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W. D. KMENTT

WASHER FEEDING APPARATUS

Filed Nov. 17, 1923

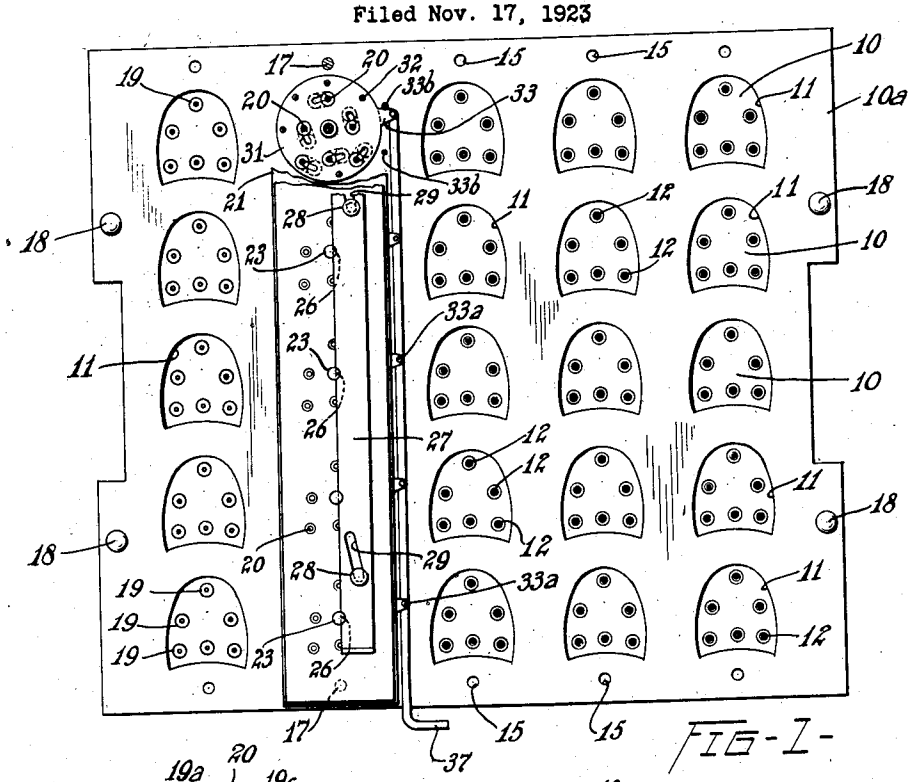


FIG-1-

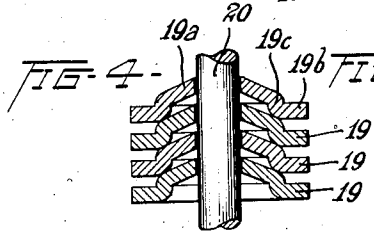


FIG-4-

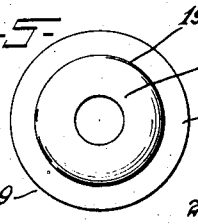


FIG-5-

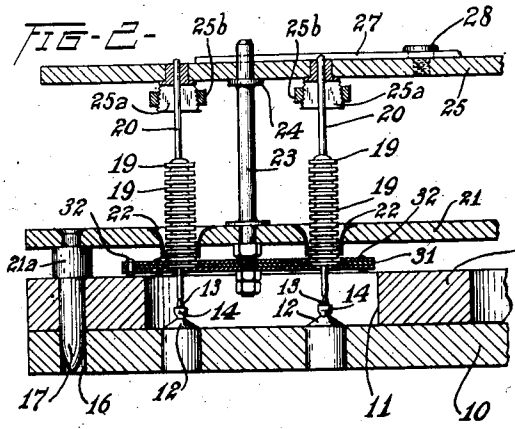


FIG-2-

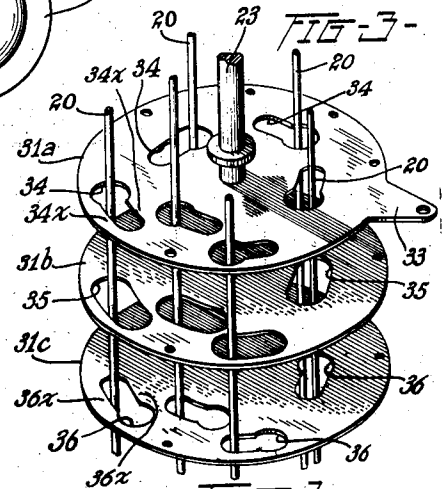


FIG-3-

Inventor
Waldemar D. Kmentt.
By Robert M. Pierson
Atty.

