Sept. 8, 1942. C. S. KNIGHT 2,295,090

METHOD OF AND APPARATUS FOR TRIMMING RUBBER HEELS

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Fig. 1

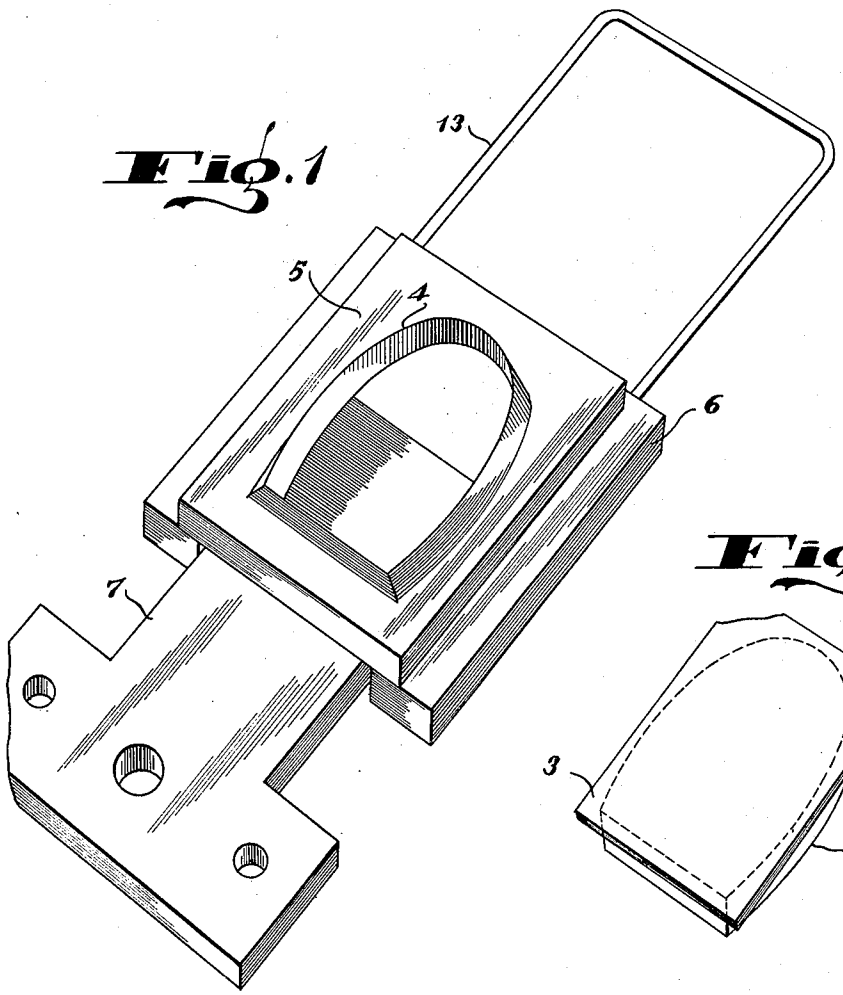
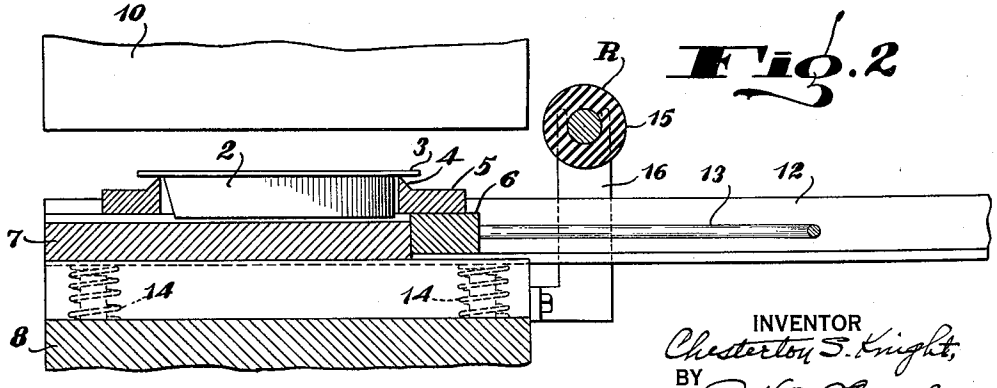



