(No Model.)

H. O. HARRIS.

MACHINE FOR ROLLING METAL TUBES.

No. 573,873. Patented Dec. 29, 1896.

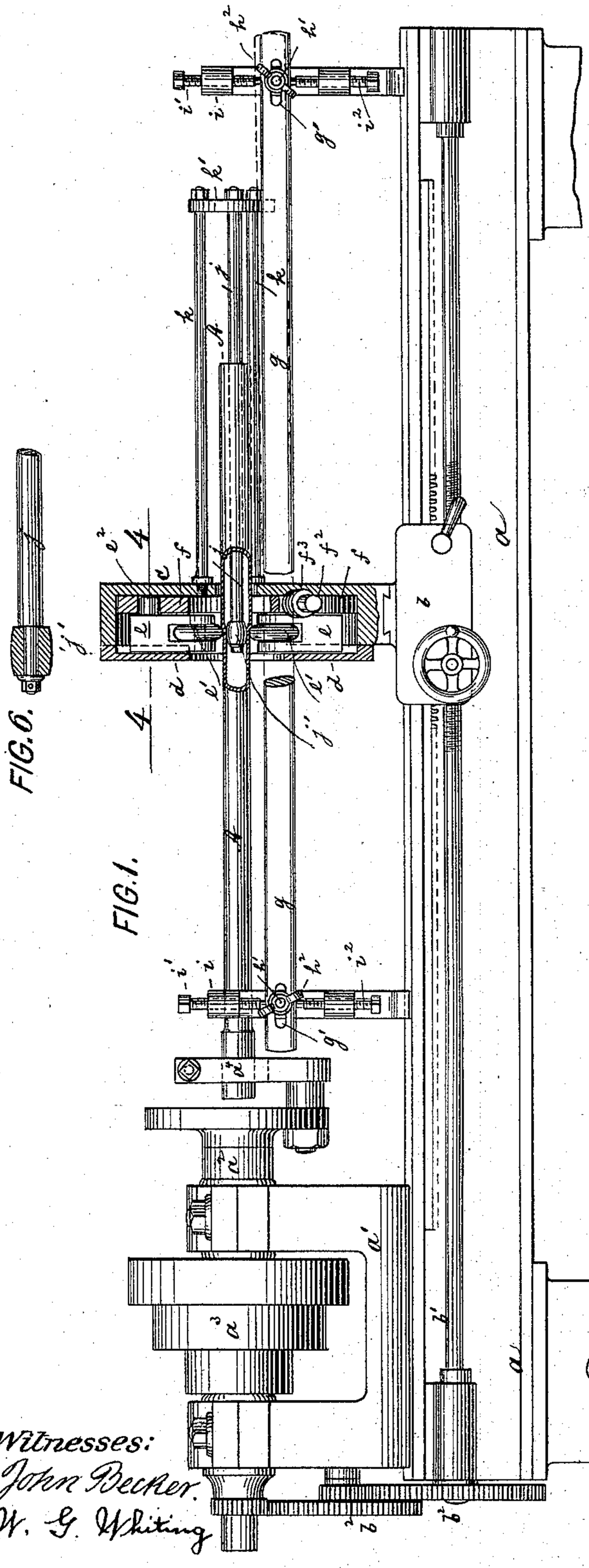

FIG. 1.

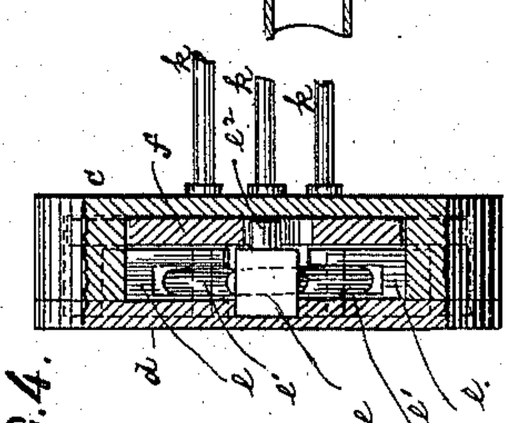

FIG. 4.

FIG. 5.

FIG. 3

FIG. 2.

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MACHINE FOR ROLLING METAL TUBES.

SPECIFICATION forming part of Letters Patent No. 573,873, dated December 29, 1896.

Application filed May 15, 1896. Serial No. 591,654. (No model.)

To all whom it may concern:

Be it known that I, HUGH O. HARRIS, of Brooklyn, New York, have invented an Improved Machine for Rolling Metal Tubes, of which the following is a specification.

This invention relates to a machine for reducing the thickness and outer diameter of a metal tube in a quick and effective manner. The machine is so constructed that friction is greatly reduced and that metal tubes of cylindrical and also of tapering form may be turned out.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of my improved machine for rolling metal tubes; Fig. 2, a face view of the draw-head with the disk *d* removed; Fig. 3, an inner face view of the disk *d;* Fig. 4, a horizontal section on line 4 4, Fig. 1; Fig. 5, an enlarged side view of the bulb and mandrel with the tube A in section, and Fig. 6 a detail of the bulb and mandrel.

