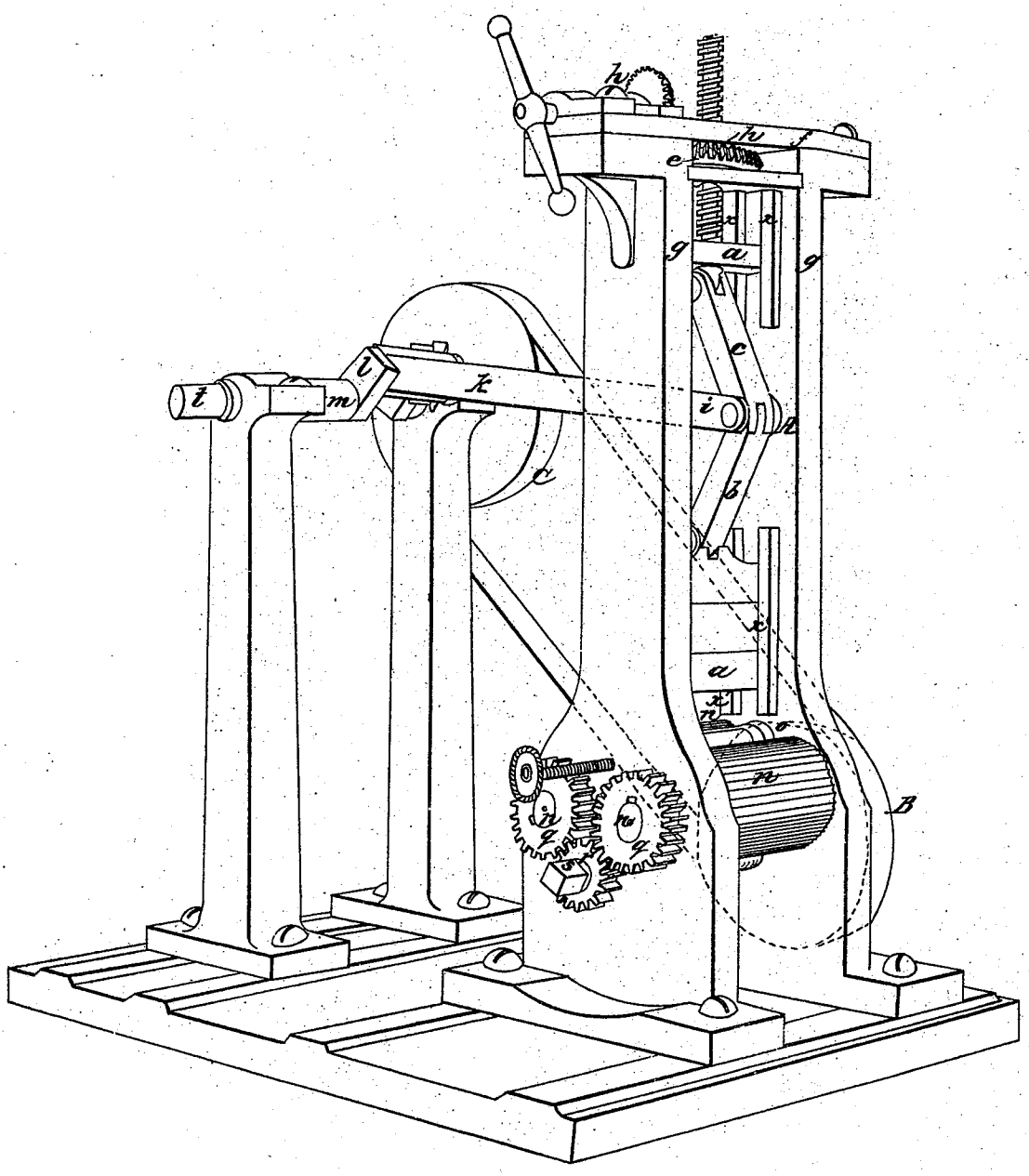
Sheet 1 - 2 Sheets.