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UNITED STATES PATENT OFFICE.

WALDEMAR D. KMENTT, OF AKRON, OHIO, ASSIGNOR TO THE B. F. GOODRICH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

WASHER-FEEDING APPARATUS.

Application filed November 17, 1923. Serial No. 675,425.

This invention relates to anchorage inserts such as the metal washers commonly used in rubber heels for shoes, the washers serving as anchorages for the nails by which the heel is secured to the shoe, and to apparatus for manipulating such inserts, as in mounting them upon the respective heel-mold pins by which they are held in proper position during the molding and vulcanizing of the heel.

Apparatus heretofore has been used in which conical washers have been threaded, in stacked relation, upon a set of guide pins adapted to be presented to the heel-mold pins in axial alignment therewith, said apparatus being provided with pick-off means for supporting the stacks of washers upon the several guide-pins and picking off or releasing the lowermost washer of each stack, to slide from the guide pin onto the heel-mold pin. Each washer has been formed with a bur on the convex face of its margin which defines its central aperture, as by forming the aperture by means of a tapered punch, the purpose of the bur being to space apart the base portions of the washers in the stack, to permit an element of the pick-off device to enter between them.

A disadvantage of washers so formed is that the spacing bur normally affords contact between adjacent washers only at their central portions, and consequently permits the washers to tilt irregularly, out of parallel relation to each other, so that the base portions of adjacent washers are closer together at one side than the other, resulting in imperfect operation or jamming of the pick-off device. The apparatus heretofore used as described also has certain defects, in that the guide-pins are unduly susceptible of mis-alignment, excessive friction is present in the sliding elements of the pick-off device, and, notwithstanding heavy construction of parts, distortion of elements under conditions of handling and use has resulted in defective operation.

My chief objects are to provide an improved washer, particularly adapted for use with apparatus of the class described, and improved, easily operated, accurate and dependable apparatus for manipulating such washers. More specific objects are lightness, simplicity and strength of construction in the apparatus, and adequate and uniform spacing-apart of the base portions of the washers as the latter are stacked upon the guide pins.

Of the accompanying drawings,

Fig. 1 is a plan view of a heel mold and a heel mold washering device embodying a preferred form of my invention, parts of the latter being broken away for clearness of illustration.

Fig. 2 is a fragmentary, vertical section of the mold and washering device.

Fig. 3 is a perspective view of parts of a washer-feeding mechanism, comprising three perforate discs, the latter being shown in detached relation for clearness of illustration.

Fig. 4 is a vertical section of a stack of my improved washers mounted upon a washer-guiding pin.

Fig. 5 is a plan view of one of the washers.

Referring to the drawings, 10 is the floor plate and 10^a the middle plate of a three-plate heel mold, the middle plate being formed with rows of heel-shaped apertures which constitute mold cavities 11, 11, when the plates 10 and 10^a are assembled as shown in Figs. 1 and 2, each cavity having a number of washer-supporting pins 12, 12, rising from its floor, each of said pins terminating at its upper end in a small washer-receiving portion 13 adapted to occupy the central aperture of a heel washer, and the base of said portion being surrounded by a shoulder 14 to limit the downward movement of the washer upon the pin. The plates 10 and 10^a are formed at each end of each row of mold cavities with registering dowel apertures, those of the middle plate being shown at 15, 15, Fig. 1, and one of those of the floor plate being shown at 16, Fig. 2, said registering apertures being adapted to receive dowels 17 upon my washering device to position the latter upon the mold. 18, 18, Fig. 1, are dowels mounted upon the floor plate 10 of the mold and adapted to occupy apertures in the middle plate and in the cover plate (not shown), to position the said plates with relation to each other.

Each of my improved washers, shown at 19, 19, is formed, preferably by stamping from sheet metal, with a substantially conical, apertured, central portion 19^a, a substantially plane, annular flange 19^b constituting the outer periphery of the washer, and with what may be termed a substantially cylindrical or more steeply coned portion 19^c between the central coned portion 19^a and the

plane outer margin or base flange 19b, so that when the washers are strung upon a guide such as the pin 20 (see Fig. 4) the annular base flanges 19b will be adequately spaced apart axially, adjacent washers bearing against each other in the annular zone of the portion 19c, and the wide bearing thus afforded serving to prevent objectionable tilting of the washers.

