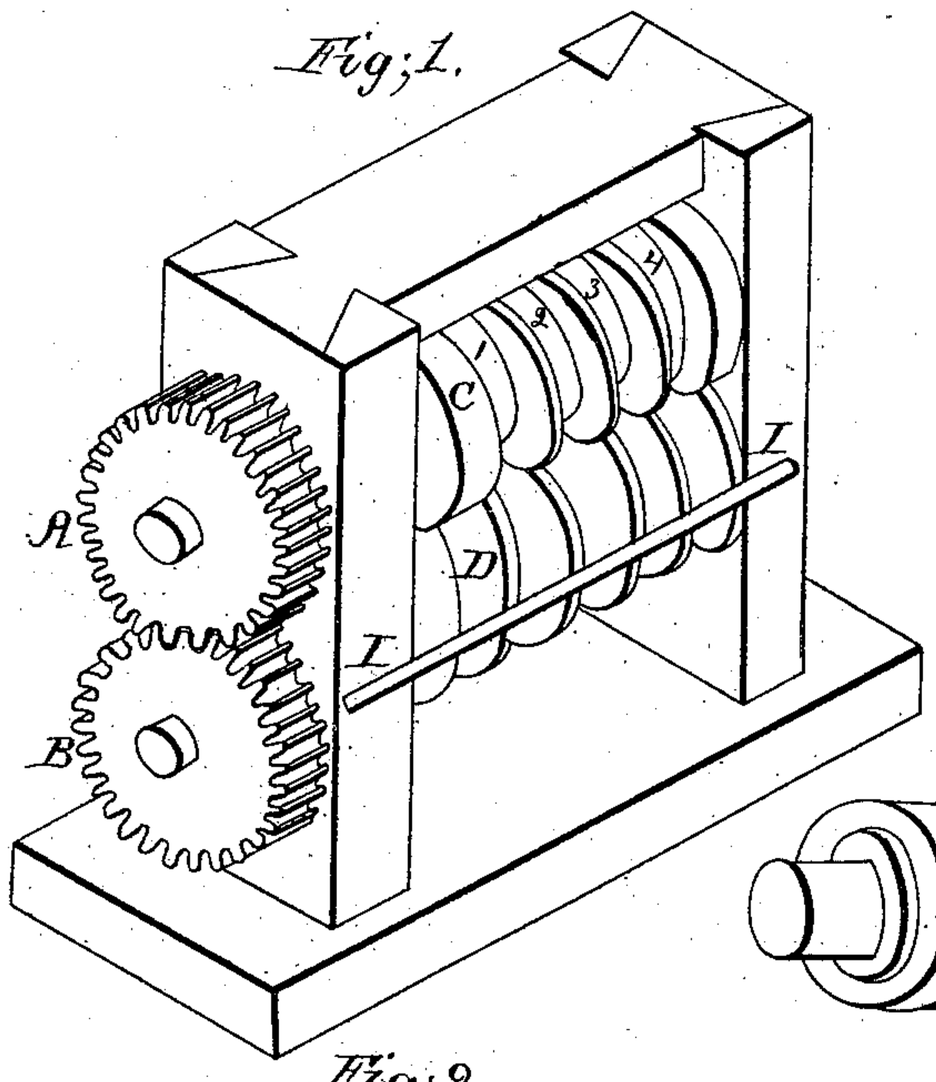
T. H. MILLER.