E. A. Lester,

Compressing Puddlers Balls,

No. 10,410. Patented Jan. 10, 1854.

Fig. 1.



Sheet 2-2 Sheet

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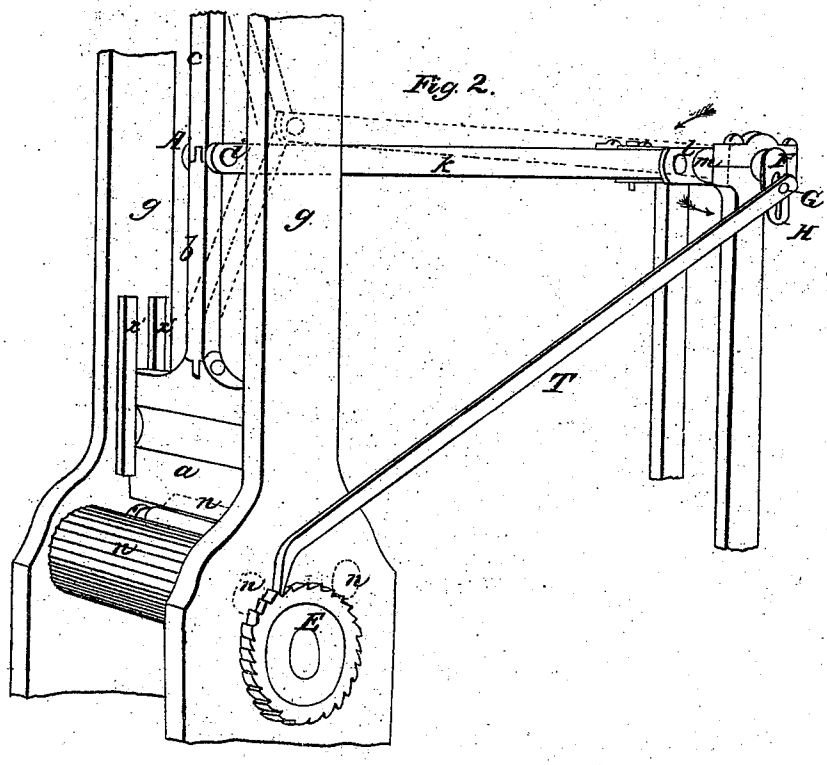
Fig. 2.



UNITED STATES PATENT OFFICE.

EBEN. A. LESTER, OF BOSTON, MASSACHUSETTS.

MACHINE FOR SQUEEZING AND COMPRESSING METALLIC BODIES.

Specification of Letters Patent No. 10,410, dated January 10, 1854.

To all whom it may concern:

Be it known that I, EBENEZER A. LESTER, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and Improved Variable Adjustable Screw and Toggle Joint Compressor, Hammer, or Squeezer for Squeezing or Compressing Metallic or other Substances; and I do hereby declare that the following is a true, full, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The object of my invention is to make a hammer or squeezer, for reducing or compressing masses of metal or other substances, which shall have a positive reciprocating motion and yet have its point of action on the substance to be worked variable as the mass is reduced, compressed or hammered down, and my said invention consists in giving the positive reciprocating motion to the hammer by a toggle joint having a movable fulcrum to let down the hammer as the substance acted upon is being reduced, in combination with a bed composed of two rollers, or the equivalents thereof, to support and turn the ball or other substance for the repeated actions of the hammer.

