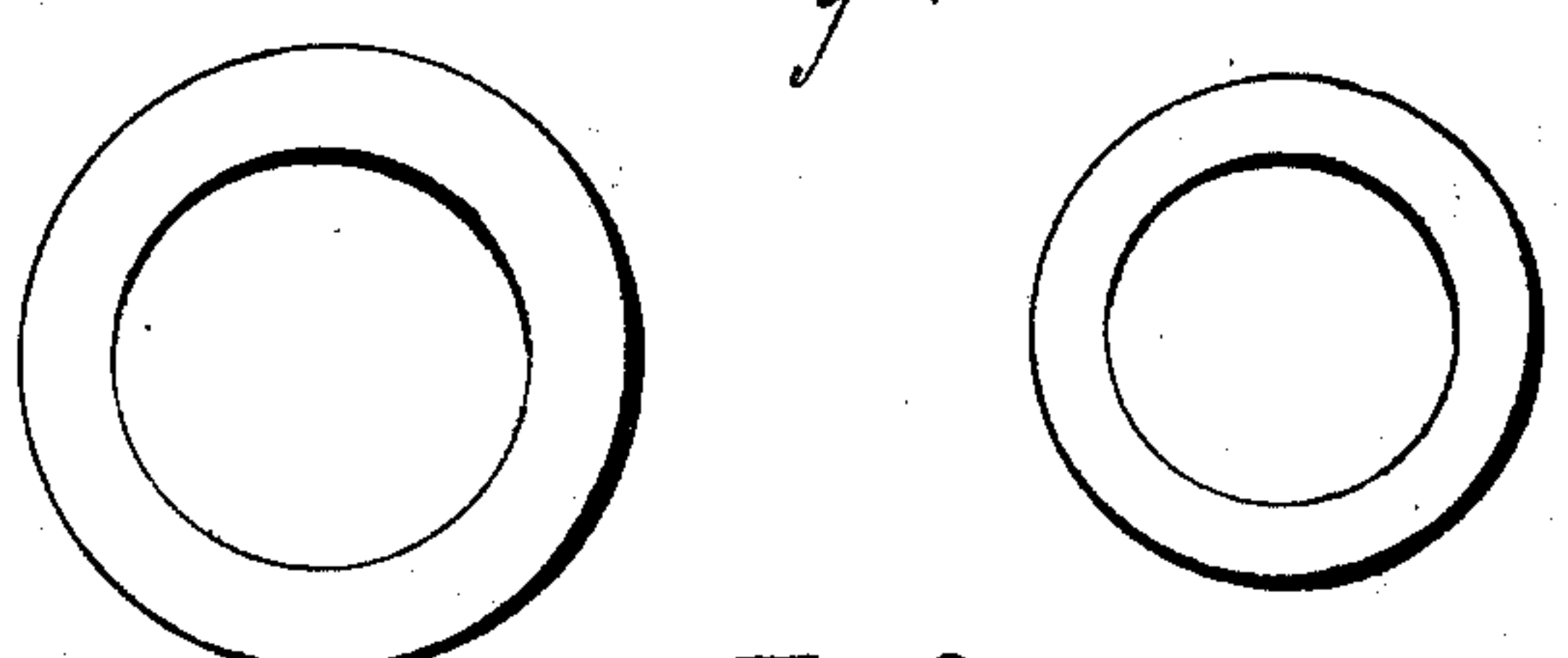


J. A. WAY.  
Axle Washer.

