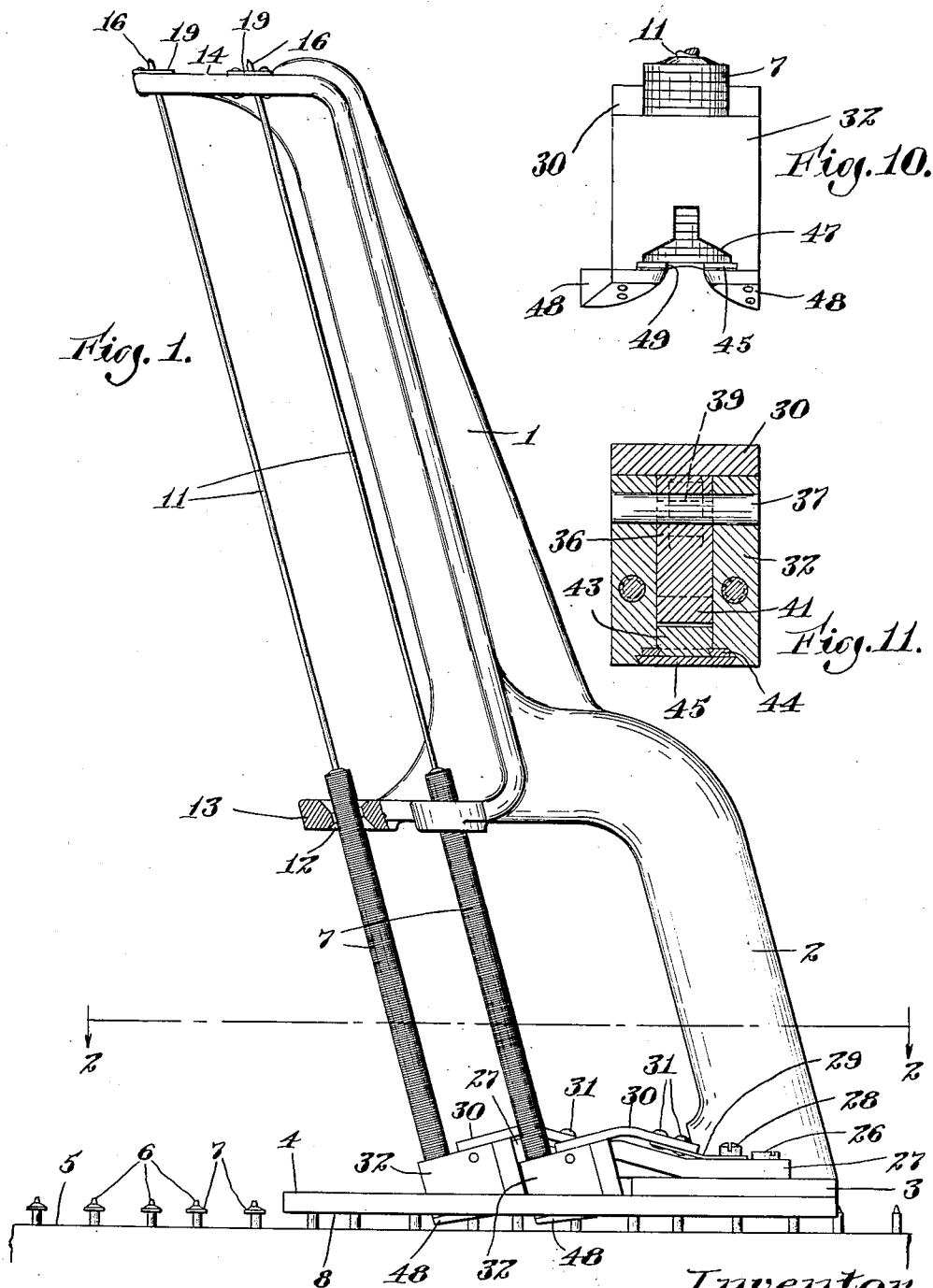
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WASHER FEEDING MACHINE

