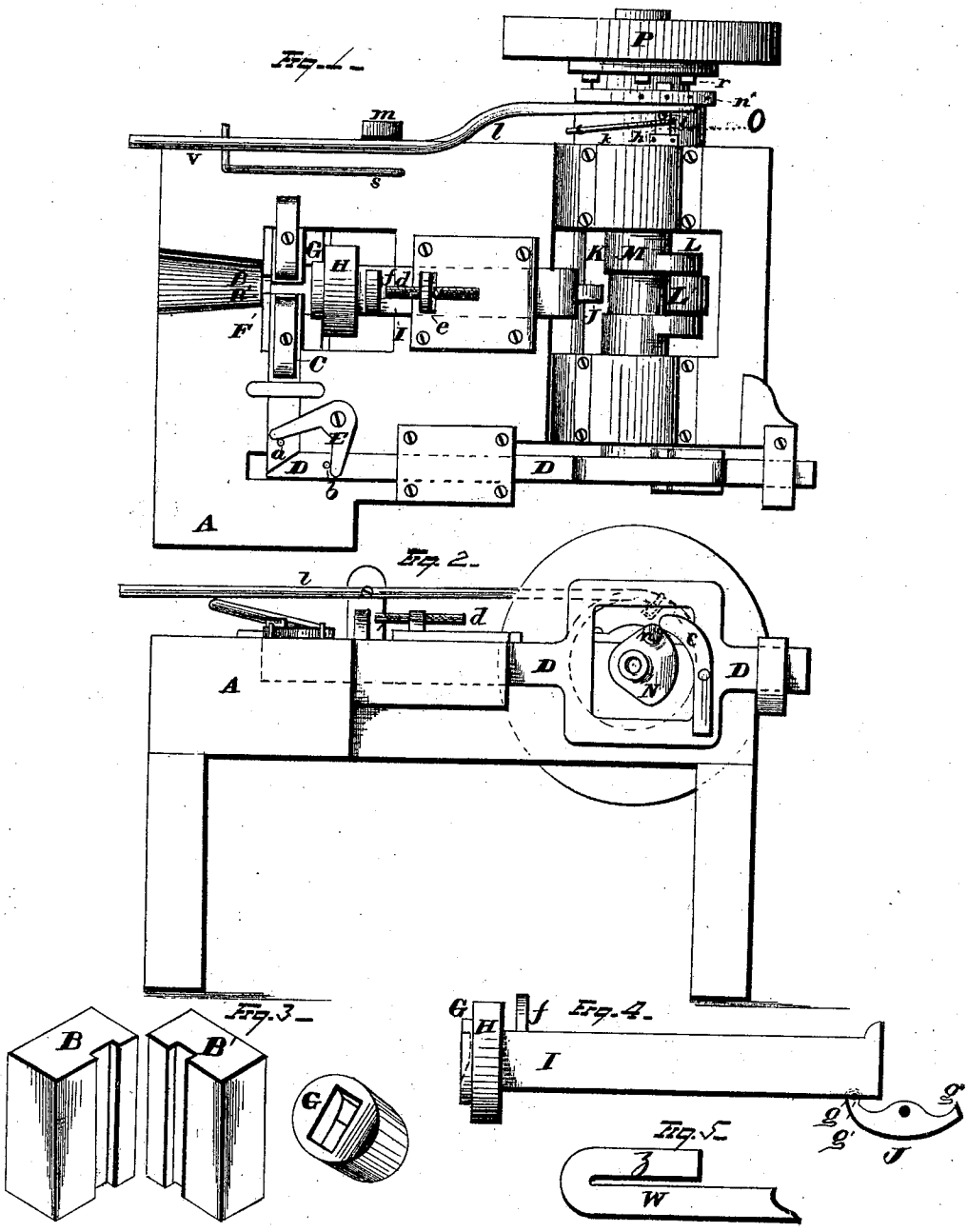
F. A. SMITH.

MACHINES FOR HEADING WRENCH-BARS.

No. 184,436. Patented Nov. 14, 1876.