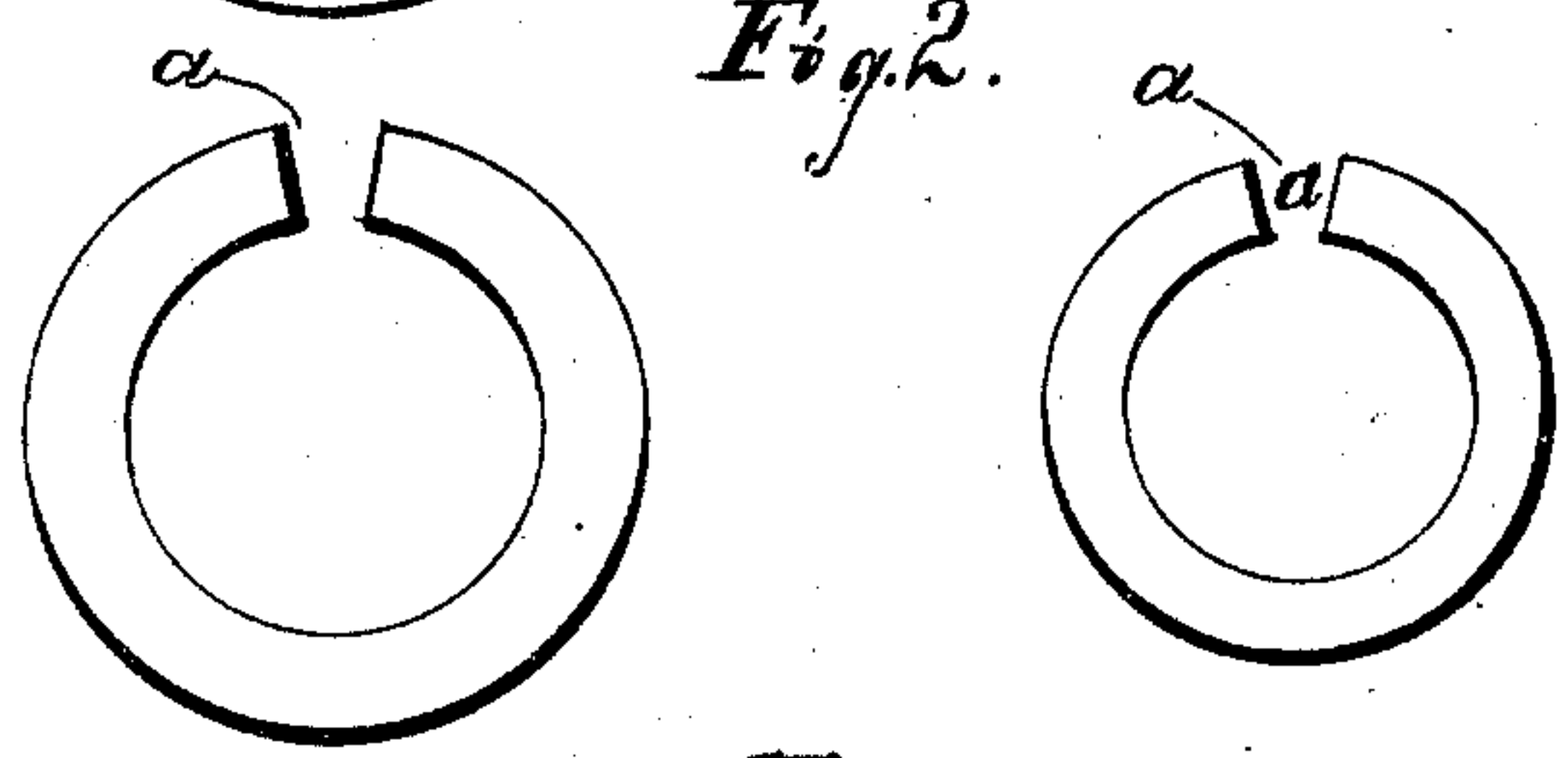
No. 80,435.

Patented July 28, 1868.

