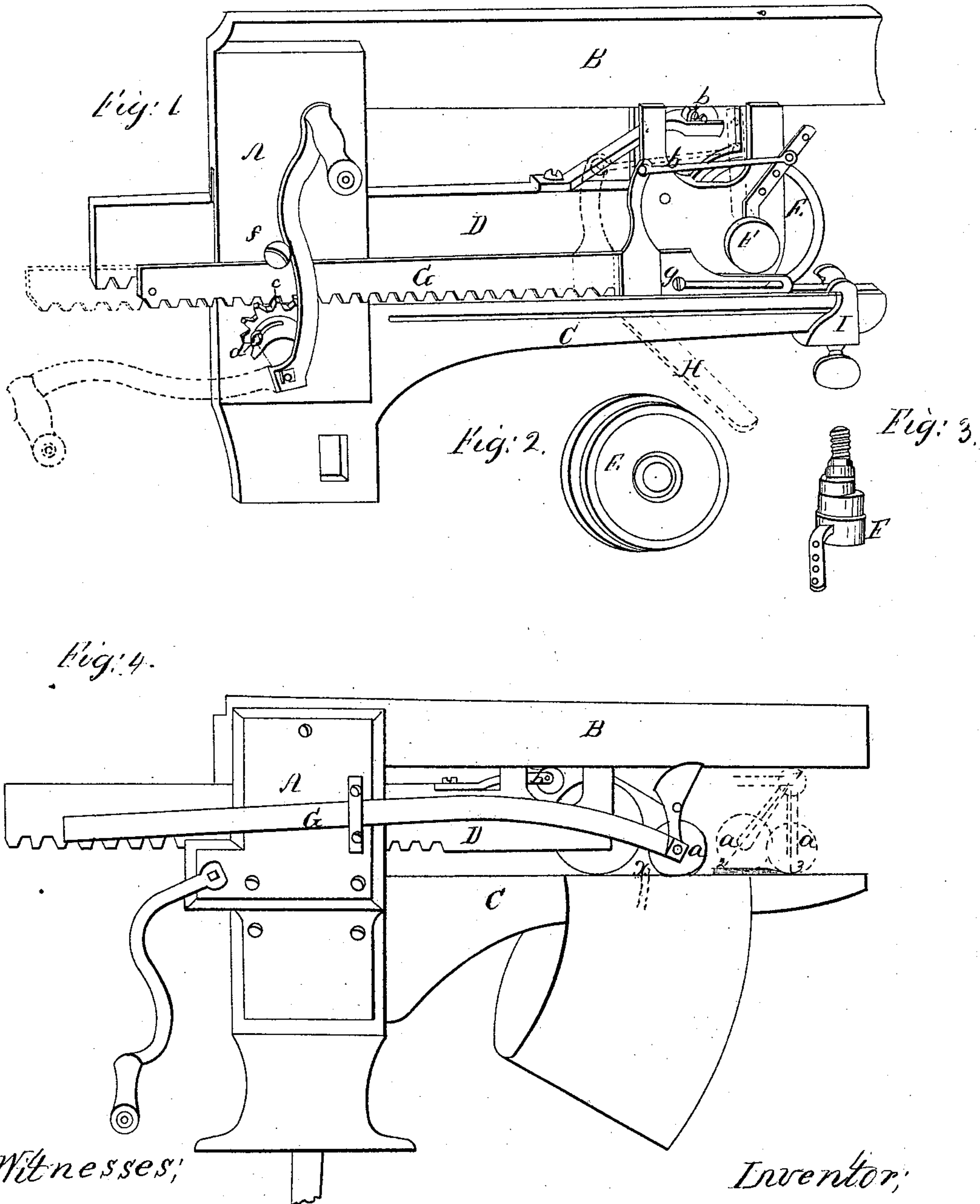


Metcalf & Squier,

Sheet Metal Grooving Machine.

No 102,027.

Patented Apr. 19. 1870.



