

No. 802,692.

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J. A. HORTON.
PROCESS OF DRAWING STEEL WIRE.
APPLICATION FILED DEC. 18, 1903.

Fig. 1.

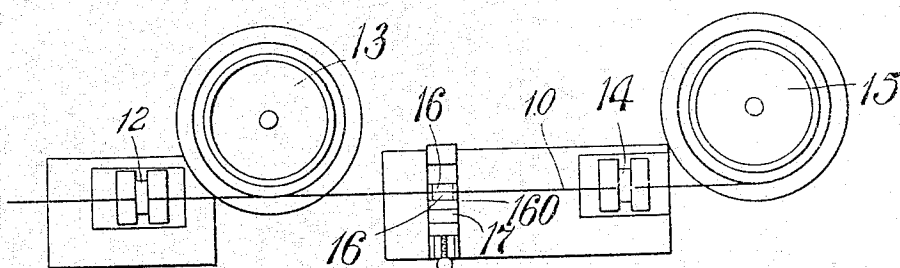


Fig. 2.

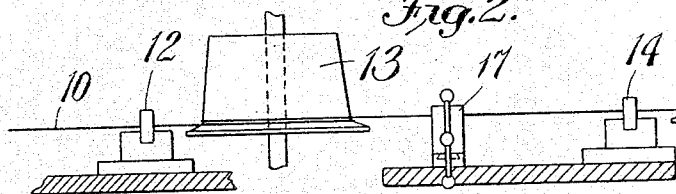


Fig. 3.

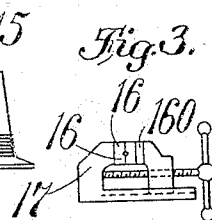


Fig. 4.

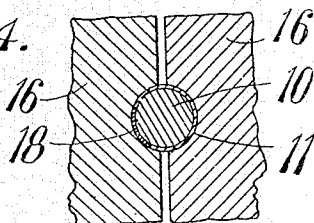


Fig. 5.

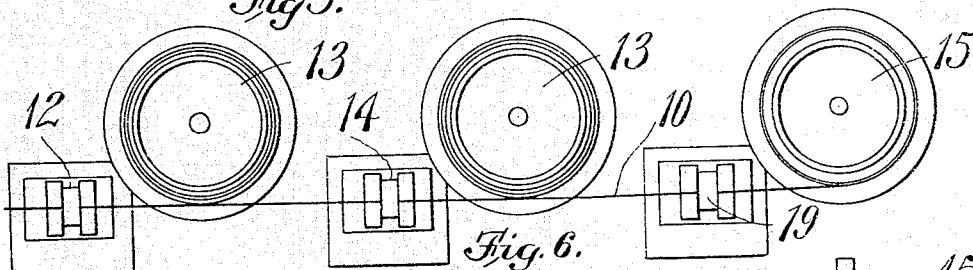


Fig. 6.

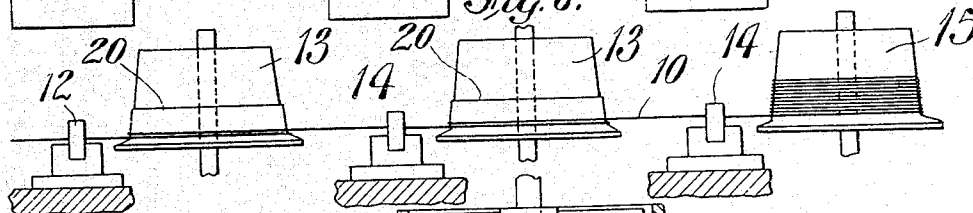
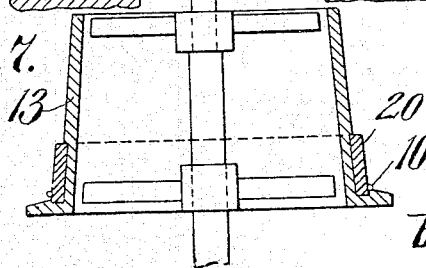


Fig. 7.



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UNITED STATES PATENT OFFICE

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PROCESS OF DRAWING STEEL WIRE.

No. 802,692.

Specification of Letters Patent.

Patented Oct. 24, 1905.

Application filed December 18, 1903. Serial No. 185,636.

To all whom it may concern:

Be it known that I, JAMES A. HORTON, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Processes of Drawing Steel Wire, of which the following is a specification.

This invention relates to the drawing of wire composed of steel or material of similar hardness; and its object is to enable the wire to be subjected to a large number of reductions in a single operation or continuous process without breaking the wire or impairing its uniform quality.

In drawing steel wire through metallic dies it is necessary in order to prevent the material of the wire and the material of the die from coming together in close contact to coat the wire with a substance that will pass through the die with the wire. This coating prevents the wire from amalgamating with the die or "stopping up" in the die. The material commonly used for coating all sizes below the largest is a bronze composed of copper and tin, which is plated upon the wire in a suitable bath. In the continuous process the wire is propelled by a series of drums rotating at successively-increasing peripheral speeds to correspond to the elongation of the wire in the successive dies, the wire being passed through the first die, wrapped one or more turns around the succeeding traction-drum, passed through the second die, wrapped one or more turns around the second traction-drum, and so on. It is necessary that these drums shall revolve at a greater peripheral speed than the speed of the wire in contact therewith, so as to allow for variation in the elongation of the wire, due to variation in the size of the eye of the die, such variation being caused either by wear of the die or by its being of improper size when made. The excess speed of the drum prior to my present invention has caused the coating of the wire to be removed in a narrow strip throughout its entire length for each traction-drum around which the wire is wrapped. When several traction-drums have removed these narrow strips, a considerable part of the coating of the wire is gone, and the steel of the wire coming in contact with the die causes an adhesion or stopping-up of the wire in the die. The removal of the coating is also detrimental for other reasons, one reason being that the par-

ticles of the coating collect in the die and distort it or choke it up, so as to either break the wire or impair its quality.

