

A. Rais

Making Sheet-Metal Articles.

N^o 83,998.

Patented Nov. 10, 1868.

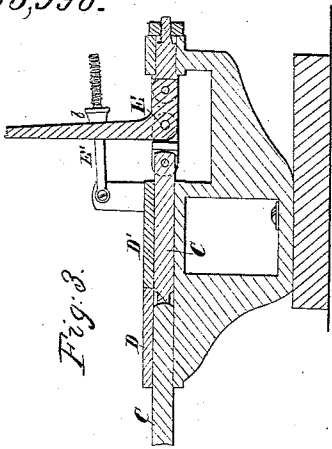


Fig. 3.

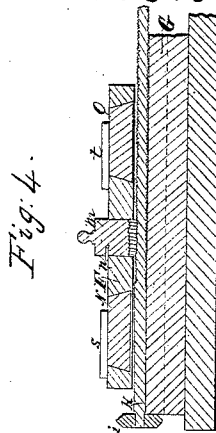


Fig. 4.

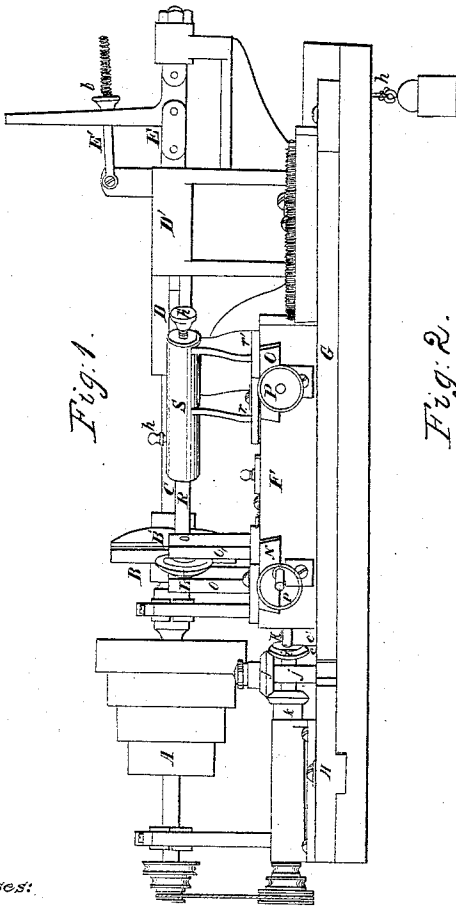


Fig. 1.

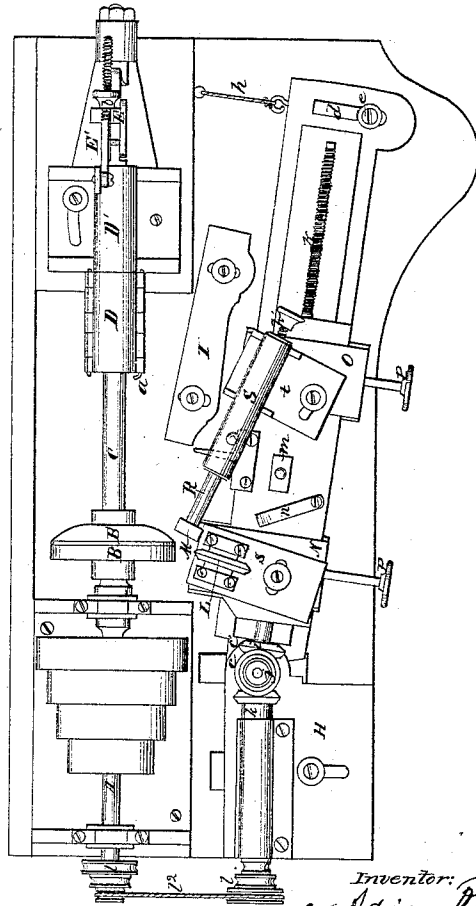


Fig. 2.

Witnesses:
Wm. Daily
Wm. M. Dale

Inventor:
Adrian Rais
A. Roux
his atty

United States Patent Office.

ADRIAN RAIS, OF WATERBURY, CONNECTICUT.

