J. Reese,

Rolling Metal Plates, Bars &c,

No. 10,524. Patented Feb. 14, 1854.

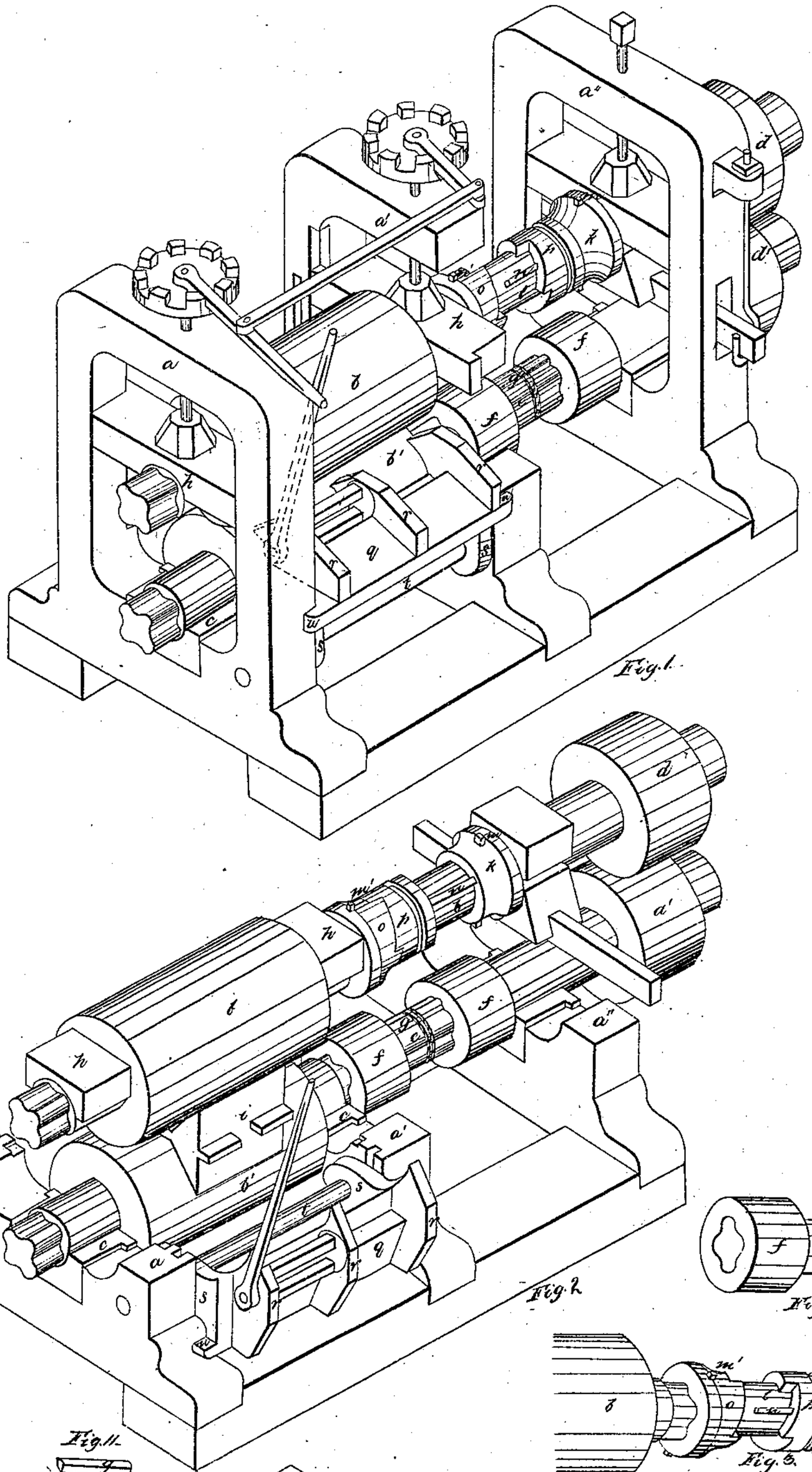

Fig. 1.

Fig. 2.