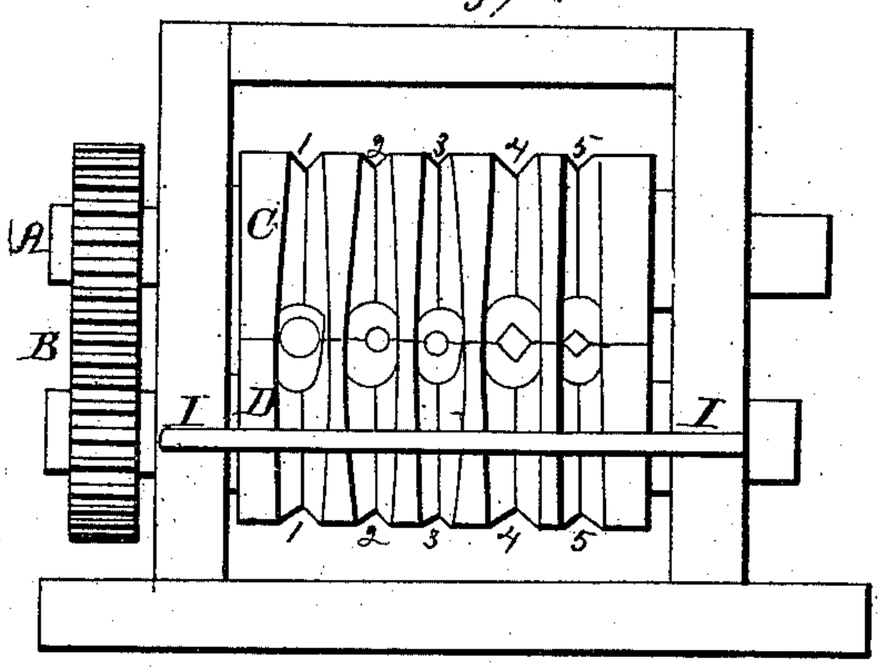
MACHINE FOR ROLLING CARRIAGE AXLES.

No. 33,155. Patented Aug. 27, 1861.

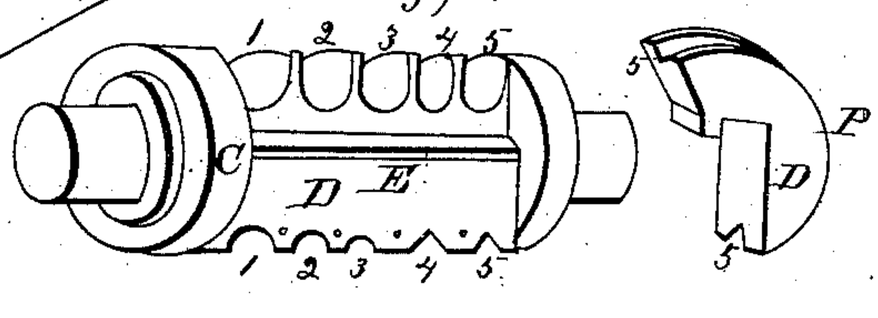
Fig; 1.



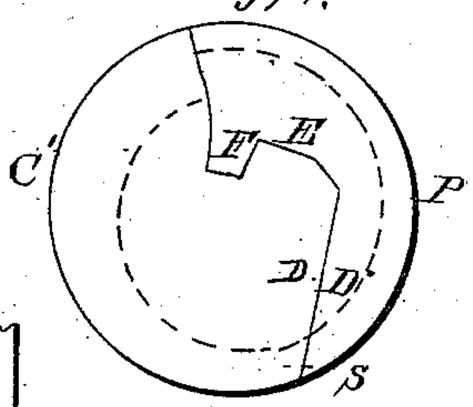
Fig; 2.



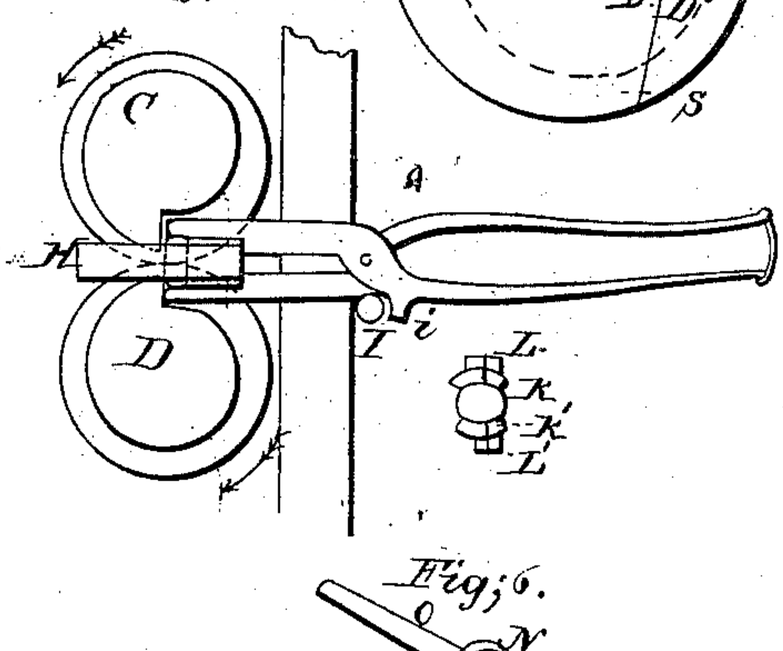
Fig; 3.