My improved washer-placing device comprises a lower frame plate 21 and spacer blocks 21a, 21a secured to the bottom face thereof and adapted to seat upon the mold to space the washering device above the latter, said spacer carrying the dowels 17 above mentioned, for registering it upon the mold. Mounted in suitable apertures through the frame plate 21 are washer-guiding sleeves 22, 22 (Fig. 2) adapted to register with the mold pins as said device is deposited upon the mold, said sleeves being of slightly greater diameter than the washers, so as to permit passage of the stack of washers therethrough while preventing substantial lateral displacement of the stack, and said sleeves are flared at their upper ends to facilitate the entry therein of the washers and of washer-guiding pins hereinafter described. Mounted on the lower frame plate 21 at the middle of each group of guide-sleeves 22 is a spacer and spindle rod 23, one portion of which extends upward from said plate and is formed near its upper end with a flange 24 adapted to be abutted by an upper frame plate 25 having apertures which receive the upper end portions of the several rods 23, the latter thus serving to register said upper frame plate 25 with the lower frame plate 21 and hold it spaced therefrom. For latching the top plate 25 upon the rods 23, each of the latter is formed with a latching notch in the side of its upper end portion as shown at 26, 26, (Fig. 1) and a latching bar 27 is slidably mounted upon the upper face of the top plate 25, its margin being adapted, when said bar is slid longitudinally in one direction, to enter concurrently the notches 26 of the several rods 23, and, when the bar is moved in the opposite direction, to be retracted therefrom, under the action of a pair of cam studs 28, 28 occupying cam slots 29, 29 in the bar 27, said studs being screwed into the plate 25 and formed with heads for slidably retaining said bar upon said plate.

Projecting downward from the top plate 25 and secured thereto by taper-threaded clamping sleeves 25a, 25a pressed into apertures in said plate and provided with clamping nuts 25b, 25b, are the washer-guide pins, 20, 20, adapted to pass through the respective washer-guiding sleeves 22 when the upper frame plate is mounted upon the rods 23, said pins being adapted to register with and approximately abut the washer receiving portions 13 of the mold pins 12 when the washering device is positioned upon the mold, so as to guide the washers 19, strung upon said guide pins 20, onto said mold pins.

For supporting the stacks of washers strung upon the several guide pins 20 when the device is in operative position, and for concurrently releasing one washer only from each stack at each operation, a disc-like pick-off structure 31, below the lower frame plate 21, is rotatably mounted upon each of the rods 23, which project below the lower frame plate 21. Each of said pick-off structures comprises three face-to-face plates 31a, 31b and 31c, said plates being secured together by rivets 32, 32, and the plate 31a is formed at its outer periphery with an ear 33, adapted to serve as a lever for oscillating the structure 31 about the rod 23. Said plates are formed, in portions thereof registrable with the mold pins 12, with slots accommodating the respective washer-guiding pins 20 and adapted, upon the oscillation of the structure 31, to release the washers 19, one at a time, from the bottom of each stack.

For so releasing the washers in succession, the slots of the uppermost washer supporting and releasing plate 31a, are of key-hole shape, said slots being shown at 34, 34, the wider portion of each slot being substantially circular and of sufficient size to permit the passage of a washer when the structure 31 is in such angular position as to register it with the stack of washers, while the narrower portion of the slot is elongate and of such width as to receive the relatively narrow portion of the washer projecting axially from the peripheral flange portion 19b, but not of sufficient width to permit the passage of said flange portion. Said plate 31a is sufficiently thin to permit the marginal portions 34x, 34x, thereof, which define the slot, to enter between the flange portions 19b of the washers stacked or threaded upon the guide pins 20, when the structure 31 is so turned as to cause said guide pins to enter the narrow portion of the slot 34.

The slots, shown at 35, 35, of the middle plate, 31b, are of such width throughout their length as to permit the passage of the washers 19, and said middle plate is slightly thicker than the flange portion 19b of the washer, so that when a washer occupies the slot 35, the washer resting upon the slot-defining margins 36x, 36x, of the lower plate 31c as shown in Fig. 2, the uppermost plate 31a will be supported slightly above and thus clear of the flange of the lowermost washer, so that said flange will not, by refusing to enter the narrow part of the slot 34, interfere with the oscillation of the structure 31.