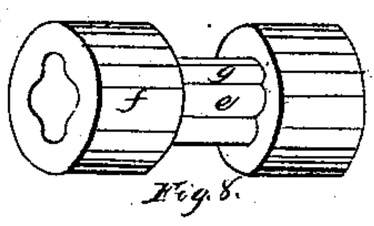

Fig. 8.

Fig. 3.

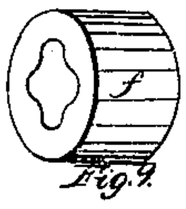

Fig. 9.

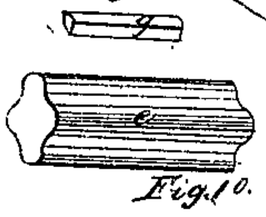

Fig. 10.

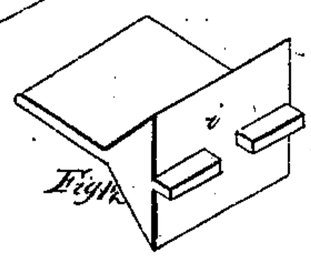

Fig. 11.

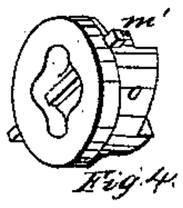

Fig. 4.

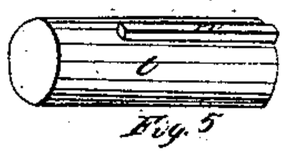

Fig. 5.

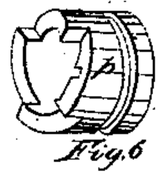

Fig. 6.

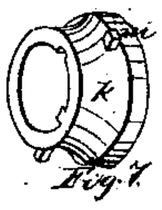

Fig. 7.

UNITED STATES PATENT OFFICE.

JACOB REESE, OF SHARON, PENNSYLVANIA.

HANGING THE FORE-PLATES TO IRON-ROLLING MACHINERY.

Specification of Letters Patent No. 10,524, dated February 14, 1854.

To all whom it may concern:

Be it known that I, JACOB REESE, of Sharon, in the county of Mercer and State of Pennsylvania, have invented a new and useful Improvement in Machinery for the Rolling of Iron; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, forming part of this specification, wherein—

Figure 1, is a perspective view of that part of the machinery of a rolling mill to which my improvements are to be applied, showing the fore plate in its place in front of the finishing rolls, and the upper roll, *b*, not connected by the coupling with the shaft of the roll *d*. Fig. 2, is a perspective view of the same machinery, the uprights of the frame work being removed so as to show the details of the machinery more distinctly, the fore plate being thrown back from the rolls; the scouring board being in place, between the rolls, and the roll *b* being connected by the coupling with the shaft of the roll *a*. Fig. 3, represents a self supporting coupling. Figs. 4, 5, 6 and 7, represent the several parts of Fig. 3 detached. Fig. 8 represents the old kind of coupling. Figs. 9, 10, and 11 represent the several parts of the old kind of coupling, detached.

In the several drawings the same letters refer to similar parts of the machinery.

My invention and improvement consists in connecting the fore-plate to the frame work which sustains the rollers, by adding to it arms which work on a bar or brace, as a center, thereby enabling the fore-plate to be drawn away from the rolls or brought to its place again by simply turning it on its center and avoiding the delay of removing the guides, the fore-plate and the rest bar, as is necessary on the old plan, whenever the rolls are to be scoured.

In order to explain fully the nature of my invention, it will be necessary to explain the present arrangement of the machinery used for rolling and finishing, and the difficulties which my improvements are designed to overcome.