Said machine consists of the following parts, as represented in the annexed drawings, viz.: The hammer, presser, or compressor (*a*) is connected to one end (*b*) of one arm of the toggle-joint (A); the opposite end of the other arm (*c*) of the toggle-joint is connected by a joint to a screw and cross-head (*d*) in guides (*x x*) having a revolving nut (*e*) inserted into and through the cross-piece or cap-piece (*f*) which connects the cheeks or housings (*g g*) of the frame of the machine. This screw by the geared nut (*h h*) is for projecting and retracting the hammer (*a*) to and from the material that is being operated on, to a greater or less extent, as may be required. The arms (*b*, *c*) of the toggle joint, (A) and the joints at the ends of those arms, are attached at (*i*) and worked by the connecting rod (*k*) and crank (*l*) of the shaft, (*m* and *t*). The hammer (*a*) is over, and parallel with, two horizontal parallel rollers (*n n*); the central diameter of the hammer is in cheeks or guide-pieces (*x' x'*) midway, or as near it as may be, between and parallel with the axes of the said two rollers. The hammer may be a block with plain or other surfaces, as represented in the drawing, or have a plain or fluted or figured cylinder inserted into it.

The guards or rubbers (*o*), and another at the end of the screw, and hid by the frame in the drawings, are placed between the rollers (*n n*) at, or near the ends thereof, for the purpose of upsetting or solidifying the ends of the material, and the rubbers may be fixed, or one or both may be movable, so that they may be made to approach to or recede from each other, by means of a screw (*p*) or screws, of one or more threads or by toggle-joints constructed similar to that of the hammer before described. The rollers (*n n*) are to have gearing (*q q*) such as to revolve either toward or from the front of the machine, both in the same direction, simultaneously, by being connected by the pinion (*r*) on the driving shaft (*s*) which meshes into their respective wheels like the lower rollers of a cane-mill or sugar-mill.

The machine may be constructed to give either one or two compressions at each revolution of the crank (*l*) by so gearing the connecting rod, (R) as to bring the arms of the toggle-joint into a line with each other, either once or twice in each revolution of the crank (*l*); that is, the traverse of the toggle joint, at each revolution of that crank may be wholly on one side of the straight line of the arms of that joint, at the moment of greatest compression, or it may traverse across such straight line and back again, at each revolution of the crank (*l*).

In the foregoing description of the machine and its operations, the rollers (*n n*) are supposed to be continuing to revolve, while the pressure is given by the hammer (*a*) and they may so continue to revolve in operations upon substances which owing to their temperature at the time, or to their essential character, are not of a solid and rigid consistency. But if it be desirable, on account of the more solid and unyielding nature of the material to be operated on, or for any other reason, to suspend the revolutions of (*n n*), at the time of compressing, this is effected by the following substitutions and modifications, see Fig. 2, after taking off the pulleys (B and C) viz: Attach the ratchet-wheel (E) to the shaft (S). F is a slotted crank, instead of the pulley

(C). G is a crank-pin, variable in a slot. H is the slot. T is the feed-arm for working the ratchet-wheel E. At each revolution of the crank F, the feed-arm T will be extended to and withdrawn from the ratchet-wheel E, and during the withdrawal the rollers will cease to revolve; that is, during the time the pressure is given, and when the feed-arm is extended by the crank the ratchet-wheel and rollers will be moved such part of a revolution as may be required. By this arrangement the rotary motion of the rollers is changed from a continuous to a regularly intermittent motion.

From the foregoing it will be seen that however the size or form of the mass operated upon may be changed by the action of the hammer or compress, the hammer can be made to follow it notwithstanding its range of motion imparted by the toggle-joint, is invariable.

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

Giving to the hammer or compressor a positive reciprocating motion by means of the toggle joint having a movable fulcrum to let down the hammer as the substance acted upon is being reduced, substantially as described, when this is combined with the bed composed of rollers, or the equivalent thereof, to hold and turn the ball or other body for the repeated actions of the hammers, as set forth.

In testimony whereof, I, the said Ebenezer A. Lester hereto subscribe my name in the presence of the witnesses whose names are hereto subscribed, on the third day of September A. D. 1851.

EBEN. A. LESTER.

Signed in presence of—

Willard Phillips,

Benj. F. Stevens.