The slots, shown at 36, 36, of the lowermost plate 31c are of the same size and shape as the slots 34 of the uppermost plate but are reversed in position, the large end of the

key-hole-shaped slot 36 underlying the small end of the key-hole-shaped slot 34, so that the lowermost washer of the stack may pass through said large end of the slot 36 while the structure 31 is in such angular position that the remainder of the stack is supported by the slot-defining portions 34^x of the uppermost plate 31^a. While the middle plate, 31^b, which serves merely as a spacer, must be slightly thicker than the flange portion of the washer, the lowermost plate, 31^c, may be of any desired thickness, and the uppermost plate, 31^a, may be of any thickness less than the distance between the base flanges of adjacent washers in the stack, so long as it is of sufficient strength. For convenience of construction, all three plates may be formed of sheet material of the same thickness, said material being of slightly greater thickness than that of which the washers are made, and the washers being formed as described so as to provide adequate spacing apart of their flange portions when they are assembled in supporting contact with each other upon the guide pins 20. The middle plate, 31^b, serves only as a spacer, the narrow portion of the slot 36 needs only to be sufficiently wide to accommodate the guide-pin 20, and the wide portions of the slots 36 and 34 may be of any size larger than the washers. My invention therefore is not wholly limited to the configuration of slots here shown, the relation of the marginal, washer supporting portions 34^x and 36^x being the matter of chief importance, but I prefer to make the plates as shown, as a matter of strength and convenience of construction.

For oscillating the several washer supporting and releasing structures 31, a hand bar 37, common to said structures, is pivoted at 33^a, 33^a (Fig. 1) to the several ears or levers 33 of the latter, said levers and the hand bar 37 acting as parts of a parallel motion in oscillating the structures 31. Stop pins 33^b, 33^b, are mounted upon the base plate 21 and adapted to be abutted by the levers 33 of the respective pick-off devices, to prevent the guide pins 30 from being bent out of alignment by the pick-off device at the limit of the latter's movement.

In the operation of the device, assuming the same to have been emptied of washers in use, the latching bar 27 is drawn toward the observer as viewed in Fig. 1, the cam studs 28 in the slots 29 causing the bar 27 to become disengaged from the notches 26 of the rods 23. The top plate 25 is then freely removed from the bars 23 and is inverted and a supply of the washers 19 are stacked or threaded upon the several guide pins 20. While the top plate 25 and parts mounted thereon are still held in inverted or substantially inverted position, the base plate 21 and parts carried thereby are reassembled with the first mentioned parts, and locked in assembled relation therewith by sliding the latching bar 27 back into latching position. The assembled device is then turned right side up, the several stacks of washers 19 then resting, let it be assumed, upon the top plate 31^a of the pick-off device, at the narrow part of the slot 34 therein. The device is mounted upon the mold over a row of heel cavities, the dowels 17 being entered in the apertures 15, 16 of the plates 10^a and 10. The hand bar 37 is then first pushed away from the observer, as viewed in Fig. 1, turning the pick-off devices counter-clockwise, and thereby permitting the lowermost washer of each stack to pass through the large portion of the slot 34 of the uppermost plate 31^a into the slot 35 of the middle plate 31^b, said washer coming to rest upon the lowermost plate 31^c, the narrow portion of the slot 36 in said lowermost plate at that time underlying the stack of washers. The hand bar 37 is then pulled in the opposite direction, turning the several structures 31 clock-wise as viewed in Fig. 1. In this movement the lowermost plate 31^c, supporting the stack of washers, slides beneath the same until the large end of the slot 36 reaches the lowermost washer, permitting it to drop through said plate and onto the washer receiving portion 13 of the mold pin 12, the washer being guided thereonto by the lower end portion of the guide pin 20. Before the lowermost washer is thus released by being brought into registry with the large end of the slot 36, the narrow end of the slot 34 in the uppermost plate, 31^a, reaches the stack of washers and the marginal portions 34^x of said plate, which define said slot, enter between the flanges 19^b of the two lowermost washers, thereafter supporting the remainder of the stack of washers, as they did at the beginning of the washer-dropping operation described. The device is similarly actuated with respect to successive rows of mold cavities until some or all of the guide pins 20 are emptied of washers, and the operation as described, including the recharging of the device with a supply of washers, is repeated.