Filed Aug. 19, 1926

3 Sheets-Sheet 1



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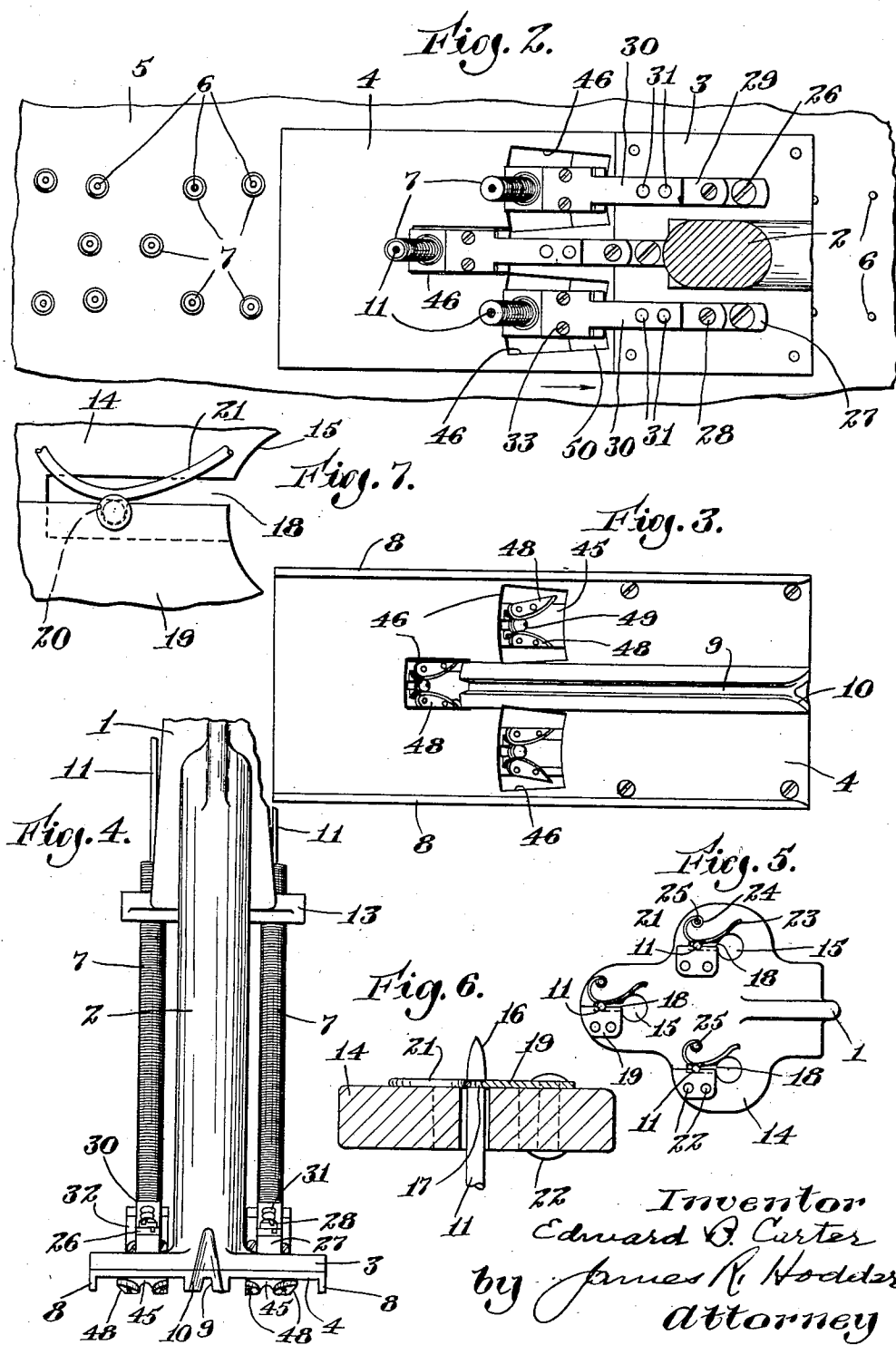
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3 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

EDWARD B. CARTER, OF BOSTON, MASSACHUSETTS

WASHER-FEEDING MACHINE

Application filed August 19, 1926. Serial No. 130,120.

My present invention relates to apparatus or machines for handling and feeding washers, and more particularly to such machines adapted to feed washers to rubber heel gang molds.

In my prior Patent #1,590,030 issued June 22, 1926, I have illustrated one form of washer handling and feeding apparatus especially adapted for use in large factories, but which, because of the expense of construction and other disadvantages, is not adaptable for use in smaller factories, such as shoe manufacturing or rubber heel manufacturing establishments.

In the rubber heel industry, it is desirable to have devices to supply or feed washers to the pins in a rubber heel gang mold, quickly and accurately, and at the same time to have a minimum number of machines to accommodate all sizes of heels to be manufactured.

It is a well known fact that the pins in rubber heel gang molds are "out of line", to provide for the curvature of the heel, and also that some of the pins in a mold will be bent or staggered, rendering it difficult to apply washers automatically thereto.

Therefore, an important object of my present invention is to provide apparatus for placing washers upon the pins in a heel mold in a quick, efficient, and accurate manner. In carrying out my present invention I have devised a portable washer feeding machine, adapted to hold a plurality of columns of washers, which machine is constructed and arranged to be "wiped" across a plurality of pins in heel layouts in a gang mold. My novel machine is extremely compact in construction, the preferred form, when fully loaded with washers, weighing under five pounds. It will thus be seen that a machine of this character, as light in weight as the present machine, can be easily operated, without fatigue to or strain on the operator.

