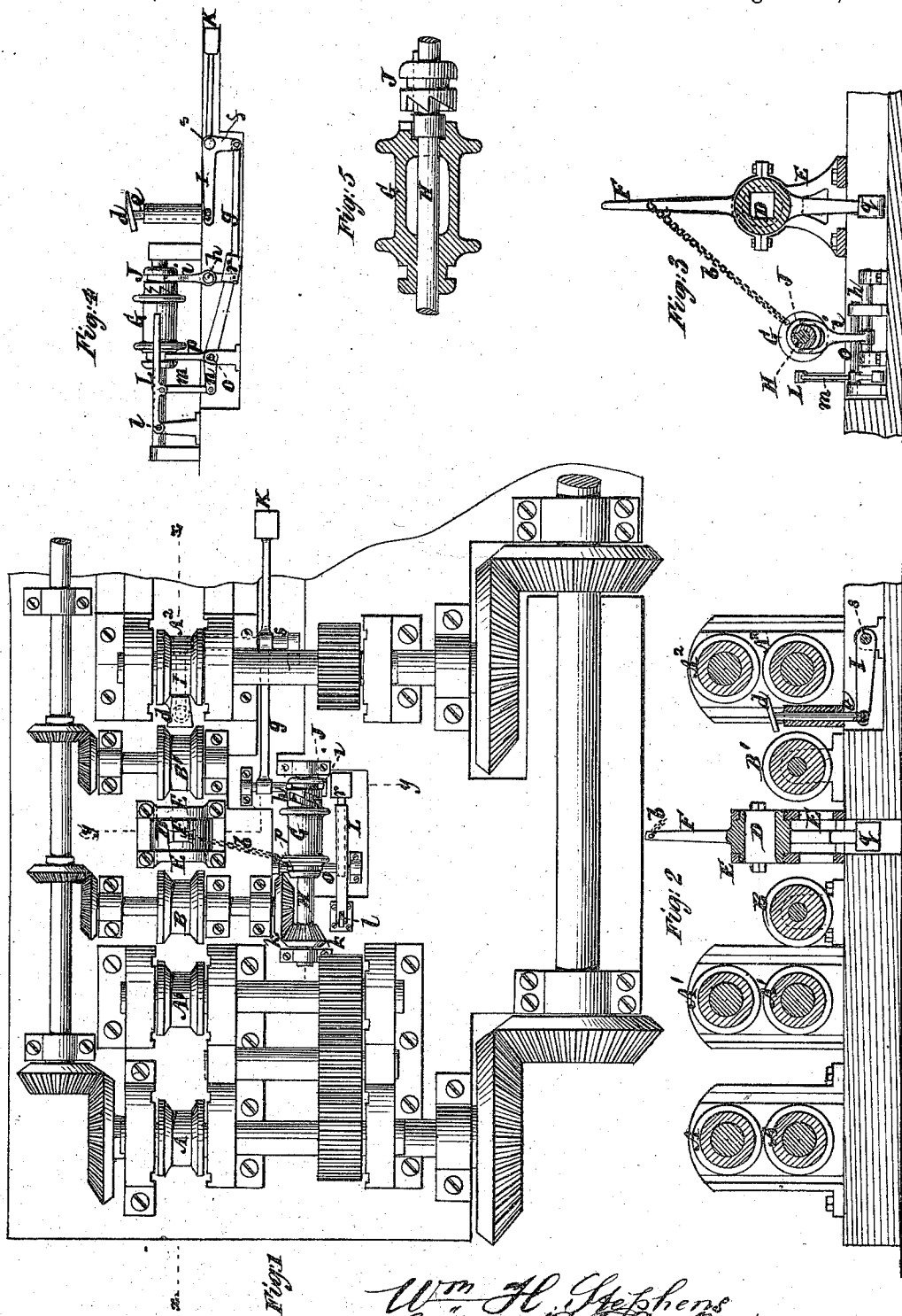


W. H. STEPHENS & G. B. F. COOPER.

Rolling-Mills.

No. 142,052.

Patented August 19, 1873.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

WILLIAM H. STEPHENS, OF EVANSVILLE, AND GEORGE B. F. COOPER, OF  
NEW ALBANY, INDIANA.

## IMPROVEMENT IN ROLLING-MILLS.

Specification forming part of Letters Patent No. **142,052**, dated August 19, 1873; application filed  
January 30, 1873.

*To all whom it may concern:*

Be it known that we, WILLIAM A. STEPHENS, of Evansville, in the county of Vanderburg and State of Indiana, and GEORGE B. F. COOPER, of New Albany, in the county of Floyd and State of Indiana, have invented certain new and useful Improvements in Rolling-Mills, of which the following is a specification:

This invention relates to train or combination rolling-mills; and consists generally in various novel combinations of mechanism, as hereinafter described.

