G. F. Mc Cleane.

Reversible Metal Roller.

No. 45,260. Patented Nov. 29, 1864.

Fig. 1.

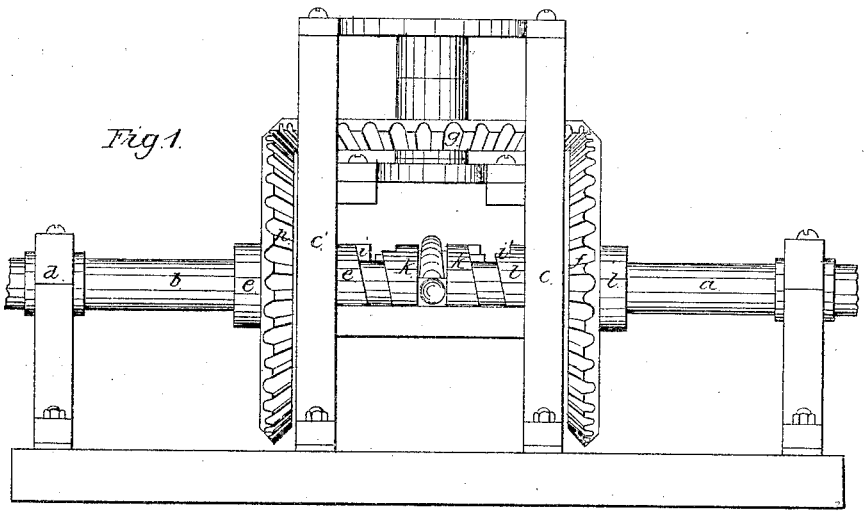
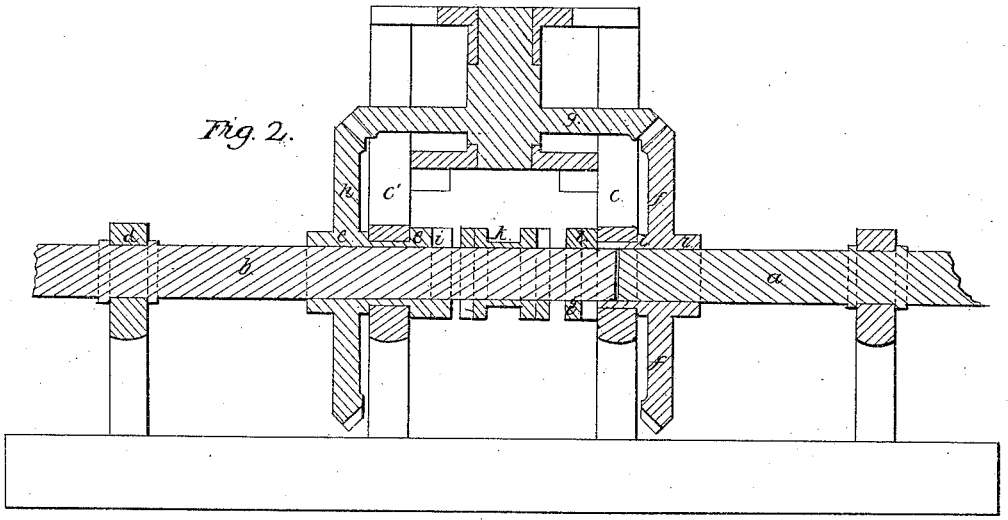


Fig. 2.



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UNITED STATES PATENT OFFICE.

GEORGE F. McCLEANE, OF PITTSBURG, PENNSYLVANIA.

IMPROVED APPARATUS FOR REVERSING THE MOTION OF ROLLS.

Specification forming part of Letters Patent No. 45,260, dated November 29, 1864.

To all whom it may concern:

Be it known that I, GEORGE F. McCLEANE, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Machinery for Reversing the Motion of Rolls; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, forming part of his specification, in which—

Figure 1 is a front view or elevation of my improved machinery for reversing the motion of rolls. Fig. 2 is a vertical section through the axis of the shaft.

In both figures like letters of reference denote similar parts.

My invention consists in an improvement in machinery used for producing the instantaneous stoppage or reversal of the motion of the heavy iron rolls used for rolling sheets or bars of metal, without interfering with the motion of the main or driving shaft from which motion is communicated to the machinery.

The ordinary mode of rolling sheet metal or bars is to pass them between the rolls always in one direction, the rolls having a continuous motion, which prevents the sheet of metal being passed back between them. It is raised up on top of the upper roll, which causes it to be returned to the front of the machine, when it is again passed between the rolls. In this operation there is a great loss of time, as it takes as long to pass the sheet of metal over the rolls as between them. The raising of the metal to the top of the rolls is very laborious work. But the difficulty is greatly enhanced where the metal to be rolled consists of heavy plates of iron such as are made for the construction of vessels of war, as they are too heavy and unwieldy to be easily raised up so as to ride over the top roll from the rear of the machine to the front. To obviate this difficulty and to economize time and power, it is only necessary to reverse the motion of the rolls as soon as the iron plate has passed through in one direction and pass it back again between the rolls. This idea is not a new one, and various devices have been employed for accomplishing the speedy reversal of motion. The mode which I have invented for effecting this change is, in my opinion, superior to any heretofore used.