Fig. 6




Fig. 2




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Fig. 3

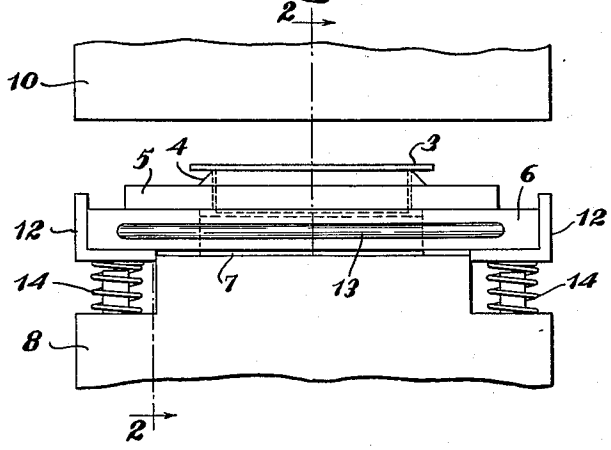



Fig. 5

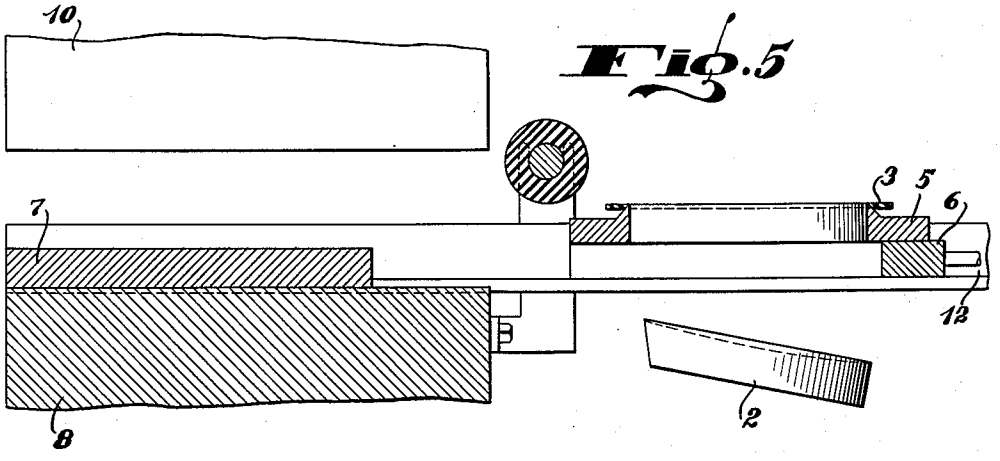
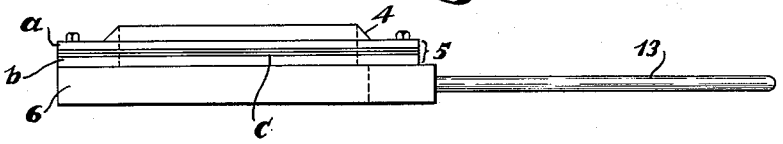



Fig. 4




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# UNITED STATES PATENT OFFICE

2,295,090

## METHOD OF AND APPARATUS FOR TRIMMING RUBBER HEELS

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Application March 20, 1941, Serial No. 384,334

9 Claims. (Cl. 164—29)

When a rubber heel is removed from the mold cavity in which it has been shaped and vulcanized, it practically always has a fin or flange of rubber projecting laterally from its upper edge and extending more or less completely around the heel. This flange (commonly referred to as "flash") is the overflow or surplus stock which has been introduced in the mold in order to be sure that the cavity will be completely filled out. Some overflow necessarily results, varying somewhat in quantity with different heels produced in the cavities of the same mold, and this surplus material must be trimmed off before the heels are sold. Such a trimming operation is laborious and naturally increases the manufacturing expense of the product.

The present invention is especially concerned with this flash trimming operation, and it aims to improve both the methods and the apparatus used in this process with a view to accomplishing this result more efficiently and economically.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a perspective view of a novel die structure which forms one feature of this invention;

Fig. 2 is a vertical, sectional view of apparatus designed for use in performing the method of this invention, this view being taken approximately on the line 2—2, Fig. 3;

Fig. 3 is a front elevation of the parts shown in Fig. 2 but omitting the roll;

Fig. 4 is a side view of a die structure similar to that shown in Fig. 1 but differing from it in respects later to be described;

Fig. 5 is a view similar to Fig. 2 and showing the parts in position to discharge the trimmed heel; and

Fig. 6 is a perspective view of a typical rubber heel before being trimmed.