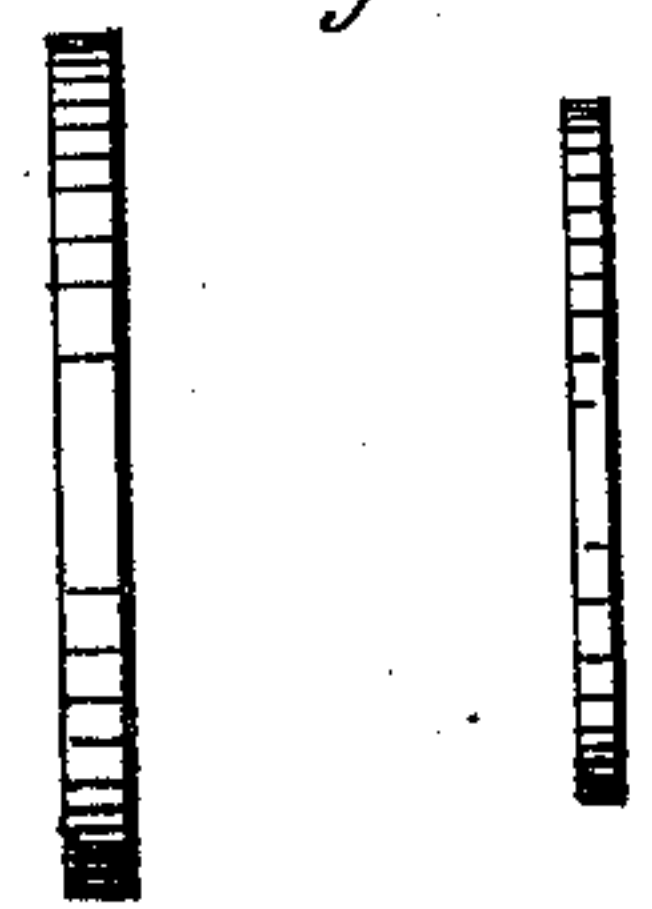
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



*Witnesses*

*W. B. Darrow  
J. Shepard*

*Inventor*

*John A. Way*

# United States Patent Office.

JOHN A. WAY, OF BRISTOL, CONNECTICUT, ASSIGNOR TO THE DARROW  
MANUFACTURING COMPANY, OF SAME PLACE.

*Letters Patent No. 80,435, dated July 28, 1868.*

## IMPROVED WASHER.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN A. WAY, of Bristol, in the county of Hartford, State of Connecticut, have invented a new and improved Washer; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front elevation of one style of my invention.

Figure 2 is a front elevation of another style of the same.

Figure 3 is a side elevation of the same.

Similar letters of reference indicate like parts.

My invention consists in the use or employment of raw hide in the manufacture of carriage-washers.

To make these washers, I make a set of round dies, similar to those generally used for cutting metal, and varying in size by sixteenths, from the inside diameter of the smallest to the outside diameter of the largest washer intended to be cut, and punches to match or fit each die.

In the centre of every punch (except perhaps a few of the smallest) I make a small hole, and thread the same to fit a screw of suitable construction. I then make what I term false centres, which centres are round and tapered, and the diameter of the largest end nearly equal (but a trifle smaller) to the diameter of each die, (except perhaps a few of the largest.) Each of the false centres is provided with a hole at the centre, to receive the body and head of the screw before mentioned, threaded to match the threaded hole in the centre of the punches. With this screw I can attach any one of the false centres to any one of the punches.

The diameters of the dies now in use for this work will, when completed, vary in size, by sixteenths, from three-quarters of an inch to three inches, and perhaps exceed that.

With these thirty-six dies, hundreds of different-sized washers can be made. For instance, suppose I make the outside diameter the size of the largest or three-inch die, and the inside diameters with the remaining thirty-five dies, and we have thirty-five sizes, and *vice versa*, and we have thirty-five more.

If I desire to make washers varying in size, from inside to outside, by one-quarter inch, from three-quarter inch inside to three inches outside, I would take strips of hide, of suitable thickness, and about six inches in width, and press or cut, with the three-quarter inch die, two rows of holes, which holes should be such distance from each other, and from the edges of the hide, that a three-inch circle described around the centre of each hole, the circles will not run into each other or beyond the edges of the hide. I gauge the hide to get this distance with gauges the same as those used for gauging metal to press it.

