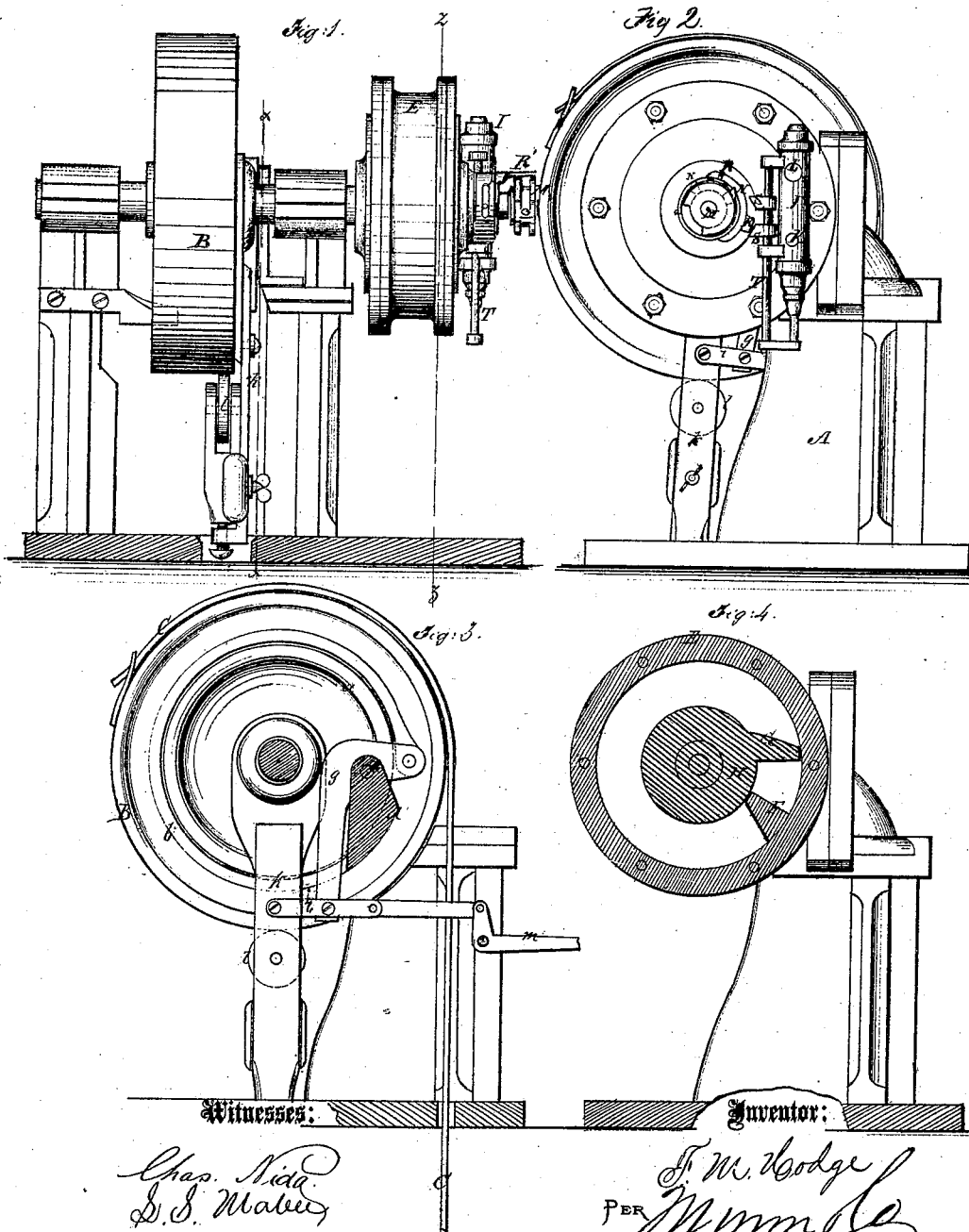


F. M. Hodge,

Steam Hammer.

No. 110,655.

Patented Jan. 3. 1871.



United States Patent Office.

FRANCIS M. HODGE, OF SHELBURNE FALLS, MASSACHUSETTS.