Referring first to Fig. 6, a rubber heel as it is removed from a cavity of a heel mold after the molding operation has been completed is there shown. It includes a heel body 2 of any suitable shape with the flange or flash 3 projecting from its upper edge, as above described.

The mechanism provided by this invention for trimming off the flash includes a die structure, a preferred form of which is illustrated in Fig. 1. It comprises a cutting die 4 integral with a die plate 5, the cutting edge being raised substantially above the adjacent surface of the plate. This edge surrounds a heel-shaped aperture of such form and dimensions as to receive loosely the body portion 2 of the particular heel on which it is to operate. A die base 6 supports the plate 5, the two being secured together by screws, or in any other convenient manner, and this base is made of U-shape or, in other words, is provided with a long slot to receive rather loosely a plate 7 which forms the bottom for the aperture in the die during the trimming operation.

In using this apparatus the heel to be trimmed such, for example, as that shown in Fig. 6, is placed in the aperture of the die 4, the bottom plate at this time completely closing the lower side of the cavity so that the heel can bottom on this plate. The cavity or aperture should be made of such dimensions as to leave a slight but substantially uniform clearance all around the heel, such a clearance being, say, in the neighborhood of twenty-thousandths of an inch, in a typical instance. Also, the depth of the cavity should be less than the maximum height of the heel by a slight amount which will vary somewhat with different heels but which can be readily determined after trimming two or three. Usually the body portion of the heel should project above the cutting edge 4 of the die by a distance of perhaps a sixteenth of an inch, or thereabouts.

This assembly may then be placed in a press, or pressure may be applied to the upper surface of the heel in any other convenient way serving to compress the heel in its vertical dimension. The first result of this pressure is to expand the heel in practically all directions in its own plane, and this expansion continues until the rubber body of the heel has completely filled out the cross-sectional dimensions of the die 4 adjacent to its upper edge. Further pressure will force the flash, which at this time overlies the cutting edge, down upon said edge, thus trimming it off substantially flush with the edges of the heel.

An organization suitable for performing this pressing operation is illustrated in Figs. 2 and 3, in which the bottom plate 7 is shown mounted securely on the upper surface of the bed 8 of a press. The cooperating platen is shown at 10. Usually the bed is stationary and the platen is reciprocated up and down by any convenient type of mechanism. The so-called "perforating presses" commonly used in the shoe trade are admirably adapted for this purpose. They are usually equipped with a single revolution clutch so that when the operator steps on the treadle the platen makes one stroke toward the bed, re-

turns to its initial position and stops there, and they also include means for adjusting the stroke of the platen. In addition, such a machine customarily is provided with rails 12—12 for supporting the die base 6 for sliding movement into and out of operative position in the press, and the die may have a handle 13 secured thereto for the convenience of the operator in sliding the die into and out of the press.

The most convenient procedure is to place the heel 2 in the die while the latter is withdrawn, the heel at this time being supported by the flash resting on the cutting edge 4 of the die. The operator then pushes the loaded die into the press. Because the over-all height of the die plate 5 is less than that of the heel, some means must be provided to lift the heel so that it can slide over the bottom plate 7 into such a position as that shown in Fig. 2. For this purpose the rails 12—12 are supported on light springs 14—14. Consequently, when the platen 10 descends, it first strikes the upper surface of the untrimmed heel 2 and the resistance of the flash to cutting is such, as compared to the strength of the springs 14—14, that the first action is to lower the rails 12—12 with the die structure supported on them until the heel strikes the upper surface of the bottom plate 7. Thereafter the heel is compressed vertically, as above described, and then the flash is trimmed off, the stroke of the platen 10 being so adjusted that it stops just as it meets the cutting edge 4 of the die.

When the platen rises the die is pulled out into some such position as that shown in Fig. 5 and the trimmed heel 2 drops out of the die by gravity. The trimmed off section 3 of flash is stripped off the die, a new heel is placed in it, and the operations above described are repeated.

It will be evident from the foregoing that heels may be trimmed in accordance with this invention at a high rate of speed, with a high degree of accuracy, and with relatively little effort and practically no skill on the part of the workman.