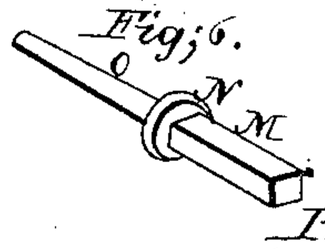
Fig; 4.



Fig; 5.



Fig; 6.



Witnesses;
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UNITED STATES PATENT OFFICE.

TOBIAS H. MILLER, OF LANCASTER, PENNSYLVANIA.

IMPROVED MACHINE FOR ROLLING CARRIAGE-AXLES.

Specification forming part of Letters Patent No. **33,155**, dated August 27, 1861.

To all whom it may concern:

Be it known that I, TOBIAS H. MILLER, of the city of Lancaster, in the county of Lancaster and State of Pennsylvania, have invented a new and improved tongs to be used in connection with a suitable machine for manufacturing wrought-iron axles for carriages and other vehicles; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification—

Figure 1 being a perspective view of the machine in which the axles are rolled or formed; Fig. 2, a front elevation thereof; Fig. 3, a view of the central core, detached, to which are secured the rollers; Fig. 4, a view of one of the rollers detached; Fig. 5, a view of my improved tongs as applied to the machine; Fig. 6, a view of a finished axle.

Like letters designate corresponding parts in all the figures.

The usual form of an iron axle is as represented in Fig. 6. It consists of a tapering portion O, on which the hub of the wheel turns, a collar N, against which the inner end of the hub rests, and a square or rectangular shank M, which sustains the body of the vehicle. The usual manner of making these axles is by forging, the collar N being a separate piece welded or suitably secured in place.

In forming the axles I employ a suitable machine instead of forging and make all the parts from single pieces of iron. This machine consists of two sets of rollers C and D, Fig. 1, one situated above the other in a horizontal position and sustained in a suitable frame. These sets of rollers are situated so that their peripheries come in contact, and they are geared together by gear-wheels A and B, secured, respectively, to their shafts outside the frame, as represented. I usually construct these rollers so as to be removable from their shafts or cores in order that different sizes may be employed to roll different-sized axles, in which case the construction of the core and the rollers that are secured thereto is substantially as represented in Figs. 3 and 4. The core is made with a longitudinal groove or channel F and bearing-surfaces E and D′, nearly or quite right-angled to each other, to which parts respectively fit corresponding parts F′, E′, and D″ of the rollers, as shown. When the rollers and core are thus united, they are secured together by screws *s′ s′*, fitting in holes *s s;* but if it is desired to make axles of a single and uniform size only each set of rollers may be formed in a single piece and suitably chilled.

The peripheries of each corresponding pair of rollers of the sets C D are provided with suitable grooves 1 2 3 4 5, Fig. 2, which grooves are of the proper extent, size, and shape to form those portions of the axle for which they are respectively designed, whether tapering or square. In the drawings the grooves 1, 2, and 3 are represented as semicircular in cross-section, gradually tapering or growing of less diameter as they extend around, so as to give the proper form to the tapering or conical portion of the axle. The grooves 4 and 5 are represented as square in cross-section for the purpose of forming the square shank of the axle. The grooves are graduated in size, so as to accomplish by successive rolling the proper size of the axle.