Witnesses;

Madison Metcalf
J. A. Metcalf

Inventor;

Daniel H. Metcalf
Daniel L. Squier

United States Patent Office.

DAVID H. METCALF AND DANIEL SQUIER, OF BATTLE CREEK, ASSIGNORS TO THEMSELVES AND MARTIN METCALF, OF GRAND RAPIDS, MICHIGAN.

Letters Patent No. 102,027, dated April 19, 1870.

IMPROVEMENT IN SHEET-METAL-GROOVING MACHINES.

The Schedule referred to in these Letters Patent and making part of the same

Be it known that we, DAVID H. METCALF and DANIEL SQUIER, of the city of Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Machines for Grooving Sheet Metals; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

This object of this improvement is to provide a simple, cheaply-constructed, and effective machine, whereby the seams in tin, iron, and other sheet-metal wares may be very rapidly perfected at one operation of the machine.

The nature of this improvement consists—

First, in providing the grooving-machine with a triple wheel, consisting of a flat or concave wheel and two plane wheels, all turning on one axis, and constituting, when in the machine, one wheel, the whole so constructed and arranged that, when the rack-bar moves forward, the wheel acts as and is an ordinary grooving-wheel, and when the movement of the rack-bar is reversed, the wheel is changed into a closing-down wheel.

Second, in providing a "transfer-bar" or "friction-bar," whereby the closing-down wheel is held up off from the track-bar of the machine, and out of the way of the bent edges of the plates about to be locked together whilst the rack-bar moves forward, and also held tightly down upon the work when the rack-bar travels rearward and the wheel returns over the seam.

Third, in providing an eccentric bolt, having an adjustable lever-arm, so arranged that the closing-down part of the triple-wheel may be governed thereby, and readily adjustable to any thickness of metal or degree of closeness in may be desired to compress the locks.

Fourth, in so constructing the machine that the setting-down wheel shall occupy the same position in the rack-bar of the grooving-wheel, in order that the spring and friction-roller in common use shall act on them both, for the purpose of more perfectly performing the work, as will presently more fully appear.

Fifth, in so placing the closing-down wheel that it shall act on such portions of the locks as have been previously prepared therefor, by the passage over them of the grooving-wheel, in order that other portions of such seams shall not prematurely be closed down and crushed thereby.

Sixth, in providing the track-bar with a stop-guage, easily attachable thereto at any point of its length, for the purpose of preventing the slipping of the plates upon each other while being grooved and the seams closed together.

Seventh, in providing the track-bar with a supporting-arm or rest for the sheet-metal plates, when a number of them are to be locked together.

In order to enable others skilled in the art to make and use our invention, we will now proceed to describe its construction and operation.

In the drawings making a part of this specification—

Figure 1 is a perspective view of our improved machine.

Figure 2 is a view of our new triple roller or wheel, showing how the central portion thereof is operated by the movement of the eccentric bolt F, fig. 3, on which it revolves.

Figure 3 is a view of the eccentric bolt F and its adjustable lever-arm for operating the same.

Figure 4 is a side view of the common tinman's grooving-machine with one form of the "transfer-bar" G, attached to a pendant carrying and extra following-roller or wheel, for the purpose of closing down the seams. This form of the transfer-bar is operated by means of "friction," applied by means of the strap connecting it to the upright of the frame A, and may be used instead of the transfer-bar shown at G, fig. 1, in that machine, or the one there shown may be substituted for the former, the one being deemed equivalent to the other.

Fig. 4 also shows, by the dotted lines, another analogous device for compressing the locks of sheet metals.

These illustrations in fig. 4 are here presented for the purposes following, viz:

In order to show what has been done heretofore in this direction, to point out the objections and difficulties attending the use of any of these devices, to show that none of them are of any practical value without the use of our invention of the transfer-bar G, fig. 1, or its equivalent transfer friction-bar G, fig. 4, and to show that the one may be substituted for the other in any of these machines.

A B C represent the main frame of the tinman's grooving-machine in common use.

D represents the rack-bar with the ordinary spring and friction-roller b.

