W. W. McCALLIP.

Machine for Rolling Wire-Rods.

No. 196,371. Patented Oct. 23, 1877.

Fig 1.

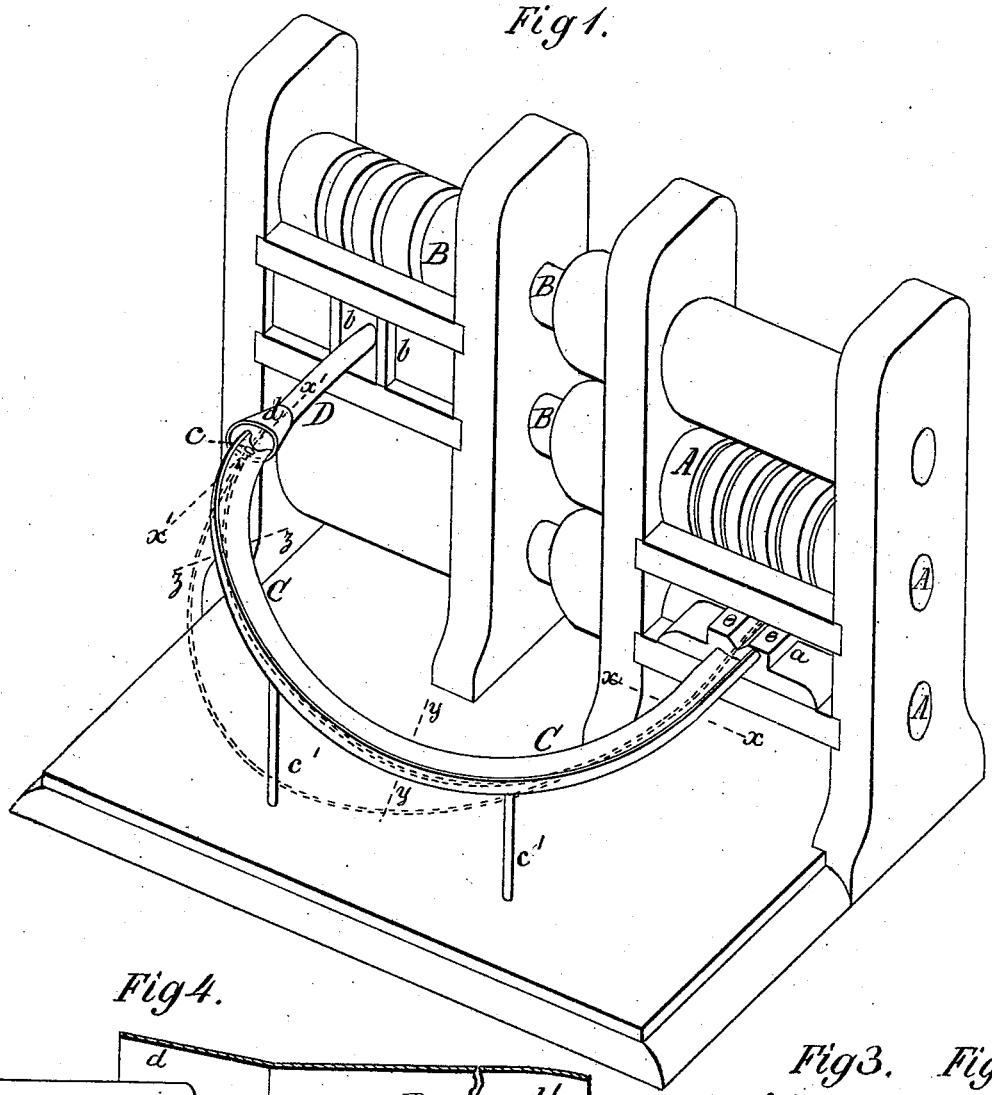

Fig 4.

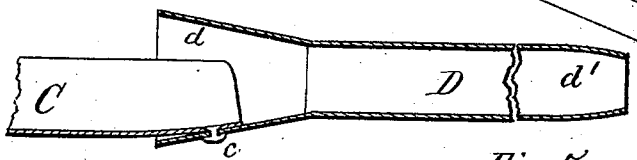

Fig 3. *Fig 2.*

Fig 5. *Fig 6.*

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UNITED STATES PATENT OFFICE.

WILLIAM W. McCALLIP, OF COLUMBUS, OHIO.

IMPROVEMENT IN MACHINES FOR ROLLING WIRE RODS.

Specification forming part of Letters Patent No. **196,371**, dated October 23, 1877; application filed August 25, 1877.

To all whom it may concern:

Be it known that I, WILLIAM W. McCALLIP, of Columbus, in the county of Franklin and State of Ohio, have invented a new and useful Improvement in Machinery for Rolling Wire Rods, which improvement is fully set forth in the following specification and accompanying drawings, in which latter—

Figure 1 is a perspective view of a set of rollers provided with a "repeater" or rod-conductor constructed in accordance with my invention. Fig. 2 is a transverse section of the said repeater or conductor in the line *x x* of Fig. 1. Fig. 3 is a transverse section of the same in either the line *y y* or *z z* of Fig. 1. Fig. 4 is a vertical longitudinal section of the same in the line *x' x'* of Fig. 1. Fig. 5 is an end view of the delivery-opening in the delivering end of the repeater, and Fig. 6 is a similar view of the delivering end of a repeater adapted for a differently-shaped rod.