In the drawings, *a*, *a'*, *a''* are the framework which support the rolls used for rolling iron; *b* is the upper finishing roll, and *b'* is the lower finishing roll. The lower finishing roll *b'* is supported by bearings *c*, *c* at either end; the neck of the roll *b'* extends beyond its bearing, into the space between the frame *a'* and *a''* where it is connected with the neck of another roll *d'* to which roller *d'*, or others similarly connected with it, motion is communicated from the steam engine or other motive power. The coupling shown in the drawings as connecting the necks of the rolls *b'* and *d'* is of the ordinary kind and is thus constructed. The ends of the necks of the rolls to be connected are made of similar diameter and shape, being squared or of any usual and convenient shape, other than circular. Between the extremities of these rolls is placed a short connecting piece *e*, which is of similar diameter and shape to the ends of the necks of the rolls *b'* and *d'*. Two rings or boxes of iron *f*, *f* are placed on this connecting piece, the inner surface of which is a counterpart of the shape of the necks of the rolls *b'* and *d'*, and which fits said necks, and connecting piece, exactly, and yet will slide back and forth from the necks to connecting piece *e*. Now when it is desired to couple or connect the rolls *b'* and *d'* the coupling just described is placed between the necks of the rolls to be geared together, and the rings or boxes *f* and *f* are slid apart along the connecting piece *e*, so as to cover the joints between the piece *e*, and the ends of the rolls *b'* and *d'*. The rings are kept at the right distance apart by a strip of wood or iron *g*, tied around the connecting piece *e*. The rolls *b'* and *d'* are thus so connected that the revolution of the roll *d'* carries with it the roll *b'*, but if it be desired to disconnect them, it is necessary to remove the separator *g*, and draw the rings *f*, *f*, toward each other on the connecting piece *e*, which leaves the coupling without any support, so that it must be entirely removed until it is desired again to connect the rolls *b'* and *d'*. To do all this requires the whole machinery to be stopped which causes great loss of time.

The upper finishing roller, *b*, is kept in its place over the lower roller *b'*, by the bearings or half journal boxes *h*, the journals of the roll *b* having no lower bearing, as it rests on the roll *b'*, and when in use it is not in gear with any other roll, but is turned as a friction roller by its contact with the lower roller, or with the iron passing over the lower roller. It is necessary that the upper roller should not be geared to any other shaft or roll, so that it may revolve evenly with the lower roller *b'*, because if the upper

roller had motion independent of what it obtains from contact with the lower roller and there was the slightest variation in diameter of the two rolls, they would not work well together, the surface of the larger roll revolving faster than that of the smaller one.

The finishing rolls require to be scoured before every heat, which in a rolling mill would be about 8 times a day. This is done by placing the scouring board *i*, with oil and emery upon it, between the rolls *b* and *b'*, and causing them still to revolve. (See Fig. 2.) Now the moment the scouring board *i*, is placed thus between the rolls, the friction of the roll *b'* on the roll *b*, by which the latter was turned, ceases, and the upper roll *b* will stand still unless it be connected with the shaft of a working roller *d*, along side of it. This has heretofore been done by means of the ordinary coupling *e*, *f*, *g*, before described, but as the coupling has to be removed and brought back each time, and the machinery has to be stopped it becomes a serious hindrance. This is obviated by the use of the self sustaining coupling shown in detail in Fig. 3, and Figs. 4, 5, 6, 7; *k* is the box (of the shape shown in Fig. 7 and hollow throughout), one end being shaped to fit over the neck of the roll and the other end having a cylindrical bore, to receive the end of the spindle *l;* a key *m* which passes through the box *k* at right angles to its axis serves to separate the neck of the roll and the end of the spindle, and to keep the box *k*, in place, thus answering the purpose of the spreading block *g* in the ordinary coupling. The box *k* has a groove cut inside of it along the cylindrical bore, to receive a corresponding rabbet on the spindle. The spindle *l* is a cylindrical shaped piece, sufficiently long to connect the ends of the rolls to be coupled. The rabbet *n* forms a key, which fitting into the groove in the box *k*, causes the spindle to revolve with the roll to which the box *k* is attached. The other end of the spindle is inserted in a cylindrical bore in the box *o*, which has crab lugs, to fit into the lugs of the sliding crab *p*. The box *o*, has also a key *m'*, similar to that in the box *k*, to keep the box in its place. The rabbet or key *n* does not extend quite far enough on the spindle to reach the box *o*, but approaches near to it; the spindle therefore turns freely in the box *o*, (by which and the box *k* it is supported) without carrying the box *o*, or the roll to which it is attached, with it. The sliding crab *p* which has lugs to correspond with those on the box *o*, has a cylindrical bore throughout so as to slide evenly on the spindle and has a groove to receive the key *n*, so that the crab cannot turn around on the spindle, but is carried around with it.