To enable others skilled in the art to make use of my invention, I will proceed to describe the construction and operation of the machinery which I use for the purpose indicated.

In the drawings, *a* is the main shaft of the machinery, which revolves always in the same direction by power communicated from some prime motor. The axis of the shaft *a* is in the same horizontal line as the axis of the lower roll and as the shaft *b*. The main shaft *a* has a sleeve, *l*, which is attached to or forms part of it, and which projects through the housing *c*, in which it has its bearing, as seen in Fig. 2, so that the sleeve *l* always revolves with the shaft *a*. The shaft *b* has its end bearing in the sleeve *l*, which it enters, its extremity next to the shaft *a* approaching, but not quite touching, the opposite extremity of the shaft *a* within the sleeve *l*. The shaft *b* has also a bearing at *d*, beyond the housing *c'*, and has also an intermediate bearing in the loose sleeve *e*, through which it passes, the sleeve *e* having a direct bearing in the housing *c'*, which is parallel to the housing *c*. To the sleeve *l* on the main shaft *a*, just outside of the housing *c*, is attached a miter gear-wheel *f*, which gears into a horizontal miter gear-wheel *g*, the shaft of which is vertical and is supported in the frame-work between the housings *c c'*. The horizontal miter-wheel *g* gears into a vertical miter-wheel, *h*, which is attached to the loose sleeve *e*, just outside of the housing *c'*. As the shaft *b* is not attached to the loose sleeve *e*, but revolves within it, it is manifest that when the parts are in the position shown in the drawings the revolution of the main shaft *a* will cause the miter-wheel *h*, and with it the loose sleeve *e*, to revolve in the opposite direction to that in which the main shaft is moving; but the shaft *b*, not being connected in any way with the loose sleeve *e*, will remain stationary. As the shaft *b* is connected by coupling or gearing with the lower roll, it is only necessary to cause the shaft *b* to revolve in either direction to produce a similar effect on the rolls; and as the main shaft *a* revolves in the opposite direction to the loose sleeve *e*, by connecting the main shaft with one or the other of these parts the motion of the rolls will be affected accordingly. This is accomplished by means of a crab or clutch, *k*, which is placed on the shaft *b* and slides on a feather projecting from

the surface of the shaft into the crab *k*, or projecting from the crab into the surface of the shaft *b*, as may be preferred. The crab *k* has crab-teeth at both ends to fit into the crab-teeth *i* at the end of the loose sleeve *e*, which projects within the housing-frame, or into the teeth *i'* on a sleeve, *l*, attached to the extremity of the main shaft *a*. It is obvious that if the crab *k* is moved to the right so as to engage the crab-teeth on the sleeve *l* of the main shaft *a* the motion of the main shaft will be communicated at once to the shaft *b*, as they are thus connected together as one shaft, while the loose sleeve *e* and its miter-wheel *h* revolve on the shaft *b* in the opposite direction. If now the position of the crab *k* is changed by sliding it to the left, it will release its hold on the shaft *a* and engage the crab-teeth at the end of the loose sleeve *e*, thus connecting the shaft *b* with the loose sleeve *e* and communicating the reverse motion of the loose sleeve *e* to the shaft *b*. By this means the motion of the shaft *b* is controlled at will, and it may be stopped suddenly by moving the crab *k* to a position between the end of the main shaft *a* and of the loose sleeve *e*, and not touching either; or it may be made to revolve with the main shaft *a* or in a reverse direction by connecting the crab *k* with the main shaft *a* on one side, with the loose sleeve *e* on the other.

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

The specific arrangement and combination of the mechanism hereinbefore described for reversing the motion of rolls, consisting of two shafts, *a* and *b*, placed in the same axial line, one of which is connected with the rolls, and each carrying a miter-wheel, which wheels, *f* and *h*, both gear into a miter-wheel, *g*, placed at right angles to and between them, one of the miter-wheels, *f*, being attached to its shaft *a*, and the other, *h*, to a loose sleeve, *e*, on the shaft *b*, with a crab, *k*, placed on one of the shafts, *b*, with which it revolves between the miter-wheels, so that by sliding the crab to one side or the other the roll-shaft *b* is geared either directly with the driving shaft *a*, which moves in one direction, or with the miter-wheel *h* and loose sleeve *e*, which move in the opposite direction, substantially as described.

In testimony whereof I, the said GEORGE F. MCCLEANE, have hereunto set my hand.

GEO. F. MCCLEANE.

In presence of—
JOHN M. NEAL,
A. S. NICHOLSON.