A further feature of the present invention consists in a novel "slice feed", which I have devised for use in the present machine, and which slice feed is automatically operated during passage over and contact with the pins in the mold. This slice feed also acts

as an automatic separating, feeding, and positioning means for the washers.

My present machine comprises a suitable base and frame, having supported on said base a plurality of arms or carriers pivotally mounted and spring fulcrumed, to permit simultaneous lateral and vertical oscillation; a plurality of wires or other supports, preferably locked in position at the top of the frame, depend therefrom and enter chambers, said chambers being carried by the pivoted arms. Each of the arms carries my novel slice feed device, automatically operable upon contact of the bottom of the carrier or arm with the pin. This slice feed arrangement comprises a bell crank lever pivotally mounted in the carrier, one end of the bell crank lever rocking in a shoe affixed to a sliding plate. The other end of the bell crank lever has a pin or rod which slides in a yoked arm. Upon upward movement of the carrier, the bell crank lever will operate to slide the slice feed plate forwardly, separating the lowermost washer of the column, feeding it into position, with the aperture in the washer in position to engage the point of the pin to which it is to be fed. Guiding means are provided on the bottom of each carrier, to guide the pin into position under the washer to be fed thereto, and when the pin has reached this position the spring upon which the carrier arm is fulcrumed will force the carrier downwardly, firmly seating the washer upon its pin, retracting the slice feed plate and leaving the device in readiness for another operation. My novel apparatus is so constructed and arranged that it will operate efficiently in the slight space allowed between the pins of a mold. Also because of the lateral and vertical oscillation permitted, and the arrangement of the guiding means on the bottom of the carriers, one of these machines is enabled to supply a plurality of differently sized molds.

The wires above-mentioned, for alining the washers, are suspended within the chambers a sufficient distance to allow or permit the passage of but one washer thereunder.

Further features of the invention, novel combinations of parts, and advantages, will

be hereinafter more fully pointed out and claimed.

Referring to the drawings illustrating a preferred embodiment of my invention,

Fig. 1 is a side elevation of my novel washer placing apparatus illustrated during passage across the pins of a mold;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a bottom plan view;

Fig. 4 is a fragmentary rear elevation;

Figs. 5, 6 and 7 are details illustrating the method of locking the wires at the top of the frame;

Fig. 8 is a longitudinal sectional view of one of the washer carriers in inoperative position;

Fig. 9 being a similar view in operating position, with a washer separated, fed out, and positioned to be placed on the washer pin;

Fig. 10 is a front elevation of one of the washer carriers; and

Fig. 11 is a sectional view on the line 11—11 of Fig. 8.

As shown in the drawings, my present novel washing machine comprises a frame designated generally at 1, formed with a portion 2 to serve as a handle for drawing or wiping the machine across a mold. A plate 3 is preferably formed or cast integrally with the frame 1, and to this plate 3 is affixed a base or support 4. The machine is illustrated as traversing a mold 5, having a plurality of pins 6 formed in heel layouts, on which pins washers 7 are being and are to be positioned. The base 4 has a longitudinal reinforcing strip 8 along each side, and centrally thereof is formed a guiding track or way 9, flared at its rearmost portion, as illustrated at 10, to engage pins which may be out of line. The pins in a heel mold, as set out in heel layouts, form three lines across the mold, and this guide 9 is adapted to engage the center row of pins.

Provision for carrying the washers in the machine is made by having a plurality of wires 11, preferably three in number, although any desired number of wires from one up may be utilized. These wires and washers pass through flared recesses 12, in a laterally extending shelf or bracket 13, preferably formed as an integral part of the frame 1, which flared recesses 12 act as guiding and supporting means for the wires and washers, and permit free passage of the washers therethrough. A second laterally extending shelf 14 is provided or formed at the uppermost end of the frame 1, having therein recesses or apertures 15. The wires utilized preferably are formed with pointed heads 16, and have circumferential grooves 17 near their upper ends.