In the accompanying drawing, which forms part of this specification, Figure 1 represents a plan of a train rolling-mill, in part, having our invention applied; Fig. 2, a longitudinal sectional elevation of the same on the line *xx*; Fig. 3, a transverse vertical section on the irregular line *yy*; Fig. 4, a side view of certain mechanism, including a winding drum and clutch, for automatically operating the turn-over device; and Fig. 5, a longitudinal, partly sectional, view of said winding drum and clutch.

Similar letters of reference indicate corresponding parts.

A *A*<sup>1</sup> represent draw or reducing and closing rolls, arranged at any suitable distance apart, and which may have a compression or dead roll or guide box between them to prevent climbing, the iron or bar to be rolled being first introduced between the rolls *A*. As the bar leaves the rolls *A* *A*<sup>1</sup> it is passed forward by one or more carrying-rollers, *B*, to and through the turn-over box *D*, the opening through which is of a suitable shape in its transverse section to effect the turning of the bar without interfering with the passage of the bar through it. This turn-over box *D* is fitted to turn in a bearing or standard, *E*. Its upper side is furnished with a lever, *F*, which is connected by a chain, *b*, with a drum, *G*, arranged loosely on a side shaft, *H*. Beyond the turn-over box *D* there is another carrying-roller, *B'*, which passes the bar forward so that it comes in contact with an inclined plate, *d*, mounted on a vertically-sliding rod, *e*, that is connected with and made to form part of a lever, *I*, fast to a horizontal rock-

shaft, *s*. Beyond the plate *d* are other draw or reducing rolls, *A*<sup>2</sup>, with accompanying devices for continuing the operation; but the single turn-over box *D* will suffice to explain the invention. Attached to the rock-shaft *s* is an arm, *f*, which is connected by a rod, *g*, with another rock-shaft, *h*, that carries a clutch-lever, *i*, which, when the inclined plate *d* and lever *I* are depressed by the weight of the bar resting on the plate, is shifted, so as to put a clutch, *J*, in gear with the winding-drum *G*. This action takes place against the controlling influence of a weighted lever, *K*, fast to the shaft *s*, and which serves to return the inclined plate *d* and clutch *J* to their normal positions. The shaft *H* has a positive motion communicated to it by bevel-gears *k k* from the shaft of the carrying-roller *B*, which latter is driven by gearing from shafting connected by gearing with the drawing or reducing and closing rolls, all the carrying-rollers having a like positive motion. The sliding clutch *J* fits a feather on the shaft *H*, so as to rotate in common with it, and when put into gear with the clutch on the winding-drum *G*, by the pressure of the bar on the inclined plate *d*, causes said drum to be quickly and partially rotated, so as to wind up on it the chain *b*. This pulls on the lever *F* and causes the turn-over box *D* to be rotated the fourth of a circle, or thereabout, when the lever *F*, striking a cross-lever, *L*, pivoted at *l*, operates, by means of a connection, *m*, and arm *n*, a rock-shaft, *o*, which carries a clutch-lever, *p*, that longitudinally shifts the winding-drum *G* out of gear with the clutch *J*, which latter then continues to revolve independently of the drum. As soon as the iron or bar under operation passes the turn-over box *D* and plate *d*, the latter is raised by the weighted lever *K*, and the clutch *J* slid back to its normal position. The turn-over box *D* is then returned to its original position by an attached pendent weight or weighted arm, *q*, the drum *G* being thereby turned or partially rotated backward to its original position, and being slid forward by a weighted lever, *r*, against any suitable stop on the shaft *H*, or elsewhere, to its normal position for gear of the clutch *J* with it in due course as another bar is passed through the

mill. In this way, or by these means, the bar, as it is passed through a continuous train of rolls, is automatically turned so as to present its various sides successively to the action of the rolls.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The plate *d*, having an attached lever, *I*, and the clutch *J*, with their connecting devices, in combination with the winding-drum *G*, the chain *b*, the lever *F*, the pendent weight *g* and the weight or weighted lever *K*, essentially as and for the purposes herein set forth.

2. The combination, with the turn-over box *D*, its attached lever *F*, and the clutch *J*, of

the lever *L*, the clutch *p*, the free or loose drum *G*, the weighted lever *r*, and the revolving shaft *H*, substantially as specified.

3. The positively-driven carrying-rollers *B*, in combination with the turn-over box *D* and drawing or compression rolls *A A<sup>1</sup> A<sup>2</sup>*, essentially as herein described.

In testimony whereof we have hereunto signed our names in the presence of two subscribing witnesses.

WM. H. STEPHENS.  
GEO. B. F. COOPER.

Witnesses:

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