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FREDERICK A. SMITH, OF CLEVELAND, OHIO.

IMPROVEMENT IN MACHINES FOR HEADING WRENCH-BARS.

Specification forming part of Letters Patent No. **184,436**, dated November 14, 1876; application filed August 7, 1876.

To all whom it may concern:

Be it known that I, FREDERICK A. SMITH, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Machine and New Process of Making Wrench-Heads; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in machines, and to a new process for making wrench-heads.

In the drawing, Figure 1 represents a plan view of a machine embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 represents the two grasping-dies and the recessed heading-die in isometrical projection. Fig. 4 represents the recessed heading-die-carrying plunger, and the curved lever which acts to withdraw said plunger. Fig. 5 is a view of the preparatory blank for a wrench-head.

The invention consists in the parts and combinations, as will be hereinafter more fully specified and claimed.

A represents the frame of the machine. B B′ are the grasping-dies, the first of which is rigidly secured to the frame of the machine. B′ is fixed to the sliding bar C, which latter fits in a groove, and is provided with a pin or projection, *a*. D is the motion-transmitting yoke and bar, placed at right angles to the sliding bar C, and moving in a groove in the same horizontal plane therewith. It is provided with the pin or stud *b*, and has fixed to its side, at the yoke, the projection or arm *c*. The end of the yoke-bar which acts on sliding bar C is cut at an angle, as is also the latter, so that the two meet each other on a miter-line. E is a bell-crank lever, which, when acted on by the pin *b* on the yoke-bar D, operates on pin *a* of the sliding bar C to withdraw the same, and thus open the grasping-dies. It is returned to its former operative position by the pin *a* when the yoke-bar acts to close the grasping-dies. F is a discharger, which acts to expel the finished product from the grasping-dies at the moment when bar C is withdrawn. G is the recessed heading-die, surrounded and re-enforced by the collar H, and is secured to the plunger I, which slides in a groove or channel. In the standard *e*, fixed on the plate extending over the said groove, is inserted a set-screw, *d*, which operates in connection with the stop *f* on the heading-die plunger, to regulate the distance of the latter's longitudinal movement. The said plunger is also provided on its under side with the socket *g*, into which projects the end *g′* of the bent lever J. Said lever J is pivoted on the rod K, and when the friction-roller of the cam L comes in contact with the other end *g″* of said lever, it causes the recessed heading-die to be withdrawn.

Instead of this device, a spring might be attached to the plunger I and to the frame of the machine, and answer the same purpose.

M is the revolving cam-shaft, provided with the cam L and friction-roller L′. It also carries the cam N, which works in the yoke of the motion-transmitting bar D, and operates to move or reciprocate the same. The cam N carries a small friction-wheel, *n*, which acts on the curved arms *c*, fixed to the side of the yoke, to withdraw the yoke-bar D. These might, however, be dispensed with, and the cam N made to act directly on the yoke.

The cam-shaft M has a boss at O, and this latter has a longitudinal groove, in which moves a sliding spring-pawl, *h*, provided with a pin, *i*. *k* is a spring, secured at one end to the boss, and bears against the pin *i* of the pawl *h*, which tends to force the latter outward. *l* is the pawl-controlling lever, pivoted to the standard *m*, fixed to the frame of the machine, which operates between the guide-piece *n′* and the pin *i* of the pawl *h* to withdraw the latter. P is a pulley, loosely mounted on the shaft M, to which the power is applied. It is provided on its lateral surface with the pins or studs *r*, which operate in connection with the pawl *h*, when the latter is released from the lever *l* and guide-piece *n′*, to revolve the cam-shaft M.

I do not limit myself to the particular mechanism here shown for throwing the cam-shaft out of gear with the pulley, as any suitable

device may be employed for that purpose; but I have found the mechanism described well adapted to the purpose.

The spring *s* bears against the under side of the lever *l*, for the purpose of keeping the end of the said lever in contact with the boss O.