Assignor to the Scoville Manufacturing Company of the same place.
Letters Patent No. 83,998, dated November 19, 1868.

IMPROVED MACHINE FOR SPINNING SHEET-METAL.

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

To whom it may concern :

Be it known that I, ADRIAN RAIS, of Waterbury, in the county of New Haven, and State of Connecticut, have invented certain new and useful Improvements in Machines for Spinning Sheet-Metal Ware; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a machine to which my improvements are applied.

Figure 2 is a plan view of the same.

Figure 3 is a longitudinal vertical section, in the plane of the axis of the clamping-arbors, for holding the metal to be operated.

Figure 4 is a like section, through the sliding carriage or rest, for the forming and working-rollers.

My invention relates to that class of machinery for forming sheet-metal ware, in which the disk, of copper or other ductile metal to be operated on, is held between two clamps, or a die and face-plate, and is operated on by means of two rollers, between which the outer portion of the disk is placed. Motion is imparted either to the rollers or to the clamps, so as to put the disk in rapid revolution, and a sliding movement is imparted to either the stock which holds the rollers, or that supporting the clamp, so as to cause the ductile metal to be drawn out and shaped between the forming and working-rollers, this operation being technically termed "spinning."

My invention more particularly refers, first, to the mechanism for clamping and holding the sheet-metal blank, the object being to provide means whereby the metal may be readily secured and held in position during the operation of spinning, and the formed kettle or other article may be easily and expeditiously removed from the machine. And my invention in this direction may be stated to consist,

First, in combining, with the two clamps or dies, between which the metal is held, the one being supported on a stationary arbor, and the other on an arbor capable of sliding longitudinally, a plunger or sliding bolt, for forcing the movable clamp against the stationary one, and a toggle-jointed lever for operating the same, in the manner hereinafter described.

Second, in dividing the bearing or journal-box of the sliding arbor longitudinally, and hinging the two parts together, so that when the kettle or other article is completed, the box may be opened, so as to permit the removal of the arbor and its clamp, and their withdrawal from within the finished kettle.

My invention refers, secondly, to the construction and arrangement of the slide-rest or carriage, for the working and forming-rollers, my object being to arrange the rollers so that they may be adjusted with ease and facility in the proper position, with respect both to each other and the metal to be operated; and to combine the carriage or rest with other ordinary

spring-machinery, in such manner that the rollers shall automatically follow any pattern, so as to impart to the sheet-metal the form desired.

To this end my invention consists,

First, in the employment, in the carriage, which has a movement generally parallel to the arbor of the clamps, of slide-rests, for holding the rollers, capable of moving transversely or across the carriage, and combined with adjusting-screws for regulating the position of the slide-rests and their rollers, as hereinafter set forth.

Second, in the method of automatically spinning to a pattern, by combining with the carriage, and hinged or vibratory frame upon which it slides, a pattern, and guide-pin, attached to the carriage, for following the pattern, and a weight or equivalent means for actuating the free end of the hinged frame, so as to press the guide-pin at all times against the pattern.

Third, in combining with the vibratory or hinged carriage-frame and sliding carriage, a screw-shaft, for imparting motion to the latter, interposed between the carriage and its supporting-bed, and receiving motion from the head-block, as hereinafter described.

Fourth, in combining, with said vibratory carriage-bed, carriage, and screw-shaft, an adjustable frame, upon the head of which said carriage-bed swings as described, the frame carrying a shaft and pulley, connected with the head-block, and communicating motion to the screw-shaft by means of gearing, under the arrangement set forth.

Fifth, in regulating the movement of the sliding carriage, by means of a movable half nut, arranged in the carriage, so as to either engage with or be disengaged from the screw-shaft, and combined with a spring or other suitable means for holding it in either position.

To enable those skilled in the art to understand and use my invention, I will now proceed to describe the manner in which the same is or may be carried into effect, by reference to the accompanying drawings.