The nature of my invention consists, first, in an open conductor, terminating in tube form at its delivering end, whereby the billet is guided in the proper direction from the open conductor to the receiving-rollers, and is allowed to pass outside and beyond the central part of the conductor, as occasion requires; second, in a mode of connecting the said conductor to its delivering tube-shaped end by a pivot, whereby the contrivance is rendered adjustable to differently-located roller-grooves.

My invention is especially adapted to the manufacture of rods of small diameter—such as wire rods, chain-rods, and small rounds, the production of which in great lengths is an advantage to the manufacturer, but is usually attended with a certain number of difficulties which have not heretofore been wholly overcome.

A good rod cannot be made of an overheated billet, nor should it be delivered too cold by the finishing-rollers. These objections have heretofore been proposed to be avoided by revolving the rollers with a high speed, and by introducing the forward end of the billet immediately after its appearance from the first pair of rollers to the next pair. To accomplish this properly the most skilled and active men are required to be placed in charge of the work; but this entails an expense which the manufacturer cannot well afford, for various reasons. And for overcoming the latter difficulty different mechanical contrivances have been invented; but these have not come into general use, on account of the great inconvenience and cost attending their construction, their adoption involving a change of the gearing, housing, and diameters of the rollers, as well as other alterations.

With my improved repeater I am enabled to dispense with the services of one skilled hand, and its cost of construction is so small that it can be adopted in even the smallest establishments to great advantage.

In the drawings, A B designate sets of rollers of ordinary construction. The rollers A are provided with a suitable guttered or open guide, *a*, over which they conduct the billet being rolled. To the rear of the guide *a* the end of a conductor, C, is fastened. This repeater is bent in a curve toward the rollers B, and in transverse section is substantially of the form represented in the drawing, it being of greater height at the outer edge than on the inner, in order to prevent the billet from slipping over at the commencement of the rolling operation, and before the end of the rod or billet has entered between the rollers B.

It has been found that at the point indicated by line *x x* a sectional shape, such as shown in Fig. 2, is the most advantageous for guiding, and that at the center of the conductor C, or near the line *y y*, and at the line *z z*, its shape may be slightly varied in the manner indicated by the section in Fig. 3, in order to facilitate the motion of the rod or billet out of and beyond the conductor, after it has entered the rollers B, which are fed with a smaller amount of metal in a given time than the rollers A are discharging.

The conductor C, near the rollers B, extends into a tube, D, with which it is connected by means of a loose rivet or bolt, *c*, which serves as a pivot for the connected parts to swing on laterally, and so that the said conductor may be adjusted to come in range with or opposite other grooves of the rollers, as occasion demands. The mouth *d* of the tube D is trumpet-shaped or flared, so as to properly guide the end of the billet into the tube. The end of the tube D is inserted between the stationary guide

b of the rollers B, and the conductor C is supported by legs c^1, or otherwise. The tube D, at its forward end, is contracted, as indicated in Fig. 4, at d', and terminates with an opening, c^2 or c^3, which is of a diameter and shape corresponding with the billet or unfinished rod. The billet has to undergo a change of shape with every new set of rollers it passes through, the most common of which changes are from an oval shape to a square, and from a square to an oval, until a required finished rod is produced.

The construction of the openings c^2 c^3 of the tube D serves to effect the guiding of the billet, and prevents twisting and false rolling.

The change of shape above alluded to has been found to produce a perfect uniform weld in the metal, and lessen its resistance in passing through the rollers. There are sometimes more than two changes found necessary, and there are, in consequence, more than two different shapes of the billet, and more guide-openings than c^2 and c^3, which correspond with the other different shapes of the billet; but the two changes above described are the most common.

The production of a finished rod from a billet requires a series of rollers, which, in practice, are connected with a number of the described repeaters, so that the billet is introduced by hand between the first pair of rollers, and received by hand from the last pair of rollers, passing through all the intermediate pairs of rollers by means of the said repeaters. In consequence of this arrangement there is much time saved in the manufacture of the rod, and the billet retains its heat and welding condition up to the last moment of operation. Moreover, it requires only one common hand at each side of the whole series of rollers to watch the operation of the conductors, while without the conductors two good, skillful hands have to attend to each side.

Operation: The billet is passed between the rollers A and discharged over the guide a upon the conductor C, and in its passage it follows the curvature of the repeater all around, as the inner dotted lines indicate in Fig. 1, and enters the tube D, and is guided thereby into the proper grooves between the rollers B. After the rollers B commence to roll the billet, it is fed thereto faster than the speed of said rollers B, on account of the reduction of size the metal undergoes, and, in consequence thereof, the length of the billet between the rollers A and B is constantly increasing. This causes the billet to rise over the outer rim of the conductor and form a uniform loop outside of it, as the outer dotted lines in Fig. 1 indicate, which increases until the billet leaves the rollers A, when the rollers B can draw in the said outside loop without difficulty, and thus the whole billet is rolled without inconvenience from such knots or short kinks as generally form in it with other modes of operation, which make no allowance for the difference of speed at the two ends of the billet.

I have shown a series of rollers of ordinary construction to which my improved repeater is applied, but it is easily seen that my repeater will operate with rollers of any other proper construction.

Having described my invention, what I claim is—

1. The combination of the semi-tubular curved conductor C and the complete delivering-tube D and pairs of rollers, substantially as and for the purpose set forth.

2. The conductor C and the tube D, united by a loose pivot, whereby a flexible connection of the said parts is effected, substantially as set forth.

Witness my hand, in the matter of my application for a patent for a machine for rolling wire rods, this 23d day of August, A. D. 1877.

WILLIAM W. McCALLIP.

Witnesses:

WALTER B. BAKER,

CHAS. W. MILLER.