After having pressed a suitable number of the strips with the three-quarter inch die and punch, I place the three-quarter inch false centre on the one-inch punch, and set the same in the press; then, as (or before) the punch descends, I enter the small end of the false centre into the three-quarter hole in the hide, and, as the punch further descends, the base of the false centre fills the hole, and causes it to be in the centre of the die as the outside of the smallest washer is pressed, and at the same time the inside of the next washer.

I then place the one-inch false centre on the one-and-a-quarter-inch punch, and proceed in like manner, until the three-inch washers are pressed or cut.

For pulling the hide from the punches, I use a take-off or picker, similar to those in ordinary use.

A centre on a punch is no new thing, but they are generally solid or secured rigidly, and not to be adjusted to different punches.

At first trial of pressing or cutting out these washers, the slug or first inside was cut without difficulty, but when the outside of the washer was cut, many of them would turn dishing or funnel-shaped, while a few would be level.

To avoid this trouble I hollowed the end of the punches, but this only increased the trouble. I tried several other experiments without any better results. I finally overcame the trouble by finishing the cutting of



the washer with the flesh side up, when generally all the washers would be level, but if cut from the same stock with the grain side up, the majority of them would be dishing.

The first hole or inside of the washer can be pressed either side up, but to be safe, the outside should be finished fleshed side up, although in some hides it may not be absolutely necessary. The greater the difference of the diameters, from outside to inside, the less liable is the washer to turn.

It is not necessary, for making a few washers of a particular size, to have the dies vary in size and number, as described, but it will be a matter of great convenience, where all sizes are intended to be made.

Neither is it necessary to cut one washer from the inside of another, but it is a great saving of time and stock.

After the washers are made, I sometimes cut away a portion of the same at *a*, for the purpose of reducing the size. Even one-third of the washer might be cut away, if desired, and then the washer compressed and crowded into the recess in the axle-nut, or the back end of the box or pipe of a carriage, when it (the washer) would have a tendency to spring open, and its edges would crowd against the rims of said recesses.

This cutting away, when desired, can be done by the consumer with a common pocket-knife.

Wooden washers have been made and left open, but it was the cut made by cutting the washers from a helix of wood, and not taking a solid piece from a whole or solid washer.

My invention is not merely concerning the idea of using raw hide in the manufacture of washers. If such were the case, the mere mention of it to a maker of leather washers would enable him to make raw-hide ones with the same tools and by the same process used for leather ones. But such cannot be done to any extent. Leather ones (excepting shoddy leather) are cut out by knives set in a proper tool, so as to describe a circle. Raw hide is so solid and firm that the knives thus arranged cut very slow at best, and soon break or heat, and refuse to work. Thus it has been necessary for me to invent the process for making them.

Leather, in tanning, swells to nearly twice its original thickness, and will, by use, (when saturated by the oil from the axles,) compress back to nearly its original thickness, and thus allow the wheel to play end-ways and rattle.

Raw hide is in its natural thickness and firmness, and becomes but very little softened, if any, by oil, and consequently compresses but little.

Persons at first sight of these washers suppose they are too thin, but by use they are found to fill as much space as leather ones, which are apparently nearly twice their thickness.

By my invention I produce an article for carriage-washers, whereby, with a few sizes, a blacksmith, wagon-maker, or other person, can be able to fit any carriage or like vehicle, when, with the ordinary washer, he must cut expressly for each vehicle, or keep hundreds of sizes on hand.

If leather washers were cut to be fitted to different vehicles in like manner, the oil from the axle would soon soften them, when they would not stay in their place, and thus become useless.

Leather, being tanned, greatly exceeds in cost the price of raw hide, and the scrap is nearly useless, while raw-hide scrap is worth half its first cost. Thus raw-hide washers can be made at a small cost.

In very light vehicles it is often desirable to use washers with a very narrow surface, when leather ones will last but a few weeks, whereas raw-hide ones, with the same surface, will last for months.

What I claim as new, and desire to secure by Letters Patent, is—

As a new article of manufacture, an axle-washer, made of raw hide, substantially as described.

JOHN A. WAY.

Witnesses:

JAMES SHEPARD,  
F. E. DARROW.