A is the ordinary pulley-shaft, supported in the usual bearings, and carrying on its head the face-plate or die, B, which constitutes one of the clamps for holding the metal to be operated on. The other clamp or die is represented by B', mounted on the end of an arbor or shaft, C, which is supported in a box, D, and is of such length as to be capable of a limited longitudinal-sliding movement, and thus allow the clamp B' to move up to or away from the stationary clamp B.

The box D is divided into two parts, hinged together longitudinally, the holding-pin *a*, on one side, being removable, so that when the sheet-metal held between the clamps has been fully formed and fashioned into the shape desired, the top of the box D can be turned back, thus leaving the shaft or arbor C entirely free to be lifted out and withdrawn, together with its clamp B', from the interior of the kettle or other finished article.

In order to force the clamp B' up against the stationary clamp, I arrange a sleeve, D', in rear of and on the prolongation of the axis of arbor C, in which slides a plunger, C', actuated by a toggle-jointed lever, E, as seen in figs. 1 and 3. By pulling forward the lever-handle, the plunger will be driven forward, moving in turn the arbor C, against the end of which it pushes, until the two clamps are pressed firmly together. The lever-handle, in this position, is held by means of a hinged rod, E', which fits in a jaw formed on the side of the lever, and is provided on its screw-threaded end with a thumb-nut, b, which is screwed up against the lever, so as to hold the latter in position. By loosening the thumb-nut, and throwing back its rod E, the lever may be pushed back, thus raising the arms of the toggle-jointed lever, and drawing back the plunger hinged to the front arm.

The clamp B' can now be moved back, so as to release the article held by it.

In order to shape the bottom of the kettle or other article at the same time that the sides are being spun, the face of the stationary die or clamp B is made concave, and the face of the clamp B' is correspondingly convex, so that when the two are pressed together they will impart to the bottom of the article held between them the concavo-convex form desired.

By the side of the clamps and arbors thus arranged, is placed the carriage F, which carries the forming-rollers, and moves on ways formed on the frame G, the latter resting on the bed-plate of the machine.

The general direction of the frame and carriage is nearly parallel with the clamp-arbors, and when the article to be spun has straight sides, the frame may be stationary, or fixed in one position. But when objects of irregular conformation are to be produced, it becomes necessary that the frame should have a vibratory motion, so as to allow the sliding carriage to follow, in its movement, the desired pattern.

To this end, the front end of the frame is arranged to swing or vibrate upon the end of an adjustable plate, H, the two ends being shaped as shown at c c', fig. 2, so as to form in some sort a ball-and-socket joint.

The rear end of the frame is slotted at d, to receive a pin, e, which serves to limit the vibratory movement of the frame; and upon the side of the sliding carriage is mounted a guide-pin or finger, f, which bears against the edge of an adjustable pattern-plate, I, attached by set-screws to the bed of the machine.

This guide-pin is held against the pattern with a yielding pressure, by means of a weight suspended from a cord, h, attached to the rear end of the frame G, as seen in figs. 1 and 2, in such manner that during the backward movement of the sliding carriage the weight will cause the guide-pin, and consequently the sliding carriage and its rollers, to follow closely the pattern, at the same time that it allows the necessary vibration of the frame G.

Instead of the weight, a spring or other mechanical equivalent may be employed for the same purpose.

In order to impart the requisite movement to the carriage F, I interpose between it and the frame a screw-shaft, K, mounted in the latter, and rotated by means of a bevelled friction or gear-wheel, i, which it carries.

This wheel engages with a horizontal bevelled friction or gear-wheel, j, mounted and revolving upon a vertical shaft, j', attached to the plate H, and the wheel j, in turn, engages with a gear or friction-wheel, k, mounted upon a horizontal shaft, supported in bearings on the plate H, and receiving motion from the shaft A, through the intermediary of the pulleys l l', and band P, or other suitable means. The plate H may be either adjustable or not.

In the drawings it is represented as adjustable by means of set-screws held in slots formed in the plate.

The carriage F can engage with the screw-shaft in any suitable manner; but in order that I may check, whenever desired, the movement of the carriage, without arresting also the revolution of the shaft, I make use of a block, m, the lower portion of which is hollowed out and screw-threaded, so as to form, in effect, a half nut, which engages with the screw-thread on the shaft K. This block fits in a recess or opening in the sliding carriage, and is so arranged that when desired it may be raised so as to be disengaged from the screw-shaft, being held in such position by means of a clamp or strap, n, which fits in a notch formed in its side, as shown in the drawings; this strap serving also to hold or press down the block when it is lowered, so as to engage the screw-shaft.