In order to provide means to hold these wires firmly in position, I have devised a

novel locking means, which will insure firm holding of the washer carrying wires in the frame. Slots 18 lead from each of the recesses 15. Small plates 19 are positioned on the top of the shelf 14, projecting partially over the slots 18, said plates 19 having small notches 20 therein. With the plate 19 in position, sufficient space is left at the top of the slot 18 to allow for the passage of the grooved portion 17 of the wire only. Aside from the grooved portion 17, the wire is too thick to permit passage between the edge of the plate 19 and the opposite side of the groove. Therefore, when the wires 11 have been loaded with washers, the operator slides the top of the wire along the grooved portion 17 into the slot 18. Entering the slot 18, the groove 17 engages a spring 21, which gives sufficiently to allow passage of the wire, and when the wire 11 reaches the notch 20 the spring 21 will force the wire thereunto, thus firmly locking the wire in position, and preventing looseness or slipping thereof during operation. The plates 19 are secured to the shelf 15 in any desired manner, as by rivets 22 or the like. The springs 21 are curved, as clearly shown in Fig. 5, one end 23 being preferably sunk in a small recess in the shelf 14, and the other end 24 being caught around a pin or the like 25.

The wires 11 are of sufficient length to hold a great number of washers, and, when the washers 7 are exhausted, the wires 11 can be readily refilled, without removal from the machine, by simply releasing the pointed end 16 from locking engagement, holding them centrally of the apertures 15 and reloading, by any suitable means. The wires would then be again locked as heretofore explained, and the machine ready for further operation.

Pivotaly mounted on the base 3 by means of pivot screws 26 are a plurality of arms 27, three being illustrated herein, and Figs. 8 and 9 being cross sectional details of one, which will suffice for all. Fixedly attached to the arm 27 by a screw or the like 28 is a spring 29. A carrying arm 30 is secured to the spring 29 in any desirable manner, as herein shown by rivets or the like 31. The carrier 32 is affixed to the carrier arm 30 by screws 33. The forward portion of the carrier 32 is formed as a chamber 34, having a flared upper end 35, to permit easy access of the washers 7 on the wires 11. As clearly illustrated in Figs. 8 and 9, the wires 11 when locked in position clear the bottom of the chamber 34 a sufficient distance to allow the passage of but one washer thereunder. A bellcrank lever 36 is mounted on a pivot 37 and has one of its arms 38 yoked, with a pin 39 therebetween. This pin 39 fits in a slot 40 at the forward end of the arm 27. This arm 27 will pivot for lateral reciprocation but is fixed against vertical oscillation. The carrier 32 and arm 30, however, affixed to the spring

29, thus have provision for vertical oscillation, but no lateral reciprocation. The other end 41 of the bellcrank lever fits in a recess 42 in a shoe 43, which shoe is set in a sliding plate 44. The carrier 32 has a bottom plate 45 on which the plate 44 slides. Clearance is provided under the walls forming the chamber 34, for the passage of the slice feed or sliding plate 44.

Fig. 8 illustrates the washer carrier and slice feed arrangement in normal position, forced downwardly by the tension of the spring 29, through recesses 46 in the base 4. At the front end of the chamber 34 a passage 47 is formed, preferably allowing the passage of but one washer at a time.

Formed on or secured to the bottom of the carrier 32, are guides 48, flaring outwardly at their rearmost portion, as clearly shown in Figs. 3 and 4 and leading to a slot 49 in the forward end of the plate 45. In passing over the mold 5, when the plate 45 comes in contact with a pin 6, as illustrated in Fig. 9, the entire carrier 32 is raised upwardly off the slanting seat 50 at the rear end of the recess 46 in the base 4, against the tension of the spring 29. The pin 39 being held between the jaws 40 of the arm 27, the end 41 of the bellcrank lever 36 is forced forwardly, pushing the shoe 43 and slice feed plate 44, also forwardly, separating the lowermost washer 51, for example, from the bottom of the column, feeding said washer forwardly, a sufficient distance to bring the recess 52 in said washer in alinement with the slot 49 in the plate 45. The guides 48 will conduct the carrier over the pin 6 until the head 53 of the pin is in alinement with the slot 49. The machine is being constantly moved across the mold, and when the head 53 of the pin thus enters the slot 49 in the plate 45, the entire carrier will drop, and be forced down by the tension of the spring 29, whereupon the washer 51 will be forced downwardly on to the head 53 of the pin, the head 53 entering the aperture or recess 52 in the washer. The carrier is now in position for contacting with the next pin in the row, whereupon this operation will be repeated. It will be appreciated that upon dropping of the carrier the bellcrank lever will be returned to normal position, together with the shoe 43 and slice feed plate 44, and that the column of washers in the chamber 34 will have dropped, leaving another in position to be engaged by the slice feed plate 44, separated from the column, fed forwardly, and positioned to be placed on a pin.

It will be appreciated that the middle carrier, as illustrated in bottom plan view in Fig. 3, will not require as great an amount of lateral reciprocation as the two outside carriers since the middle carrier follows the middle line of pins in the heel layouts, which line of pins is relatively straight. Some of

these pins, however, may be slightly out of line, or bent one way or the other. Therefore, but a slight space has been left in the recess 46 for the center carrier, for such lateral oscillation as may be requisite.

