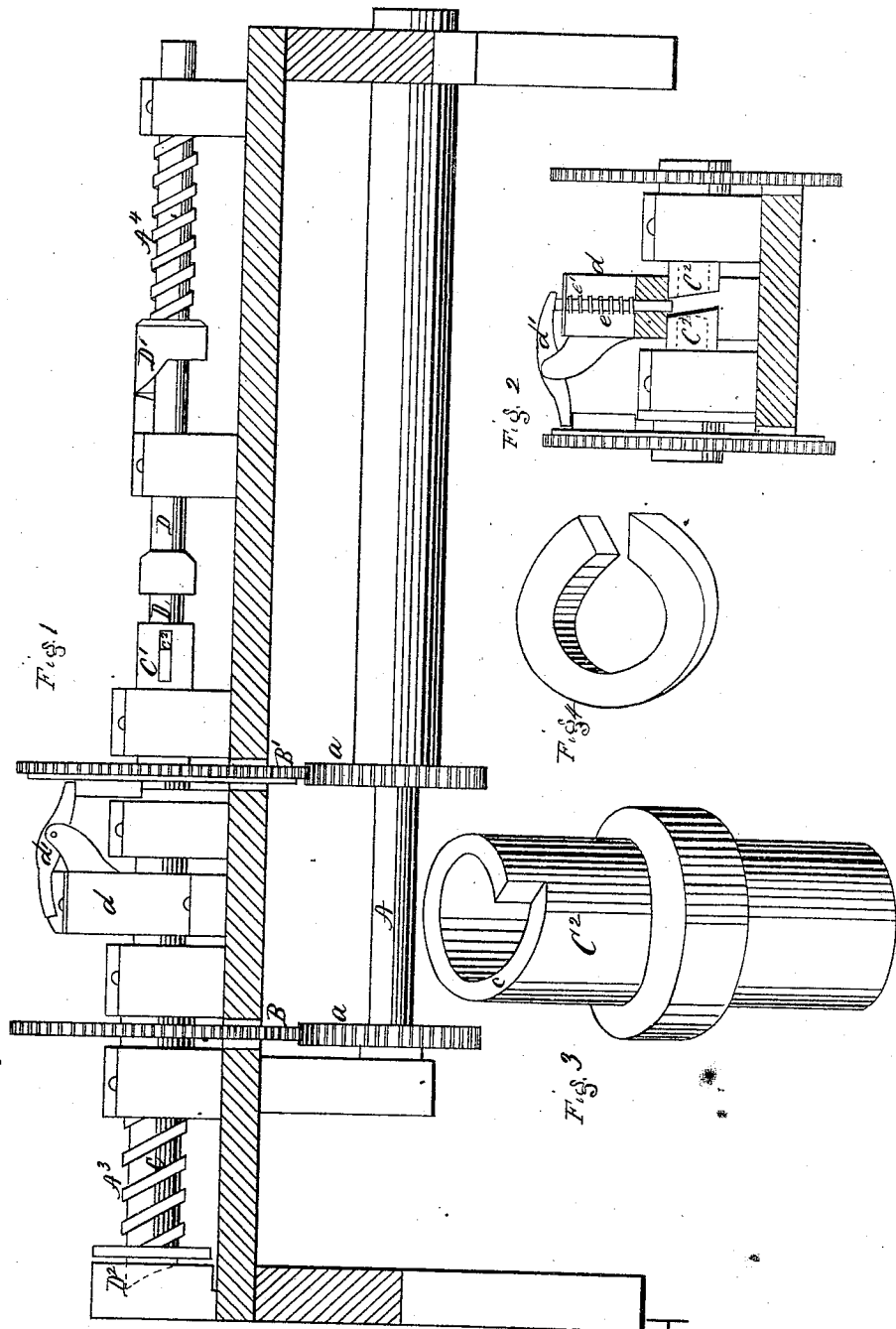


S. TRETHERWEY.

Machine for Forming Spiral Washers.

No. 159,232.

Patented Jan. 26, 1875.



WITNESSES
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SAMUEL TRETHEWEY, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO
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IMPROVEMENT IN MACHINES FOR FORMING SPIRAL WASHERS.

