(No Model.)

C. T. GRILLEY.

MANUFACTURE OF WASHERS.

No. 338,347. Patented Mar. 23, 1886.

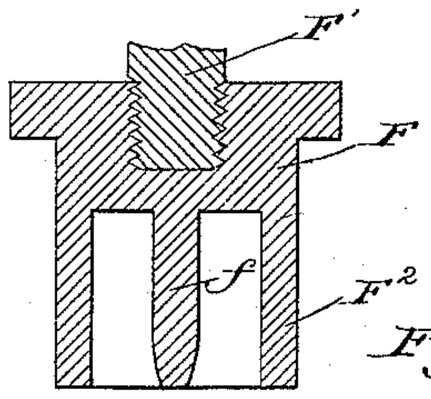

Fig: 1.

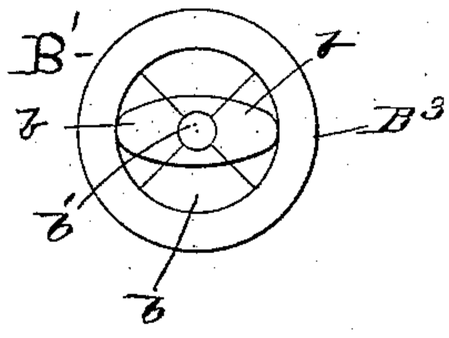

Fig: 2.

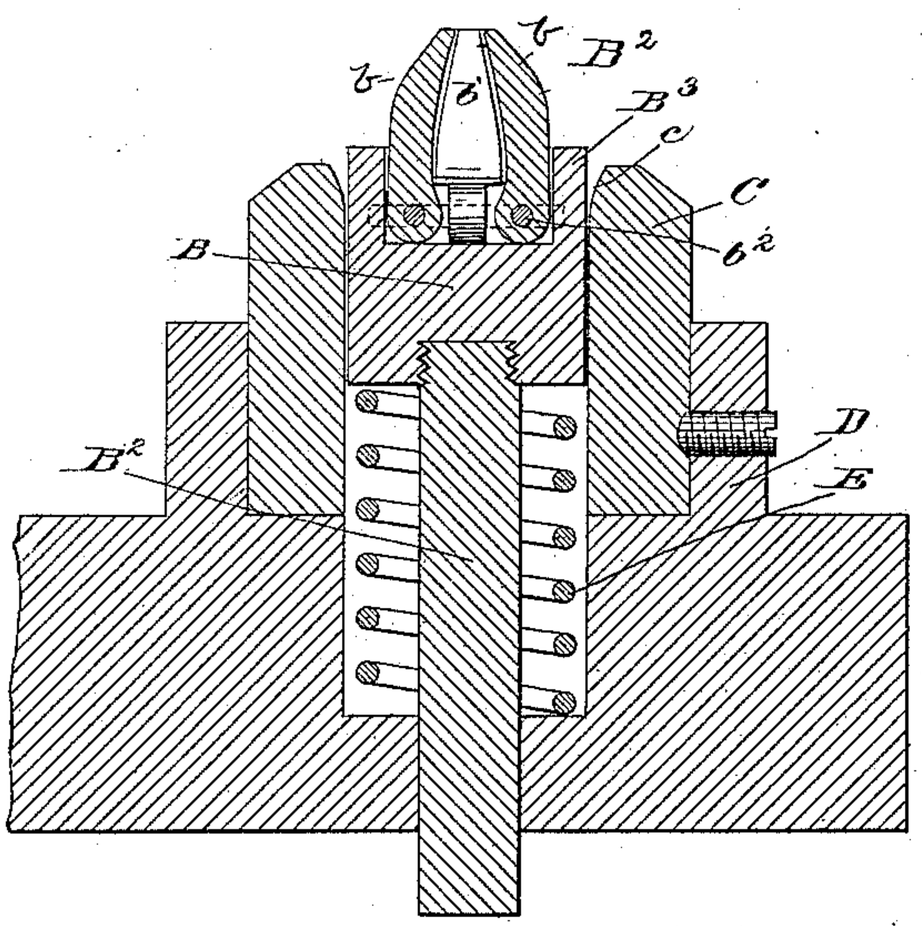

Fig: 4.