It will thus be seen that I have devised an extremely compact, efficient, and simple machine, economical of manufacture and requiring no skilled labor to operate same. The operator can shift from a mold using one size heel to another mold utilizing a larger or smaller size of heel layouts within a wide range of size, with this one machine. The machine requires no attention, except to reload or refill the wires 11 with washers, when the supply of washers thereon has been exhausted.

I believe that my novel machine is capable of use in many other fields than that of washer feeding, and therefore I do not wish to be limited, in the present application, to washer feeding, but have claimed the machine and operating parts broadly herein.

It will also be appreciated that while I have illustrated the present machine with three carriers, three reserve washer supporting or carrying wires, I am not limited to this number, but may construct the machine with but a single carrier and wire, or with any desired number. I may also substitute tubes for carrying the washers instead of the wires, within the province of the present invention.

The operation of the present device will be instantly apparent to those skilled in this art, and is as follows:

The machine being loaded with washers, and ready for operation, the operator will position the machine on one side or end of a gang mold, with the central pin, for example, of three rows of pins, entering the flaring end 10 of the central guide 9. The machine will then be wiped rapidly across the mold. As each pin comes in contact with the bottom plate 45 of the carrier, an upward movement thereof will be started. Coming into the guides 48 lateral reciprocation of the carrier will be effected, so that the pin will be directed into the slot 49. As the carrier moves upwardly, the bellcrank lever oscillates on its pivot 37, the end 41 rocking in the shoe 43 and moving the same forwardly together with the slice feed plate 44. The plate 44 engages the lowermost washer of the column, separates it therefrom, feeds it forwardly, and the washer is held in place by the remainder of the column and by resting on the forward end of the plate 45, until the pin head 53 enters the slot 49, whereupon the spring 29 will force the entire carrier downwardly, firmly and positively seating the washer 51, as shown in Fig. 9, on the head of the pin. The bellcrank lever, shoe and plate 44 will instantly return to normal position, so that, no matter how slight a space may be between the pins,

the machine will function rapidly enough to position a washer on every pin.

It will be appreciated that while I have necessarily described my present invention somewhat in detail, I may vary the size, shape, arrangement and number of parts, within wide limits without departing from the spirit of the invention.

While I have illustrated conical washers as being utilized in instant machine, it will be apparent that the machine will function equally well with flat washers or other articles of various shapes, which are desirable for use in certain classes or types of rubber heels. No change whatever in the mechanism of the machine is requisite to handle such flat washers. Furthermore, slight variations or fluctuations in the sizes of washers, whether conical, convex or flat, will be immaterial, as the successful operation of the machine does not depend upon having an absolutely or strictly standard size of washer or article.

I believe that it is entirely novel with me to have devised a machine or apparatus of the type illustrated and described herein, wherein a stack or stacks of articles are carried, and wherein the operating mechanism is automatically controlled and operated by the devices to which the articles are to be fed, or on which said articles are to be positioned, and I therefore include, in the present application, claims to this feature broadly.

My machine will function equally as well with high pins as with low pins, fluctuations or variations in the heights of these pins in various molds, not affecting the successful operation of the machine. In other words, the machine as illustrated in the drawings is constructed so that the plate 45 will strike a pin, even if said pin is of the lowest type utilized. Thus the guides 48 and plate 45 will correctly position the washer carriers irrespective of the height of the pins or other devices, to which the articles in the carrier are to be fed.

I also preferably utilize spring metal for the plate 45, and provide space thereunder, at the forward end, as clearly shown in Figs. 8, 9 and 10, to provide for a "give" downwardly of this plate 45, in the event that a thick washer should be presented to the slice feed arrangement. The spring plate 45, however, will be of sufficient rigidity to be unaffected by a thin or a normal washer. However, if a thick washer is at the lowermost part of the column, when engaged by the slice feed plate 44, it would normally be prevented from passing from the carrier by the walls of the passage 47. However, pressure being exerted on the washer, the plate 45 will "give" sufficiently to allow the passage of the washer. Thus it will be seen that in my novel machine I may use washers of varying thickness, varying diameters, flat or convex, within wide ranges, without affecting the successful and efficient functioning of the machine.

I may also, if desired, provide greater clearance of the wires 11, at the bottom of the chamber 34, by utilizing differently shaped wires at the top, although the form illustrated herein is very efficient in operation. I may also form the tops 16 of the wire recessed instead of pointed, dependent on the type of refill or loading wires used to transfer washers to the wires 11.