Specification forming part of Letters Patent No. **159,232**, dated January 26, 1875; application filed
December 8, 1874.

To all whom it may concern:

Be it known that I, SAMUEL TRETHEWEY, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Devices for Bending and Setting Nut-Locks, &c.; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming a part of this specification, in which—

Figure 1 is an elevation of my improved machine, the bed being in section. Fig. 2 is a sectional view, showing the discharging-trigger. Fig. 3 is a view of one of the hollow gripping-dies, and Fig. 4 is a nut-lock.

Like letters refer to like parts in the several figures.

My invention relates to machinery for bending and setting nut-locks for fish-bars and similar uses; and it consists in hollow gripe-dies having inclined faces inserted in the ends of mandrels, through one of which a solid mandrel reciprocates, so that the central solid mandrel supports the washer while gripped by the dies, and the revolution of the hollow mandrel withdraws the central mandrel at the instant the washer is released by the gripping-dies. The discharge of the washer from the dies may be facilitated by the stroke of a trigger operated by a cam upon the gear-wheel carrying the hollow mandrel.

In the drawing referred to, A indicates a shaft carrying the two small pinions *a a*, meshing into gear-wheels B B', which carry the hollow mandrels C C'. The hollow mandrel C passes loosely through the center of gear-wheel B, so as to have an end movement, but is secured to the wheel B by a groove and feather, so as to revolve with the wheel. The forward movement or advance of the hollow mandrel and its hollow gripping-die is caused by a cam, D², on the end of the mandrel, and its quick return movement by a spiral spring, A³, surrounding the mandrel. In the end of hollow mandrel C is secured a hollow gripping-die, C², having an inclined face, *c*, shown more clearly in Fig. 3. C¹ is a second hollow mandrel, similar in construction to the mandrel C, in so far as it is supplied with a hollow gripping-die, C², having an in-

clined face, but this mandrel is keyed to the gear-wheel B', so that its only movement is that of revolution with the gear-wheel. Centrally of the hollow mandrel C¹ is a solid mandrel, D, keyed to and revolving with the hollow mandrel C¹, the key *c*² working in an elongated slot in the mandrel C¹, so as to allow the withdrawal of mandrel D by a cam, D', at the instant that the gripping-dies C² separate to release the washer. The quick return movement of mandrel D is caused by a spiral spring, A⁴, or equivalent mechanism. Directly over the bite of the gripping-dies is a post, *d*, through which works a trigger, *e*. To the post is pivoted a lever, *d'*, operated by a cam or cams upon the gear-wheel B. The cam upon the gear-wheel is so located as to operate the lever *d'* and trigger *e* at the instant that the washer is released by the gripping-dies, so as to cause the trigger to strike the washer and facilitate its discharge from the machine. The trigger, being quickly retracted by a spiral spring, *e'*, does not interfere with the revolution of the mandrels. The dies, at the point of meeting, are surrounded by a bridge, through one wall of which is a feed channel or opening for the introduction of the blank.

The essentials of this machine are the hollow gripping-dies having inclined faces, and the reciprocating mandrel.

The operation of these devices is as follows: The blank, previously heated, is introduced through the feed channel or opening in the bridge until it comes within the gripe of the dies, which advance and seize it, drawing it from the feed-channel, the bridge preventing it from revolving with the dies, bending it around the mandrel D, and at the same time, owing to the inclined faces of the dies, setting it to the form shown in Fig. 4. When the dies have made one complete revolution the mandrel D is withdrawn by the cam D', and the mandrel C retracted by the spiral spring A³, or other suitable device, and simultaneously the cam on the face of gear-wheel B comes in contact with lever *d'*, forcing down the trigger *e*, causing it to strike the washer sharply and thus facilitate its escape from the machine. The discharge of the washer will generally occur from its own weight, but is insured by a blow

from a trigger similar to that shown in the drawing.

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

The combination of the hollow gripping-dies having inclined faces, the reciprocating central mandrel, and suitable mechanism for preventing the blank from revolving with the

die, substantially as and for the purpose specified.

In testimony whereof I, the said SAMUEL TRETHEWEY, have hereunto set my hand.

SAMUEL TRETHEWEY.

Witnesses:

J. W. PAUL,
D. S. WILLIAMS.