E, figs. 1 and 2, represents our new triple-grooving and setting-down wheel.

F, figs. 1 and 3, represents our new eccentric bolt with its adjustable arm.

G, fig. 1, represents our new transfer-bar, attached to the upright A of the frame of the machine by means of the screw f, and to the outermost end of the rack-bar D by means of the screw g; the former passing into the upright immediately over the loose pinion c on the crank-shaft, and the latter through the slotted end of the transfer-bar G into the rack-bar D. A screw, d, passes into the crank-shaft through a slotted opening in the loose pinion c, and serves to hold the pinion in its place on the shaft, and also to regulate the distance the loose pinion shall turn on the shaft, thereby controlling the moving distance of the transfer-bar, and, through the link h, governing the

eccentric and central closing-down portion of the wheel E.

H, fig. 1, red lines, represents the supporting-arm adjusted to the slot in the track-bar C, in which it rests when not in use.

I, fig. 1, represents the stop-gauge with its thumb-screw, for the purpose of attaching it to the track-bar C.

The manner of operating this machine differs in no essential particular from those in common use, except that, before locking the plates together, we bring out of the track-bar C the supporting-arm H, so that it shall be at about right angles with the latter, and also adjust the stop-gauge I to the track-bar at any convenient and suitable point of its length. Having done this, with the plates to be locked together suitably prepared, they are placed on the supporting-arm H, with their bent edges resting on the center of the track-bar, and their outermost ends against the stop-gauge I. We now run the rack-bar forward, by means of the crank, passing the grooving-wheel E over the work in the usual manner, the bar G in the mean time firmly holding the central setting-down portion of the wheel E up, as the bar moves forward, by its pressure on the eccentric bolt F, transferred, by means of the pinion c, bar G, link h, and levered end of the axis on which the wheel E revolves, from the crank. In this manner it will be plainly seen that the central closing-down wheel is not allowed to roll along on the seam, but is held up off of the track-bar, so that there is nothing in the way, either of the sight, for we must see what the groove-wheel is doing, nor of the entering bent edges of the plates within the groove of the wheel E. The stop-gauge I has also performed its office, during this portion of the work, in preventing the slipping of the plates upon each other, and the seam is thus ready to be closed down and finished. This slipping of the plates has been corrected by the mallet before hammering down the seams heretofore, but when we roll them down before leaving the machine they become immovable, and hence the necessity of preventing their slipping by means of the stop-gauge.

We have now only to reverse the the movement of the crank, by which means the loose pinion is turned on the crank-shaft, the latter remaining stationary, until the screw d passes in the slot of the pinion c over to its opposite side, carrying the transfer-bar G to the position represented by the red lines, fig. 1, the inner pinion on the crank-shaft, ordinarily provided and attached immovably thereto, now acting as in other grooving-machines, and carrying the rack-bar with the wheel E back toward the rear of the machine, and over the seams, as with other machines, in its retrograde movement.

The play of the loose pinion on the crank-shaft, as shown, by the movement of the transfer-bar G, fig. 1, has brought down the central and closing-down portion of the wheel E upon the seam, and tightly pressed it together, at the point when the groove-wheel has ceased to act, before the rack-bar has commenced its retrograde movement, and this pressure is maintained throughout, while elasticity of the spring carrying the friction-roller b serves to closely press all notched ends of the plates, lapped portions, and thinner parts of the same in a very perfect manner. By the same means last described, this arrangement of the closing-down wheel and spring, the machine is rendered ever ready for greatly-varying thicknesses of metal without any readjustment of the spring or of the pressure-roller.

Any desired pressure of the work may be secured, irrespective of the grooving-wheel, by means of the adjustable lever of the eccentric bolt F and link h, shown in fig. 1.

Many advantages are secured by the use of this

machine over any of those in use, a few of which we will particularize, viz:

First. The closing-down wheel travels just when the grooving-wheel travels, and not further, and hence we do not crush any portion of the lock forward of the grooving-wheel when we desire to reverse the movement of the rack-bar before the lock is completed, as is often the case.