I do not wish to be limited, in the present application to the operation of my novel slice feed arrangement by contact with pins or studs, or the like, as I may desire to utilize this slice feed in connection with other lines of work, wherein the slice feed would be automatically operated by means other than the work to which the articles fed are to be delivered.

Numerous applications of the utility of my novel machine will doubtless present themselves to those skilled in the arts.

My invention is further described and defined in the form of claims as follows:

1. In a machine of the kind described, a column of articles adapted to be positioned on devices, and means automatically operable by said devices to separate the lowermost article from said column.

2. In a machine of the kind described, a column of articles adapted to be positioned on devices, and means automatically operable by said devices to feed the lowermost article from said column.

3. In a machine of the kind described, a column of articles adapted to be positioned on devices, and means automatically operable by said devices to separate and feed the lowermost article from said column.

4. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, and means automatically operable by said pins to separate the lowermost washer from said column.

5. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, and means automatically operable by said pins to feed the lowermost washer from said column.

6. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, and means automatically operable by said pins to separate and feed the lowermost washer from said column.

7. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, and means automatically operable by said pins to separate and feed the lowermost washer from said column, and position said washer for engagement by one of said pins.

8. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, and means automatically operable by said pins to separate the lowermost washer from said column, said

means comprising a slice feed plate normally disengaged from said washer.

9. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, and means automatically operable by said pins to feed the lowermost washer from said column, said means comprising a slice feed plate normally disengaged from said washer.

10. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, and means automatically operable by said pins to separate and feed the lowermost washer from said column, said means comprising a slice feed plate normally disengaged from said washer.

11. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, and means automatically operable by said pins to separate and feed the lowermost washer from said column, and position said washer for engagement by one of said pins, said means comprising a slice feed plate normally disengaged from said washer.

12. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, a chamber in said carrier for containing a column of washers, and means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered.

13. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, means permitting vertical oscillation of said carrier, a chamber in said carrier for containing a column of washers, and means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered.

14. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber, and means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered.

15. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, means

permitting vertical oscillation of said carrier, a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber, and means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered.

16. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber, and being spaced a sufficient distance above the bottom of said chamber to permit the passage of but one washer at a time thereunder, and means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered.

17. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, means permitting vertical oscillation of said carrier, a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber, and being spaced a sufficient distance above the bottom of said chamber to permit the passage of but one washer at a time thereunder, and means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered.

18. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber, and being spaced a sufficient distance above the bottom of said chamber to permit the passage of but one washer at a time thereunder, means at the top of said frame to lock said wires against movement, and means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered.

19. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, means permitting vertical oscillation of said carrier,

a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber, and being spaced a sufficient distance above the bottom of said chamber to permit the passage of but one washer at a time thereunder, means at the top of said frame to lock said wires against movement, and means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered.

20. A machine of the kind described, comprising a frame, a base, a carrier mounted for lateral and vertical reciprocation on said base and extending through a recess therein, a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber, spaced a sufficient distance above the bottom of said chamber to permit the passage of but one washer at a time thereunder, means at the top of said frame to lock said wires against movement, a fixed longitudinal guideway on said base leading to guides on said carrier, said guides being adapted to conduct said carrier over a pin in a mold, and means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by said pin.

21. In a machine of the kind described a column of washers adapted to be positioned on pins in a heel mold, means automatically operable by said pins to separate and feed the lowermost washer from said column, said means comprising a slice feed plate normally disengaged from said washer, and adapted to be moved into engagement with said washer by means of a pivoted bellcrank lever rocking in a shoe on said plate.

22. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, means automatically operable by said pins to separate and feed the lowermost washer from said column and position said washer for engagement by one of said pins, and means to positively place said washer on said pin.

23. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, means automatically operable by said pins to separate and feed the lowermost washer from said column and position said washer for engagement by one of said pins, said means comprising a slice feed plate normally disengaged from said washer, and means to positively place said washer on said pin.

24. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, means automatically

operable by said pins to separate and feed the lowermost washer from said column and position said washer for engagement by one of said pins, means to positively place said washer on said pin, and means to permit the feeding of washers of varying thicknesses.

25. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, means automatically operable by said pins to separate and feed the lowermost washer from said column and position said washer for engagement by one of said pins, said means comprising a slice feed plate normally disengaged from said washer, means to positively place said washer on said pin, and means to permit the feeding of washers of varying thicknesses.

26. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, means automatically operable by said pins to separate and feed the lowermost washer from said column and position said washer for engagement by one of said pins, means to positively place said washer on said pin, and adjustable means to permit the feeding of washers of varying thicknesses.

27. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, means automatically operable by said pins to separate and feed the lowermost washer from said column and position said washer for engagement by one of said pins, said means comprising a slice feed plate normally disengaged from said washer, means to positively place said washer on said pin, and adjustable means to permit the feeding of washers of varying thicknesses.

28. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, means automatically operable by said pins to separate and feed the lowermost washer from said column and position said washer for engagement by one of said pins, means to positively place said washer on said pin, and automatically adjustable means to permit the feeding of washers of varying thicknesses.

29. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, means automatically operable by said pins to separate and feed the lowermost washer from said column and position said washer for engagement by one of said pins, said means comprising a slice feed plate normally disengaged from said washer, means to positively place said washer on said pin, and automatically adjustable means to permit the feeding of washers of varying thicknesses.

30. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, means automatically operable to separate and feed the lowermost

washer from said column and position said washer for engagement by one of said pins, means to positively place said washer on said pin, and a spring supporting plate beneath said column of washers automatically adjustable to permit the passage of washers of varying thicknesses.

31. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, means automatically operable to separate and feed the lowermost washer from said column and position said washer for engagement by one of said pins, said means comprising a slice feed plate normally disengaged from said washer, means to positively place said washer on said pin, and a spring supporting plate beneath said column of washers automatically adjustable to permit the passage of washers of varying thicknesses.

32. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, means automatically operable by said pins to separate and feed the lowermost washer from said column and position said washer for engagement by one of said pins, means to positively place said washer on said pin, and a spring supporting plate beneath said column of washers automatically adjustable to permit the passage of washers of varying thicknesses.

33. In a machine of the kind described, a column of washers adapted to be positioned on pins in a heel mold, means automatically operable by said pins to separate and feed the lowermost washer from said column and position said washer for engagement by one of said pins, said means comprising a slice feed plate normally disengaged from said washer, means to positively place said washer on said pin, and a spring supporting plate beneath said column of washers automatically adjustable to permit the passage of washers of varying thicknesses.

34. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, a chamber in said carrier for containing a column of washers, means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered, and means to positively place said washer on said pin.

35. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, means permitting vertical oscillation of said carrier, a chamber in said carrier for containing a column of washers, means automatically operable by contact with a pin in said mold to separate the lowermost washer from said

column and feed said washer to position for engagement by the pin to which said washer is to be delivered, and means to positively place said washer on said pin.

36. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber, means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered, and means to positively place said washer on said pin.

37. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, means permitting vertical oscillation of said carrier, a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber, means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered, and means to positively place said washer on said pin.

38. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, a chamber in said carriers for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber, and being spaced a sufficient distance above the bottom of said chamber to permit the passage of but one washer at a time thereunder, means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered, and means to positively place said washer on said pin.

39. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, means permitting vertical oscillation of said carrier, a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber and being spaced a sufficient distance above the bottom of said chamber to permit the passage of but one washer at a time thereunder, means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to

position for engagement by the pin to which said washer is to be delivered, and means to positively place said washer on said pin.

40. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber and being spaced a sufficient distance above the bottom of said chamber to permit the passage of but one washer at a time thereunder, means at the top of said frame to lock said wires against movement, means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered, and means to positively place said washer on said pin.

41. A machine for delivering washers to pins in a mold, comprising a frame, a base, a carrier pivotally mounted on said base and extending through a recess therein, means permitting vertical oscillation of said carrier, a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber and being spaced a sufficient distance above the bottom of said chamber to permit the passage of but one washer at a time thereunder, means at the top of said frame to lock said wires against movement, means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered, and means to positively place said washer on said pin.

42. A machine of the kind described, comprising a frame, a base, a carrier mounted for lateral and vertical reciprocation on said base and extending through a recess therein, a chamber in said carrier for containing a column of washers, a washer retaining wire suspended from the top of said frame and entering said chamber, spaced a sufficient distance above the bottom of said chamber to permit the passage of but one washer at a time thereunder, means at the top of said frame to lock said wires against movement, a fixed longitudinal guideway on said base leading to guides on said carrier, said guides being adapted to conduct said carrier over a pin in a mold, means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by said pin, and means to positively place said washer on said pin.

43. A machine for delivering articles to devices, comprising a frame, a base on which

said frame is mounted, said machine resting on and being guided by said devices, a column of washers carried by said machine, and means automatically operable to separate and feed the lowermost article from said column.

44. A machine for delivering articles to devices, comprising a frame, a base on which said frame is mounted, said machine resting on and being guided by said devices, a column of washers carried by said machine, means automatically operable to separate and feed the lowermost article from said column, and means to positively place said article on said device.

45. A machine for delivering washers to pins in a heel mold, comprising a frame, a base on which said frame is mounted, said machine resting on and being guided by said pins, a column of washers carried by said machine, and means automatically operable to separate and feed the lowermost washer from said column.