Fig: 3.

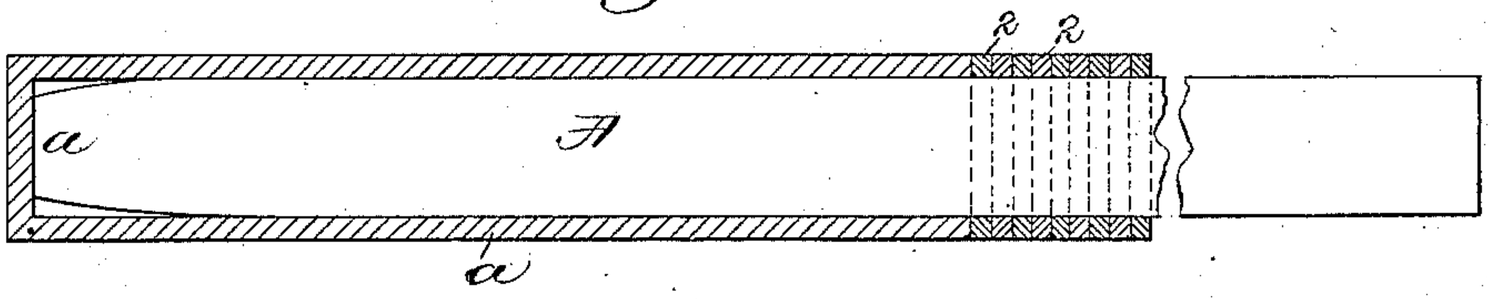

Fig: 5.

Fig: 6.

Witnesses.
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UNITED STATES PATENT OFFICE.

CHARLES T. GRILLEY, OF BOSTON, MASSACHUSETTS.

MANUFACTURE OF WASHERS.

SPECIFICATION forming part of Letters Patent No. 338,347, dated March 23, 1886.

Application filed November 30, 1885. Serial No. 184,307. (No specimens.)

To all whom it may concern:

Be it known that I, CHARLES T. GRILLEY, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Processes of Making Washers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In the manufacture of leather washers it has been customary to cut the same in circular form from sides of leather, and then by pressure compact the fibers of the leather together, thereby making a hard and durable washer; also to take strips of leather, bend the same over a former, and unite the free ends.

In the first instance, washers to be cut in circular form require comparatively large pieces of leather, and consequently are usually cut from sides of leather, which being necessarily expensive, they cannot be made at any material profit, as the waste which occurs by skiving to the required thickness in unsuitable stock and the loss in cutting increase the cost of the washers about fifty per cent.

In the second instance, washers made from strips of leather having their free ends joined together are always weak and incapable of withstanding the strain put upon them when joined by any of the numerous forms of joints now devised; consequently such washers are considered inferior to what is commercially termed a "solid" washer.

This invention has for its object to cut oval or other shaped rings from leather or other suitable material, one of the outside diameters of the said rings being less than the outside diameter of a completed circular washer, and then by pressure forcing the said rings into true circular form, that they may be utilized for washers.

It has been devised by me to cut rings of oval or other shape from small pieces of leather which are too small to be of any material commercial value, and to force the said rings into a true circular form, thereby making a solid washer from a single continuous piece, which will be strong, durable, and inexpensive, and equally as valuable as an ordinary solid washer.

The invention consists in cutting from leather oval or other shaped rings, placing the same upon a former, and by pressure forcing the same into a true circular form.

Figure 1 shows in vertical section a machine capable of carrying out this invention; Fig. 2, a top view of the former; Fig. 3, in horizontal section, a device for bending the washers previous to applying them to the machine, if so desired, the core being shown in elevation; Fig. 4, a left-hand end view of the core shown in Fig. 3; Fig. 5, a face view of a ring as it is cut from the leather; Fig. 6, a similar view of a completed washer.

