

No. 653,084.

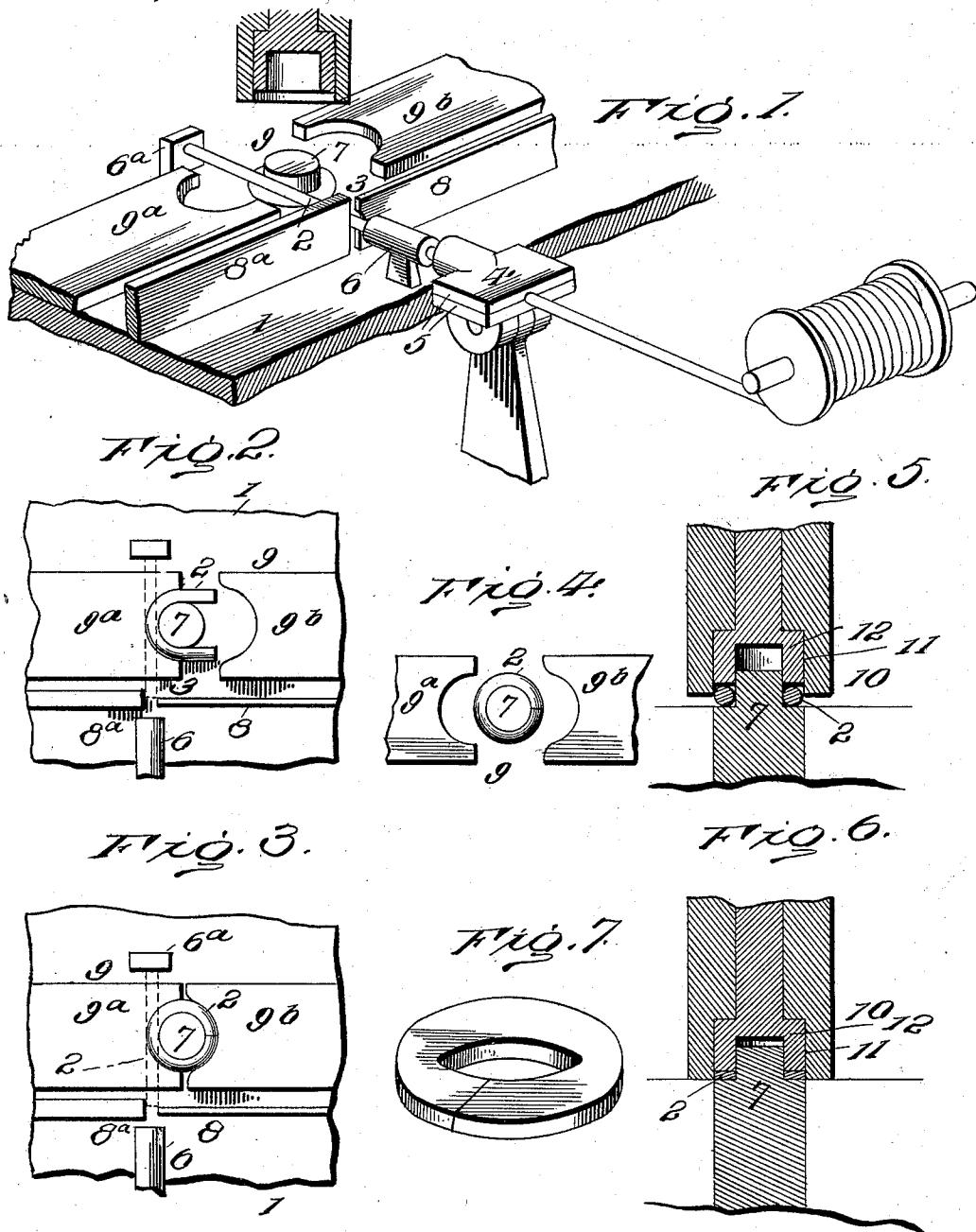
Patented July 3, 1900.

H. C. HART.

METHOD OF MAKING WASHERS.

(Application filed Mar. 7, 1900.)

(No Model.)



WITNESSES:

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HUBERT C. HART, OF UNIONVILLE, CONNECTICUT.

## METHOD OF MAKING WASHERS.

SPECIFICATION forming part of Letters Patent No. 653,084, dated July 3, 1900.

Application filed March 7, 1900. Serial No. 7,689. (No model.)

*To all whom it may concern:*

Be it known that I, HUBERT C. HART, a citizen of the United States, residing at Unionville, in the county of Hartford and State of Connecticut, have invented new and useful Improvements in Methods of Making Washers, of which the following is a specification.

This invention relates to an improved method of making washers.

10 In the present method of making washers they are stamped out from sheet metal, necessitating a loss of from fifty to seventy-five percent in what is generally termed "scraps."