The letter *a* represents the frame of the machine, of which *a'* is the head-stock and a^2 the live-spindle, which is driven from step-pulley a^3 in the manner usual in lathes. The tube A to be reduced is adapted to be connected to the spindle a^2 by means of a clamp or chuck a^4, so as to be axially revolved thereby.

b is the slide-rest, which is reciprocated in the ordinary manner by connections b' b^2 and carries the annular draw-head *c*, which is adapted to encircle the work A. To the draw-head *c* there is secured a fixed disk *d*, provided with four (more or less) radial ways or grooves *d'*. Within these grooves there are guided the radially-movable slides *e*, to the inner ends of which the reducing-rolls *e'* are pivoted. These slides are provided, moreover, with the laterally-projecting pins e^2, engaged by the cam-grooves *f'* of a second or oscillating disk *f*, between which and the disk *d* the slides *e* are confined.

It will be seen that when the disk *f* is oscillated the slides will thereby be forced either inward or outward along the ways *d'*, so as to decrease or increase the diameter of the draw-space formed between the rolls *e'*.

In order to oscillate the disk *f*, it is provided with an arm f^2, carrying a loose grooved roller f^3. This roller engages and is guided along a longitudinal rail *g*, which is vertically adjustable at either end. To effect this adjustment, the slotted ends *g'* of rail *g* are connected to blocks *h* by means of bolts *h'* and winged nuts h^2. Each of the blocks *h* is engaged by a pair of set-screws i' i^2, turning in standards *i* of the machine-frame.

In order to raise or lower either end of rail *g*, the nut h^2 is slackened, the block *h* adjusted by a turn of the set-screws, and the nut again tightened up to lock the rail in its new position.

It will be seen that by lowering the rail *g* the arm f^2 will be depressed and the disk *f* swung downward to move the slides *e* inward. On the other hand, by raising the rail *g* the arm f^2 will be liberated, so that the frictional contact between the work and the rolls *e'* will cause the disk *f* to be swung upward and the slides *e* to be moved outward until the roller f^3 again contacts with the rail. By raising the right-hand end of the rail *g* slightly above the left-hand end this outward movement of the slides will be effected gradually during the travel of the draw-head from left to right, and in this way the diameter of the draw-space will be gradually increased to form tapering tubes.

To the draw-head *c* there is secured, by means of rods *k* and a plate or spider *k'*, one end of the mandrel *j*, which is adapted to be projected with its free end into the tube A to be drawn. This free end carries a head or a loose bulb *j'*, which is placed centrally between the reducing-rolls *e'*, so that the distance between the bulb and rolls represents the thickness to which the tube A is to be reduced. The head on the mandrel permits the work to be readily drawn off, and by making the working face of the mandrel revoluble friction is to a great extent avoided.

The operation of the machine is as follows: The tube A to be reduced is connected to the live-spindle by clamp a^4, so as to be axially revolved. The draw-head *c* is moved to the left and the rail *g* adjusted to form a draw-space of the desired width. Motion being imparted to the slide-rest, the draw-head is made to travel along the tube so as to sub-

ject each portion thereof to the action of the reducing-rolls. These rolls, as well as the bulb j', will be revolved by frictional contact with the tube A and will thus reduce its thickness in a quick and uniform manner.

The principal advantages connected with my invention are that the machine can be accurately adjusted to form cylindrical and tapering tubes of any desired thickness and that the machine works with a minimum amount of friction.

What I claim is—

1. In a machine for rolling metal tubes, the combination of a reciprocating draw-head with radially-adjustable slides that form the draw-hole, and a mandrel secured to and longitudinally movable with the draw-head, substantially as specified.

2. In a machine for rolling metal tubes, the combination of a reciprocating draw-head, with a disk d, having radial grooves d', a disk f, having cam-grooves f', a series of radially-movable slides e, having reducing-rolls e', and pins e^2, and a mandrel which is secured to the draw-head and projects with its free end between the rolls e', substantially as specified.

3. In a machine for rolling metal tubes, the combination of a reciprocating draw-head with radially-movable slides, an oscillating disk having cam-grooves engaging the same, a rail for locking the disk, a mandrel secured to the draw-head, a live-spindle, and means for attaching the work to such spindle, substantially as specified.

4. In a machine for rolling metal tubes, the combination of the following elements: a reciprocating draw-head, a fixed disk having radial grooves, an oscillating disk having cam-grooves, slides engaging the disks, a mandrel secured to the draw-head, a rail engaging the oscillating disk, means for adjusting said rail, a live-spindle and means for locking the work to such spindle, substantially as specified.

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