In accordance with this invention, and as previously set forth, the ring 2, of oval or other shape, having one of its outside diameters less than the outside diameter of the completed washer 3, as shown in Figs. 5 and 6, is preferably cut from small pieces or strips of leather which are too small to be successfully utilized for other purposes, and therefore very cheap.

The rings 2, as shown in Fig. 5, are forced into the true circular form shown in Fig. 6 by pressure exerted in various ways, and by any suitable machine.

The oval rings to be made into washers may, and preferably will, be placed upon a core, A, (see Figs. 3 and 4,) having a tapered end portion, *a*, and a follower, *a'*, of suitable diameter, surrounding the core, will then be pushed upon it, moving the rings from the tapered end portion *a* downward upon the circular portion of the core A, thus giving to the washer a preliminary bend, tending to open the sharp bends or corners at the end portions of the rings. The washer thus partially shaped is then placed upon the former B, which consists of the core, B', mounted upon a suitable post or shaft B^2, and having an annular abutting face, B^3, and a series of jaws, *b*, having tapering end portions pivoted by suitable pins, b^2, within the annular abutting face B^3.

The jaws *b*, four in number, as shown in Fig. 2, are so constructed as to normally bear against each other by gravity, leaving, however, between their upper ends a circular orifice, *b'*, and the said jaws *b* are so tapered as to present an oval-shaped end, as shown in Fig. 2.

The former B, constructed as described, is placed within a ring, C, of such diameter as it

is desired that the completed washer shall have outside, said ring C being mounted in any suitable frame-work, D, the said former B being normally retained in elevated position by a spring, E.

The follower F, attached to or depending from any suitable moving rod or arm, F′, is provided with an annular abutting face, F^2, and with a centrally-located tapering pintle, *f*, the latter being adapted to enter the orifice *b′*, formed at the meeting ends of the jaws *b*, the abutting face F^2 surrounding the said jaws.

A ring, 2, after being detached from the core A, is placed upon the jaws or expanding device *b* and the follower F is made to descend. The pintle *f* first enters the orifice *b′*, expanding the jaws *b*, and the annular abutting face F^2 then strikes the said ring, forces it down upon the said jaws and against the annular abutting face B^3, and then in its further descent depresses the entire component parts of the former B, forcing it and the ring 2 down through the ring C, the upper edge of which is slightly beveled, such movement effecting the final stretching and compression of the washer. After this the follower F and the former B, acted upon by the spring E, return to their normal positions, respectively, and the washer, which has been forced by pressure into a true circular form, is removed from the tapering jaws or expanding devices. In order to accomplish this with facility and to give to the washer a "set," that it may be entirely devoid of all tendency to return again to its normal position and to produce a hard and compact washer, the latter is preferably made pliable by soaking the same in water previous to having any pressure exerted upon it.

It is obvious that the preliminary step—placing the ring 2 over the core A—may be dispensed with, if desired.

While it is preferable that a machine constructed substantially in accordance with that herein shown be employed, it is obvious that other devices capable of forcing an oval or other shaped ring having one of its outside diameters, as that shown by the dotted line *x*, Fig. 5, less than the outside diameter of the completed washer 3, (shown in Fig. 6,) may be constructed without departing from the spirit of this invention.

It will be seen that by this method of manufacturing washers small pieces of leather, which are usually thrown away or burned, may be utilized to great advantage, and that a solid washer, which is in every way equally as valuable, commercially, as the solid washer now upon the market, may be made.

I claim—

That improvement in the art or method of manufacturing circular washers which consists in cutting from leather an oval or other shaped ring having one of its outside diameters less than the outside diameter of the completed circular washer, and then forcing the same into true circular form by pressure, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES T. GRILLEY.

Witnesses:
B. J. NOYES,
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