15 In the manufacture of washers by my method I take a round piece of metal and make it into a coil of any suitable diameter, and then place it under pressure, so as to compress it into a flat and perfectly-smooth washer.

20 One of the chief advantages derived from my invention is the enormous amount of metal saved; hence the great reduction in the cost of the finished article.

25 A further object is to provide a method of introducing a thicker piece of metal between the dies than the finished article, forming a washer of closer density than those now in use.

Many other objects and advantages will be hereinafter referred to, and be particularly 30 pointed out in the claim.

In the drawings forming a part of this specification, Figure 1 is a diagrammatic view illustrating a means for carrying out my method, the wire from which a washer is to be made having been fed to a position to be cut the desired length to form a coil. Fig. 2 is a diagrammatic view showing the coil half completed around the mandrel; Fig. 3, a similar view showing the coil complete; Fig. 4, a 35 similar view showing the coil completed and the coil-forming device returned to its normal position; Fig. 5, a sectional view of the coil of wire between a die and mandrel just before the final compression of the latter takes place; Fig. 6, a similar view after the pressure has been applied and the coil converted into a flat surface, and Fig. 7 a detail view of the finished article.

The same numerals refer to like parts in all 40 the figures, it being understood that the parts of the mechanism so designated for obtaining

the result are entirely of a conventional character, and the details of construction so shown in no way form a part of my invention in this application.

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The numeral 1 indicates a suitable frame (broken away) for supporting the feeding, cutting, coiling, and compressing mechanism.

The wire is indicated at 2 and is fed to a cutting mechanism 3 by a pair of feeding 60 gripper-jaws 4, adapted to grip and feed the wire forward the desired length and then return to their normal position to grip the wire for the next succeeding feed. The gripping device consists of a pair of reciprocating jaws 65 5, which move the wire forward through a stationary guide 6 on a plane with the upper reduced end of the mandrel 7, around which the coil is made to form the washer.

The cutting device, as illustrated, indicates 70 a stationary member 8<sup>a</sup> and a movable cutter 8, which is timed to cut the wire before the coiling mechanism 9 starts to perform its function.

The die 10 consists in this instance of a 75 main body portion having a recess 11, in which a movable plunger-section 12 is seated.

The steps taken in the practical application of my method are substantially as follows: The wire is first fed forward by the 80 feeding mechanism to a point opposite the upper end of the mandrel 7 and is limited in its movement, so as to bring it in proper position, by a stop 6<sup>a</sup>, whereupon one member 9<sup>a</sup> of the coil-former advances and forms one-half of 85 the contemplated washer, and upon the completion of this movement the opposite forming member 9<sup>b</sup> advances from the opposite side of the mandrel and completes the coil. The coil now being completed and around the 90 mandrel, the coil-forming device withdraws and returns to its normal position, leaving the coil in position to be engaged by the die, as clearly shown in Fig. 4. The die and the mandrel are now brought together, and the 95 coil, "of preferably round wire," is compressed into a flat washer, after which the die and mandrel are separated, and the completed washer is ejected by the movable plunger-section 12.

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While I have described the operation of feeding, cutting, and coiling as being accom-

plished automatically, I contemplate and in fact do form the coil independent of the dies. However, as a rapid and more expedient method some automatic arrangement is to be 5 preferred.

I have stated in the foregoing that preferably round wire is employed. I reserve the right to the use of any shape, the point of novelty in this method being in that a flat 10 washer is made from a coil of metal which is thicker than the completed article, the same being placed under pressure and making its density greatly increased.

When the metal wire is passed around the 15 mandrel and made into a coil, especially if it is relatively high in carbon, the molecules forming the outer periphery to a certain extent become separated, causing said outer edge to be more or less broken, and the molecules forming the inner periphery of said wire 20 become condensed, this being more perceptible in the manufacture of washers of large degree. It will therefore be seen that by having the coil of wire contained between dies 25 equal in diameter to the greatest diameter of the finished article and applying pressure sufficient to decrease the volume thereof while so positioned a flat split washer may be produced having a uniform density throughout, 30 with a continuous outer edge and from wire which is relatively high in carbon, a result

not attainable from such wire by any other process known to me.

It will be seen from the foregoing description that by my improvement I produce a 35 cheap, quick, and economical method of making washers. As already stated, in the old way of stamping washers a large quantity of material is wasted, while in my method there will be no waste, as the coiling of the wire 40 does away with the necessity of the usual scraps.

While as a rule I prefer to have the finished article split, I may, if desired, add another step to the method and join the ends. 45

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The herein-described method of making flat 50 split-ring washers from wire consisting of making independent rings from the wire and then subjecting said rings to pressure to flatten and increase their density and decrease their volume.

In testimony whereof I have hereunto set 55 my hand in the presence of two subscribing witnesses.

HUBERT C. HART.

Witnesses:

GEORGE E. TAFT,  
L. J. COLLINS.