The device is of light and simple construction, the sliding of elements upon each other is greatly reduced as compared with devices of this general character heretofore used, with a corresponding reduction of the effort required for operation, the plates 31^a, 31^b and 31^c being rotatably or pivotally mounted, and the device is rapid and accurate in operation. The rods 23 serve both as spacers for the plates 21 and 25 and as spindles for the respective pick-off devices. A spacer or brace is thus provided in the center of each group of pick-off slots, so that accuracy of spacing and rigidity of frame structure is thus locally provided, extreme accuracy being essential to the proper functioning of

such devices Quick detachability of the separable sections of the apparatus is provided in the action of the latching bar 27. The washers, being formed as described, not only provide adequate and regular spacing of their base margins and security against tilting, but may be economically manufactured. The pick-off devices, being positioned below the lower frame plate 21 and closely adjacent the guide-sleeves 22 mounted thereon, are adapted to release the successive washers very close to the mold pins, and the guide-sleeves and pick-off devices are adapted to act against the several stacks of washers, without substantial leverage, so that bending of the pins out of alignment and disruption of the orderly arrangement of the washers in the stack are avoided.

My invention is susceptible of modification within its scope, and I do not wholly limit my claims to the specific construction shown.

I claim:

1. Washer-manipulating apparatus comprising a frame structure, a washer-guiding pin mounted thereon and having a freely projecting lower end portion, and a pick-off device adapted to release in succession washers stacked on said pin while supporting the remainder of the stack, said pick-off device comprising three plates secured together in face-to-face contact, the upper and lower plates being adapted alternately to support a stack of washers mounted on said pin as the plates are actuated through successive movements, and the middle plate being so formed as to permit the free passage of washers from the upper to the lower plate.

2. Washer-manipulating apparatus comprising an upper frame structure, a plurality of washer-guiding pins projecting downward therefrom, a lower frame structure associated with said upper frame structure, a plurality of pick-off devices pivotally mounted on said lower frame structure, each of said pick-off devices being common to a group of said washer-guiding pins and adapted, upon being oscillated, to release the lowermost washer from each of stacks of washers mounted on the several pins of the group while supporting the remainder of each stack, an axle member for each of said pick-off devices, each axle member being secured to said lower frame member and adapted to serve as a spacer between the latter and said upper frame member, and quick-detachable means for securing said upper frame structure to said axle members.

3. Washer-manipulating apparatus as defined in claim 2, the quick-detachable means comprising a latching bar common to said axle members and slidably mounted upon the upper frame structure, said axle members extending through apertures in said upper frame structure and being formed with respective latching notches adapted to receive said latching bar.

4. Washer-manipulating apparatus comprising an upper frame structure, a washer-guiding pin freely projecting downward therefrom, a lower frame structure so associated with said upper frame structure that said pin projects past said lower frame structure, and a pick-off device under said lower frame structure, operatively attached thereto and adapted, upon being actuated, to release the lowermost washer from a stack of washers mounted upon said pin while supporting the remainder of the stack.

5. Washer-manipulating apparatus comprising an upper frame structure, a washer-guiding pin freely projecting downward therefrom, a lower frame structure so associated with said upper frame structure that said pin projects past said lower frame structure, a pick-off device under said lower frame structure, operatively attached thereto and adapted, upon being actuated, to release the lowermost washer from a stack of washers mounted upon said pin while supporting the remainder of the stack, and means on said lower frame structure adapted by contact with a washer in the stack to prevent displacement of said pin by the force of said pick-off device.

6. Washer-manipulating apparatus comprising an upper frame structure, a set of washer-guiding pins freely projecting downward therefrom, a lower frame structure so associated with said upper frame structure that said pins project past said lower frame structure, and a pick-off device under said lower frame structure, pivoted thereto and adapted, upon being oscillated, to release the lowermost washer from each of stacks of washers mounted upon said pins while supporting the remainder of the stack.

7. Washer-manipulating apparatus comprising an upper frame structure, a set of washer-guiding pins freely projecting downward therefrom, a lower frame structure so associated with said upper frame structure that said pins project past said lower frame structure, a pick-off device under said lower frame structure, pivoted thereto and adapted, upon being oscillated, to release the lowermost washer from each of stacks of washers mounted upon said pins while supporting the remainder of the stack, and means on said lower frame structure adapted by contact with washers in the stacks to prevent displacement of said pins by the force of said pick-off device.

In witness whereof I have hereunto set my hand this 14th day of November, 1923.

WALDEMAR D. KMENTT.