Letters Patent No. 110,655, dated January 3, 1871; antedated December 24, 1870.

IMPROVEMENT IN DROP-HAMMER LIFTERS.

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

To all whom it may concern:

Be it known that I, FRANCIS M. HODGE, of Shelburne Falls, in the county of Franklin and State of Massachusetts, have invented a new and improved Drop-Hammer Lifter; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to hammers operated by steam or air, and consists in certain combinations and arrangements of mechanism for lifting and holding the hammer, which will be first described in connection with all that is necessary to an understanding thereof, and will then be specified in the claim.

Figures 1 and 2 are, respectively, a front and side view of the lifter.

Figures 3 and 4 are sectional views through the lines *x x* and *z z* of fig. 1.

In fig. 3—

A represents the frame of the drop-hammer;

B, the lifting-drum; and

C, the belt, having one end fastened thereto, while the other is attached directly or indirectly to the hammer.

In fig. 4—

E represents the steam-cylinder; and

F, a partition therein, to compel the steam to actuate in one direction only.

It is an annular collar, fast upon the lifting-shaft, and carrying the same with it in its motion.

G is a projecting flange or wing rising from the collar H, and fitting steam-tight between said collar and cylinder E.

Fig. 2 gives a view of the valve-gear and the means by which it is operated.

I is the valve-chest, of which the lower part receives the steam through K, and conveys it through a port on the opposite side into the cylinder, while the upper port exhausts steam therefrom through L and the opposite outlet in the cylinder.

T is a valve-rod, by whose movements these ports are opened and closed, and

S S are pieces attached thereto, by which it is reciprocated.

Q is a sliding circular plate, having a vertical stud R, which alternately moves rod T in opposite directions, and a lateral projection, R', by which it is itself vibrated.

M is a disk fast on the lifting-shaft, and provided with two tappets, N N, which act alternately against the projections R' to move the rotary slide Q.

In fig. 3 is shown the device by which the hammer is held up until the operator is ready for it to fall.

a represents a circular flange fast on the side of lifting-wheel B:

b, a friction-brake around the same; and

g, a bell-crank lever fulcrumed at *h*, whose short arm is attached to the brake, and its long arm to the mechanism which operates it.

k is an arm loosely pendent from the shaft, and provided with a friction-roller, *l*.

i is a strap, which connects lever *g* with arm *k* on one side, and the treadle mechanism on the other.

The mode of operation of this automatic holding-device is as follows:

The hammer being at its highest point of elevation, its gravity tends to bring it down; but, in rotating the lifting-wheel B, a sufficient friction is produced by the contact of the said wheel and *l* to cause the latter to turn and draw the strap *b* tight about the flange *a*, and completely arrest any further rotation of B. The hammer is thus held until the treadle is operated to loosen the belt *b*.

The mode of operation of the lifting apparatus is as follows:

The hammer being down, and the port K open, steam is received through the latter, and conveyed through apertures opposite, which lead into cylinder E, between the partition F and the wing G. This, acting against said wing, carries it around in the cylinder until the stud R lifts the valve-rod T. This closes the port K and opens the exhaust L, which connects with an outlet in the cylinder that has been passed by the wing G.

The steam now ceasing to act, the weight of the hammer would reverse the direction of the lift-wheel and shaft, and would immediately fall if they were not held by the friction device.

Having thus described all that is necessary to a clear understanding of my invention,

What I esteem to be new, and desire to protect by Letters Patent, is—

1. The rotary engine herein described, and drum E, arranged on the same shaft, combined with the hammer-strap C, as and for the purpose described.

2. The combination of friction-roll *l*, drum B, pendent arm K, strap *i*, belt *c*, band *b*, (on flange *a*), and lever *g*, all relatively arranged as and for the purpose described.

3. The disk M having tappets N N, and the sliding circular plate Q having stud R and lateral projection R' thereon, combined with the valve-rod S S T, all constructed and relatively arranged as and for the purpose specified.

The above specification of my invention signed by me this 2d day of March, 1870.

FRANCIS M. HODGE.

Witnesses:

GEO. W. MABEE,
ALEX. F. ROBERTS.