The operation of the machine is as follows: The iron bar to be operated upon has one of its ends heated to the requisite degree, and is then either bent upon itself or upset. I prefer the first-named method, though the latter can also be employed. This bar is then placed in the groove of the grasping-die B, with the said bent or upset end presented to the recessed heading-die. Power is applied to the loosely-mounted pulley P by any suitable means. By depressing the end *v* of the pawl-controlling lever *l* its opposite end is elevated and thrown out of contact with pin *i*, and the spring *k* operates then to push the pawl outward, so that the pins or studs on the side of the pulley come in contact with the same and thus revolve the cam-shaft M. As said shaft revolves, the cam N on its end, moving in the yoke of the motion-transmitting bar D, operates to push the same forward, and causes the sliding bar and its grasping-die B′ to advance and firmly hold the shank of the iron bar; and as the cam-shaft continues its revolution the roll L′ of cam L comes in contact with the heading-die-carrying plunger I, forcing the same suddenly and powerfully forward, causing said die to act on the bent or upset end of the iron bar, and forming it into the shape of a wrench-head. The cam shaft, continuing its revolution, shortly afterward comes in contact with the end *g″* of the bent lever J, causing the heading-die G to be withdrawn. Then the small friction-wheel *n* of the cam N, as the shaft M is completing its revolution, acts on the arms or projections *c* of the yoke-bar, causing the same to be withdrawn. During this return movement, the pin *b* of the yoke-bar acts on one arm of the bell-crank lever E, which causes the other arm thereof to act on pin *a* of the grasping-die bar C, and this effects the withdrawal of said die, during which motion the finished wrench-head is discharged from the machine.

The lever *l* is released shortly after being depressed, and before the cam-shaft has completed a revolution, so that when the revolution is completed it shall operate to withdraw the pawl *h*, and bring the cam-shaft M to rest.

It will be observed that in the drawings the grasping-dies are represented as having smooth anvil ends, so that the longitudinal motion of the heading-die toward the grasping-dies brings the heading-die against the projecting folded end of the hot bar, and it is crushed or upset against the ends of the said grasping-dies as an anvil. The extra stock is crowded out and caused to spread out upon the anvil-surface, and the wrench-head is completed by shaving off this projecting fin.

It is evident that I do not limit myself to the particular mechanism for transmitting motion and power to the lateral grasping-die, for many other means may be employed. Thus the cam-shaft M may be geared with bevel-gear at its end to the bevel-gear of a shaft, at right angles thereto, and this latter shaft has a cam to operate directly upon the end of the bar C, in the same manner that the cam L acts upon the shaft I.

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

1. The within-described process of making wrench-heads, which consists in bending the end of a bar upon itself, and then subjecting the end so prepared, and when hot, to the forming action of a heading-tool, whereby it is given the shape of a wrench-head, substantially as described.

2. The within-described process of making wrench-heads, which consists in bending the end of a bar upon itself, then holding the shank of said bar between two grasping-dies, with the folded ends projecting therefrom, and then, while so held, subjecting the projecting portion, when hot, to the forming action of a recessed heading-die, whereby the said projecting portion is given the shape of a wrench-head, substantially as described.

3. In combination with the sliding bar C, carrying grasping-die B′, the motion-transmitting yoke-bar D, bell-crank lever E, and pins or projections *a b*, substantially as described.

4. In combination with the cam-shaft M and sliding spring-pawl *h*, provided with pin *i*, the spring *k* and pawl-controlling lever *l*, substantially as and for the purpose described.

5. The combination of the grasping-dies B B′, having plane anvil-surfaces, with a die recessed to form a wrench-head, substantially as and for the purpose described.

6. The combination, with the stationary grasping-die B and movable grasping-die B′, both having plane anvil-surfaces, of the plunging-die, constructed to form a wrench-head, substantially as and for the purpose described.

7. The combination of the wrench-heading die G, plunger I, and cam-shaft M, and the spring-pawl *h*, pawl-controlling lever *l*, and loosely-mounted pulley P, carrying lateral studs *r*, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK A. SMITH.

Witnesses:

FRANCIS TOUMEY,

WM. BEHRENS.