Upon the sliding carriage F are mounted the rollers L M, between which the sheet-metal is spun. In order to regulate the distance between the rollers, for the purpose of spinning the metal thicker or thinner, as desired, I attach the bearings in which each is mounted to slides N O, capable of moving transversely or across the carriage, and adjusted by means of the thumb-screws P, mounted in the carriage, and engaging with their respective slide.

The outside roller, L, is mounted between two uprights, o o', and the inside roller M is mounted so as to revolve on the end of a shaft or rod, R, the other end of which is held in a sleeve, S, by means of a set-screw, p, on top.

In the rear end of the sleeve is an adjusting-screw, p', which projects into the sleeve, so as to bear against the end of the rod R. By turning the screw to the right or left, the fastening-screw p being first removed from contact with the rod, the rod R may be moved forward or backward, so as to bring its roller, M, into proper position with respect to the roller L, and then, by tightening the screw p, the rod will be held firmly in the desired position.

The sleeve S is held by uprights r r', supported on the slide O. The uprights o o' and r r' may be attached directly to the slides, but, as in machinery of this class, the utmost nicety of adjustment is often indispensable, I prefer to attach the uprights to plates s t, pivoted at one end to their respective slides, and slotted, as shown in the drawings, so as to receive set-screws, by which they are held. By loosening these screws, the plates, and consequently the rollers which they carry, may be moved upon their pivots, and set at any desired angle, as required by the nature of the work to be done, and then held in such position by simply tightening the set-screws.

It will be seen from the foregoing that when the sliding carriage, by means of the bevelled gearing, is put in motion, the spinning-rollers, by reason of the arrangement of the vibrating frame, weight, pattern, and guide-pin, will be caused automatically to accurately follow the pattern, and to thus produce in an easy and simple manner an article of any desired conformation.

The operation of spinning the metal is too well understood by those skilled in the art to which this invention pertains to require description.

Having, therefore, described my invention,

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

1. The combination, with the metal-holding clamp or dies, the one being fixed upon a stationary arbor, and the other upon an arbor capable of sliding longitudinally, of a plunger or sliding bolt, to force the movable clamp against the stationary one, and a toggle-jointed lever for operating said plunger, substantially as shown and set forth.

2. Dividing the bearing or journal-box of the sliding arbor longitudinally, and hinging the two parts together, substantially in the manner and for the purposes set forth.

3. The combination of the sliding carriage F, the spinning-rollers, their transverse-slide rests, and the screws for regulating the position of said rests, so as to adjust the spinning-rollers with relation both to each other and to the metal to be operated on, substantially as herein shown and set forth.

4. The arrangement of the plates upon which the spinning-rollers are mounted, the same being pivoted to and adjustable upon the transverse-slide rests of the carriage F, as and for the purposes specified.

5. The method of automatically spinning to a pattern, by the employment, in connection with the spinning-rollers, their sliding carriage, and the hinged or vibratory frame, on which said carriage moves, of a pattern-plate, a guide-pin for following said pattern, and a weight, or its equivalent, operating upon the free end of the vibratory frame, so as to hold at all times the guide-pin against the pattern, under the arrangement herein set forth.

6. The combination with the sliding carriage, its actuating-screw shaft, and the vibratory frame on which it moves, of an adjustable plate, H, to which the frame is hinged, as described, the said plate carrying a pulley and shaft, connected with the driving-shaft of the machine, and communicating motion to the screw-shaft, substantially in the manner and by the means herein shown and set forth.

7. The movable half nut, in combination, with the sliding-carriage, and its actuating-screw shaft, under the arrangement and for operation as set forth.

In testimony whereof, I have signed my name to this specification, before two subscribing witnesses.

ADRIAN RAIS.

Witnesses:

F. J. KINGSBURY,
GEO. B. KERR.