As the heel expands laterally under the pressure of the platen, there is some slip of its upper surface under the platen. It is desirable that this slip be made relatively free and frictionless so as not to impede the lateral expansion of the rubber heel body. For this purpose a lubricant of any suitable kind, such as talc or water, may be introduced between the meeting surfaces of the platen and heel. This operation may be performed either by hand or automatically, and one convenient arrangement for applying a lubricant is illustrated in Fig. 2. Here a roll 15 is removably supported in two brackets, one of which is shown at 16, so that as a heel is moved forward into the press its upper surface will engage the peripheral surface of the roll and rotate the latter, thus coating the heel with water carried by the roll. If the body of the roll is made with a thick layer of sponge rubber, it will apply sufficient water to the heel for lubricating purposes and it will retain a considerable quantity of water. The supply of water in the roll may be replenished simply by dipping it in a container filled with the liquid, or water may be fed to the roll at a regulated rate by any convenient form of drip apparatus.

It is preferable to be able to adjust the height of the die plate so that the degree to which the heel is compressed before the edge of the die cuts into the flash can be adjusted to suit the requirements of a series of individual heels. For this purpose the die plate 5 may be made in upper and lower sections *a* and *b*, as shown in Fig. 4, and these may be spaced apart by a series of shims *c*, all of these parts being secured releasably together by bolts or screws. Shims may be removed or inserted as required to adjust the die to the desired over-all height.

While I have herein shown and described a typical embodiment of my invention and a preferred way of carrying out the process, it will be evident that the method of this invention may be performed with the aid of a great variety of forms of apparatus, and that the invention may be embodied in other forms without departing from the spirit or scope thereof.

Having thus described my invention, what I desire to claim as new is:

1. That improvement in methods of trimming the flash on a molded rubber heel, comprising the steps of expanding the heel with the flash thereon in substantially all directions in the plane of the heel, and cutting off the flash substantially flush with the edges of the heel while it is so expanded.

2. That improvement in methods of trimming the flash on a molded rubber heel, comprising the steps of expanding the body of the heel into engagement with the surface of an encircling wall confining the heel at its edges while leaving the flash projecting beyond said surface, and then cutting off the flash substantially flush with said surface.

3. That improvement in methods of trimming the flash on a molded rubber heel, comprising the steps of loosely enclosing the edges of the heel immediately below the flash, compressing the heel vertically and thereby expanding it sufficiently to cause it to fill the cross-sectional dimensions of said enclosure immediately below the flash while leaving the flash projecting beyond the enclosing surface, and then cutting off the projecting flash.

4. A method according to preceding claim 3, including the steps of relieving the pressure on said heel after the flash has been cut off and thereby allowing the rubber body of the heel to contract, and permitting it to drop out of said enclosure.

5. That improvement in methods of trimming the flash on a molded rubber heel, comprising the steps of loosely enclosing the edges of the heel immediately below the flash in a confining wall having a cutting edge surrounding said heel edges immediately below the flash, compressing the heel vertically thereof and thereby expanding it laterally until it substantially fills out the space defined by said wall, and simultaneously pressing the flash upon said edge and thereby cutting it off.

6. In a mechanism for trimming the flash from a molded rubber heel, the combination with a die having a cavity therein shaped to receive said heel loosely, said die being provided with a cutting edge surrounding said cavity, a base for said die, a bottom plate for said cavity serving as a support for a heel positioned therein, and means supporting said plate and said base for relative sliding movement into and out of cooperative relationship to each other.

7. In a mechanism for trimming the flash from a molded rubber heel, the combination with a die having a cavity therein shaped to receive said heel loosely, said die being provided with a cutting edge surrounding said cavity, a base for said die, a bottom plate for said cavity serving as a

support for a heel positioned therein, one or more shims between said die and said base, and means for releasably fastening said parts together.

8. In a mechanism for trimming the flash from a molded rubber heel, the combination with a die having a cavity therein shaped to receive said heel loosely, said die being provided with a cutting edge surrounding said cavity, a base for said die, a bottom plate for said cavity serving as a support for a heel positioned therein, a bed supporting said bottom plate, a platen movable toward and from said bed into and out of contact with a heel in said die, rails on which said die base is mounted for movement into and out of cooperative relationship to said bottom plate, and springs supporting said rails normally in an elevated position but yielding under the pressure of said platen on said die.

9. In a mechanism for trimming the flash from a molded rubber heel, the combination with a die having a cavity therein shaped to receive said heel loosely, said die being provided with a cutting edge surrounding said cavity, a base for said die, a bottom plate for said cavity serving as a support for a heel positioned therein, a platen movable toward and from said base to press the flash on the heel against the cutting edge of said die, and means supporting said plate and said die for relative movement to open the bottom of the die for the heel to drop therethrough and to close it again for operation on another heel.

CHESTERTON S. KNIGHT.