To the frame of the machine, at the proper distance in front of the rollers, is secured a horizontal gage-rod I, the use of which, in connection with the tongs, will be hereinafter explained.

My invention principally consists in using, in connection with the machine above described, a pair of tongs for holding the heated iron that forms the axle, so constructed that all the parts of the axle are formed from a single piece without removing the iron from the tongs, (the ends of the iron being merely reversed therein,) and the iron is so gaged that it shall always enter the proper distance between the rollers.

The tongs, Fig. 5, are formed of two levers pivoted together as usual, but having the jaws L L of greater length than in ordinary use. The extremities of these jaws on their inner side are respectively provided with swivel clutches or holds K K, of proper shape for suitably seizing and holding the iron that is submitted to the action of the rollers. These swivel-clutches turn freely on swivel-joints or pivots that pass through them and the ends of the jaws L L. At such a distance in the rear of the swivel-clutches as corresponds with the length of that portion of the

axle-iron forming the square shank M before it is rolled or drawn out are made shoulders *k k* in the jaws L L, as represented, and in the rear of these shoulders, between the jaws when closed on the iron, is situated a tapering space *l* of sufficient size and of such length as to receive the tapering portion O of the axle when turned therein, with the swivel-clutches holding on the collar N. One or both levers of the tongs is or are provided with a gage-check *i*, forming a projecting shoulder, as represented. The portion of this gage-check on the tongs is arranged with reference to the distance of the gage-rod I from the rollers, as these two parts act together.

The iron to be rolled into axles is usually of cylindrical shape; and is cut of the proper length to form all the parts of the axle, as represented at Q, Fig. 5. When it is properly heated to be rolled, it is inserted between the swivel-clutches of the jaws, the rear end thereof resting against the shoulders *k k*, while the forward end projects beyond the tongs. Thus arranged the swivel-clutches hold exactly on that portion of the iron forming the collar N. When thus held the projecting portion of the iron in front of the swivel-clutches is of just the right length to form the tapering part of the axle, and the portion in the rear of the clutches within the jaws is of just the length to form the square shank of the axle. Thus secured in the tongs, the projecting portion of the unrolled axle-iron is inserted in one of the grooves 1 2 3 between the rollers till the check *i* strikes the gage-rod I, which action enters the iron up to the swivel-clutches. The rollers C D are then actuated in the direction indicated by the arrows in Fig. 5, thereby rolling the iron out and forming the tapering portion O. By successive rolling it is readily reduced to the desired size. As soon as the tapering or conical portion of the axle is properly formed the tongs and iron are entirely withdrawn from the rollers, and (without releasing the rear end of the tongs from the link) by placing the end of the rolled taper against any object and pressing sidewise of the tongs the swivel-clutches turn on their joints, the tapering end of the axle is turned into the space *l* between the jaws, and the iron is reversed, thereby bringing the shank portion forward ready to be rolled or formed. This end of the iron is formed in the square grooves 4 and 5 in the same manner as above described.

Thus by my improved arrangement not only is the iron gaged to enter a certain depth between the rollers by means of the check *i* and gage-rod I, but it is also gaged in the jaws of the tongs, so that each portion is rolled or formed without removing the iron from the tongs by the use of the swivel-clutches and the shoulders *k k*. The advantage of such an arrangement in the economy of time and labor is apparent, as the great trouble of removing the iron from the tongs and replacing it in a different position is avoided. By such celerity of action, also, there is less loss of the necessary heat of the iron in working.

I do not claim gaging the depth that the iron enters the rollers by a gage-rod and check, as I am aware that such a device has before been known; but

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

The tongs herein described, provided with the swivel-clutches K K, shoulders *k k*, space *l*, and check *i*, for the purpose of holding, turning, and gaging the iron in the process of rolling without removing it from the tongs, when the same is used in connection with the gage-rod I and grooved rollers C D of the machine, substantially as herein specified.

T. H. MILLER.

Witnesses:
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