Now when the several parts are in the position shown in Figs. 1 and 3, the spindle and crab are supported by the boxes *k* and *o*, and the roll to which the box *k* is attached can revolve, (and with it the spindle *l* and crab *p*) without affecting the box *o* or its roller *b*, and at the same time the spindle *l*, by entering the bore of the box *o*, within which it turns freely, supports the roller *b*, without the use of a bearing under the journal of the roll *b*, which would otherwise be necessary. Now if it is desired to couple the roll *b* with the roll *d*, it is done by simply sliding the crab *p* until its lugs interlock with those of the box *o*. The rabbet *n* extends so far that the crab *p* is still over it and as the spindle therefore cannot revolve without carrying with it the crab *p*, which is now interlocked with the box *o*, the coupling is complete. The connection can be at once broken by sliding back the crab *p* far enough to release the lugs of the box *o*. The advantage of this form of coupling is that it is sustained without any additional bearing between the coupling and one of the rolls to be connected, as is ordinarily required where couplings are used, and is not detached from the rolls by the act of throwing them in or out of gear, and that it can be used without any stoppage of the machinery.

In the drawings Figs. 1 and 2 *q* is the fore-plate, and *r*, *r*, are the guides, placed before the rollers, to aid in feeding in the iron to be rolled. Fig. 1, shows the fore-plate and guides in their right place. The fore plate is usually inserted in grooves in the frames *a*, *a'* which support the rolls, and lies upon a rest bar, which extends from one frame to the other. In order to insert the board *i* for scouring the rolls, it is necessary on the old plan of construction to stop the machinery, and unscrew the guides from the fore-plate, and remove the fore plate and rest bar. This is a tedious and difficult job, and has moreover to be done about eight times a day and causes a very serious expenditure of labor and loss of time. All this I save by my arrangement of the fore-plate: I add to the fore-plate as usually made, two arms, *s*, *s* which extend from either end of the fore plate; through these arms passes a round bar, *t*, which extends from one frame to the other, serving as a brace to the frames, and making the pivot or center on which these arms turn. I also add a lug *u*, to each side of the fore plate *q*, which, when the fore plate is in the position shown in Fig. 1, rest against the outside of the frames *a*, *a'* and act as stops to prevent the fore plate being drawn too close to the rolls when the iron is passing over it, through the rolls. When it is desired to insert the scouring board between the rolls all that is necessary is to turn the fore plate on its arms, thus drawing it away

from the rolls as seen in Fig. 2. It may readily be replaced again, by simply raising it up, when the operation of scouring is complete, and the rolls *b* and *d* (which had been connected by the coupling for the purpose of scouring, to impart motion to the roll *b*, which had otherwise been locked by the action of the scouring board) are now disconnected by sliding back the crab *p* and the machinery is again fitted for use. Thus the operation of scouring the finishing rolls is accomplished without stopping the machinery for a single moment.

The other parts of the drawings are the usual appendages to similar machinery in a rolling mill, and need not be particularly described.

Having thus described my improvements in machinery for rolling iron and other metals what I claim as my invention and desire to secure by Letters Patent is not the scouring of rolls as described in the foregoing specification, nor yet the coupling of the upper roll when the rolls are to be scoured and uncoupling it when they are in use. But

What I do claim as my invention is—

The hanging the fore plate of a rolling mill on centers, placed either above or below the level of the rolls, by adding arms to the fore plate, working on a bar or on pivots, for the purpose of removing the fore plate out of the way when the rolls are to be scoured without detaching it from the frame of the mill, substantially in the manner hereinbefore described.

JACOB REESE.

Witnesses:

B. B. CAMPBELL,

N. BUCKMASTER.