The above difficulties are overcome by the present invention, which in the best form now known to me is carried out by renewing the coating of the wire with a soft material of a similar nature, such as the copper-and-tin alloy or bronze above mentioned. The detailed steps of the process will be hereinafter described.

Of the accompanying drawings, Figure 1 represents a plan view of a simple form of apparatus for carrying the invention into effect. Fig. 2 represents a side elevation thereof. Fig. 3 represents an end view of the holder for the bronze wire-coating blocks, showing also said blocks. Fig. 4 represents an enlarged section of the wire and wire-coating blocks. Fig. 5 represents a plan view of modified apparatus, which is preferred in actual practice to that shown in Figs. 1 to 4, inclusive. Fig. 6 represents a side elevation thereof. Fig. 7 represents an enlarged section of one of the traction-drums.

The same reference characters indicate the same parts in all the figures.

Referring first to Figs. 1 to 4, inclusive, 10 indicates the wire, and in Fig. 4 11 indicates the bronze coating thereon exaggerated in thickness. 12 is a die through which the wire is passed to reduce its diameter. 13 is a traction-drum around which the wire is wrapped one or more turns to draw it through the die 12 and which rotates at a peripheral speed somewhat in excess of the speed of the wire. 14 is a second die in which the wire experiences a further reduction, and 15 is a wire winding or storing drum which draws the wire through the die 14 and winds it up in a coil. Between the drums 13 and the die 14 the wire 10 is embraced by a pair of blocks 16 16, held in a vise 17 and composed of the same or similar material to the coating of the wire—namely a copper-and-tin bronze in the instance assumed. These blocks by attrition coat the wire with their substance as the wire is pulled through them, and thus serve to renew the soft coating of the wire and prevent the contact of the steel wire with the next die 14. At 18 in Fig. 4 is illustrated a place on the wire where the original coating has been worn off and renewed by one of the bronze blocks 16. 160 is a rubber or other cushion which

se- matic feed of the blocks as they wear.

Although the apparatus shown in Figs. 1 to 4 may be employed to successfully carry out the invention, I prefer that shown in Figs. 5, 6, and 7, as the latter is simpler and requires less attention and less frequent renewal of the destructible parts. In these figures I have shown two traction-drums 13, a wire-storing or winding drum 15, and reducing-dies 12 14 19, one preceding each drum. The traction-drums 13 rotate at a greater peripheral speed than the speed of the wire. Each of the drums 13 is provided with a wire-forwarding surface consisting of a ring or annulus 20, composed of the same material as the coating of the wire. Instead of wearing off this soft coating on the wire, as would a wire-forwarding ring or surface composed of a material harder than the coating, these bronze rings 20 tend to renew or add to the said coating when there is any difference in speed between the drum and the wire. It will be understood that the drums and dies may be provided in any suitable number, so as to subject the wire to as large a number of reductions in one continuous operation as is desired. It is further understood that the exact form of apparatus for carrying out the steps of the process is immaterial and that the substances or materials herein described may be varied without departing from the spirit of the invention.

I claim—

1. In the process of drawing iron or steel wire, drawing the wire through a reducing-die and causing it to come in contact with a lubricating metal softer than the wire, before passing through the die, and during its progress through the die.

2. The process of drawing wire which consists in propelling the wire through a reducing-die, by a wire-forwarding surface caused to travel at a different speed from the wire and composed of a material softer than that of the wire, which coats the wire.

3. The process of drawing wire which consists in propelling the wire through a reduc-

ing-die, by a drum having a wire-forwarding surface, around which the wire is wrapped, said surface revolving faster than the speed of the wire and composed of a wire-coating material.

4. The process of drawing wire which consists in passing the wire continuously through a series of reducing-dies, and coating the wire between said dies by attrition with a metal softer than that of the wire.

5. The process of drawing wire which consists in passing the wire continuously through a series of reducing-dies, and propelling the wire between said dies by a drum around which the wire is coiled, said drum having a wire-forwarding surface revolving faster than the speed of the wire and composed of a wire-coating material.

6. The process of drawing wire plated with a metal softer than the wire which consists in subjecting the wire continuously to a series of reductions, and renewing the coating of the wire between said reductions by attrition with a material similar to that of the coating of the wire.

7. The process of drawing soft plated wire which consists in subjecting the wire continuously to a series of reductions and propelling it between said reductions by a wire forwarding-surface around which the wire is coiled, said surface traveling faster than the wire and composed of a material similar to the coating of the wire.

8. The process of drawing bronze-plated steel wire which consists in subjecting the wire continuously to a series of reductions and propelling the wire between said reductions by a drum around which the wire is coiled, said drum having a bronze wire-forwarding surface revolving faster than the speed of the wire.

In testimony whereof I have affixed my signature in presence of two witnesses.

JAMES A. HORTON.

Witnesses:

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A. C. RATIGAN.