Second. In grooving all work which has been "wired," before finishing grooving, we must run close up to the wire with the grooving-wheel, else we do not perfect our work. If we do this with "pendent" machines, like those represented in fig. 4, the pendent-wheel falls down over and beyond the wire, causing vexation and delay. If we let the pendent-wheel fall rearward of the wire, the groove-wheel has not prepared the seam for closing down, and hence the work is imperfectly performed, shown at x, fig. 4.

Third. In consequence of the closing-down wheel dropping down beyond the point reached by the grooving-wheel, the former rests on the work after the grooving-wheel has left it, necessitating a greater length of the bars C and B of the machine than is otherwise required.

In using any grooving or closing-down wheel, we are very liable to push the locks, so that, by reason of the metal plates having slipped on each other, they are fastened immovably in an uneven manner; but with our stop-gauge this serious difficulty is overcome.

In the machine of I. I. Lawback, intended to be represented by the dotted lines in fig. 4, the pendant "allows" the closing-down wheel or roller to "swing inward" when the groove-roller moves forward; but there is nothing provided for the purpose of holding the roller up out of the way of the work and of the line of vision of the operator. This is a serious difficulty, but a greater and fatal one consists in the absence of any device for the purpose of forcing the closing-down wheel down upon the work, unless it be the seam itself, after the pendant and grooving-wheel have passed entirely over its whole length. In that case we may, by a very nice adjustment of the closing-down roller, succeed in forming a tolerable seam; but it should be borne in mind that we often, and in many kinds of work always, desire to retrograde and close down the locks before passing entirely off of the seam, as, for instance all straight "wired" work, and such as is turned for wiring, or wired either straight or flaring.

If with the Lawback machine we shall stop in the middle of a lock and retrograde, the wheel for closing down the locks will often simply travel back over them without compressing them at all, as will be seen by a careful inspection of the dotted lines in fig. 4, the pendant remaining in the line 1-2 by reason of the elevation given it by the metal plates there shown. Especially will this be the case if any greatly-increased thickness of metal be presented for grooving from that for which the pendant is adjusted. If, now, we push or hold it a moment with the thumb or finger while we start backward the rack-bar, we may, by indenting the metal plates, form a wedge, so to speak, and thus succeed in forming the lock. This pressure, essential to success, and without which none of these machines are of any practical value, is one of the salient points of our invention.

Disclaimer.

We do not claim the use of a flat or concave wheel or roller for the purpose of closing down the seams of sheet metals; nor do we now claim the combination of a grooving and closing-down wheel or roller, when the closing-down wheel or roller runs before or follows after the grooving-wheel or roller; nor do we claim broadly the combination of a closing-down roller and

grooving-roller, so as to be moved by the rack-bar D, when the grooving and closing-down rollers move on separate axes, the one following the other; and there is no device equivalent to the transfer-bar G, fig. 1, of our machine, for the purpose of insuring the proper working of the closing-down wheel; but

What we do claim, and desire to secure by Letters Patent of the United States, is—

1. The triple wheel E, when constructed and operated substantially in the manner and for the purpose herein described.

2. The eccentric F, in combination with the triple wheel E, when constructed and operating substantially in the manner and for the purpose specified.

3. The combination of the bars D and G, triple wheel E, and bolt F, when constructed and arranged to operate substantially in the manner and for the purposes specified.

4. The combination of the frame A B C with the bars D and G, spring and friction-roller b, wheel E, and adjustable eccentric bolt F, when the same are constructed and arranged to operate substantially in the manner and for the purposes herein specified.

5. The bar G, eccentric bolt F, screw d, and pinion c, when arranged and operating substantially as described.

6. The supporting-arm H, triple wheel E, and gauge I, when arranged to operate as set forth.

In testimony that we claim the foregoing, we have hereunto set our hands and seals this 20th day of August, A. D. 1869.

DAVID H. METCALF. [L. S.]
DANIEL SQUIER. [L. S.]

Witnesses:

W. B. RUSSELL,
LEVI MOSHER.