46. A machine for delivering washers to pins in a heel mold, comprising a frame, a base on which said frame is mounted, said machine resting on and being guided by said pins, a column of washers carried by said machine, means automatically operable to separate and feed the lowermost washer from said column, and means to positively place said washer on said pin.

47. A machine for delivering washers to pins in a heel mold, comprising a frame, a base on which said frame is mounted, said machine resting on and being guided by said pins, a column of washers carried by said machine, and means automatically operable by said pins to separate and feed the lowermost washer from said column.

48. A machine for delivering washers to pins in a heel mold, comprising a frame, a base on which said frame is mounted, said machine resting on and being guided by said pins, a column of washers carried by said machine, means automatically operable by said pins to separate and feed the lowermost washer from said column, and means to positively place said washer on said pin.

49. A machine for delivering washers to pins in a heel mold, comprising a frame, a base on which said frame is mounted, said machine resting on and being guided by said pins irrespective of height of said pins, a column of washers carried by said machine, means automatically operable by said pins to separate and feed the lowermost washer from said column, and means to positively place said washer on said pin.

50. A machine for delivering washers to pins in a mold, comprising a frame, a base resting on and being guided by said pins, a carrier pivotally mounted on said base and extending through a recess therein, a chamber in said carrier for containing a column of washers, means automatically operable by

contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered, and means to positively place said washer on said pin.

51. A machine for delivering washers to pins in a mold, comprising a frame, a base resting on and being guided by said pins, a carrier pivotally mounted on said base and extending through a recess therein, means permitting vertical oscillation of said carrier, a chamber in said carrier for containing a column of washers, means automatically operable by contact with a pin in said mold to separate the lowermost washer from said column and feed said washer to position for engagement by the pin to which said washer is to be delivered, and means to positively place said washer on said pin.

52. A device for placing washers upon the pins of a mold by relative traverse between the device and the mold, having in combination, a magazine for a stack of washers, and means operated by a mold pin during said traverse for displacing the lowermost washer from the stack and moving it into position to be threaded upon the mold pin.

53. A device for separating end washers successively from a stack of washers, having in combination, a member upon which the washers are threaded, yieldable means for holding the stack upon said member and means for overcoming said yieldable means to cause relative movement between the member and the stack.

54. A washer placing device adapted to be caused to travel over a mold pin having, in combination, a magazine for a stack of washers, a feed member for displacing the lowermost washer, and an actuator therefor located in position to be operated by transverse engagement with the mold pin.

55. A device for placing washers upon the pins of a mold by relative traverse between the mold and the device, having in combination, a magazine for a stack of washers, a feed member, and means operated by a mold pin during said traverse for causing the feed member to engage a washer on its periphery and move it into position to be threaded upon the pin.

56. A device for placing washers upon the pins of a mold by relative movement between the mold and the device, having in combination, a magazine for a stack of washers, a feed slide movable transversely of the stack to displace the lowermost washer, actuating means for said slide operable by engagement with a mold pin, and means for holding the washer in its displaced position.

57. A device for placing washers upon the pins of a mold by relative traverse between the device and the mold, having in combination, a substantially flat shoe which rests upon

the top of the pins, a magazine for a stack of washers carried by said shoe, and means responsive to said relative traverse for causing the successive lowermost washers of the stack to be threaded successively upon successively encountered mold pins.

58. A device for placing washers upon the pins of a mold by relative traverse between the mold and the device, having in combination, a magazine for a stack of washers, a feed member, and means operated by a mold pin during said traverse for causing said member to engage a washer on its periphery and move it into a position inclined to the axis of the mold pin.

59. A device for placing washers upon the pins of a mold by relative movement between the mold and the device, having in combination, a magazine for a stack of blanks, a feed slide movable transversely of the stack to displace the lowermost washer, and means operated by a mold pin during said relative movement for operating the feed slide.

60. A device for placing washers upon the pins of a mold by relative traverse between the mold and the device, having in combination, a shoe, a magazine for a stack of washers pivotally mounted thereon, a feed slide movable transversely of the stack to displace the lowermost washer of the stack, and means operated by a mold pin during said traverse for operating the feed slide.

61. A device for placing washers upon the pins of a mold by relative traverse between the mold and the device, having in combination, a magazine for a stack of blanks, rigid means for engaging the under side of the forward portion of the lowermost washer, yielding means for engaging the under side of the rear portion of said washer, a feed member, and means responsive to such traverse for pushing the washer off from the rigid means into position to be held between the yielding means and the under side of the next-to-the-lowermost washer.

In testimony whereof, I have signed my name to this specification.

EDWARD B. CARTER.