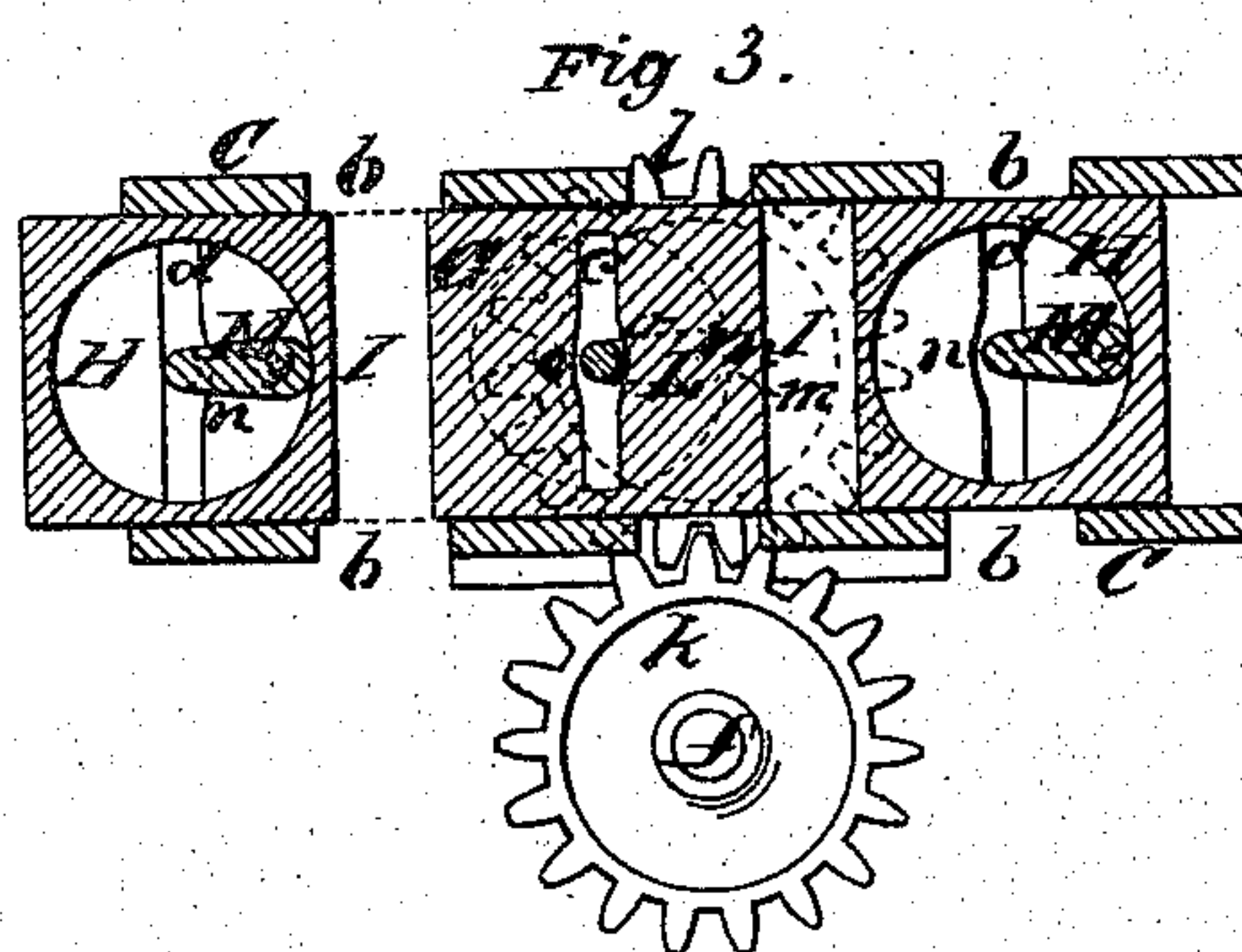
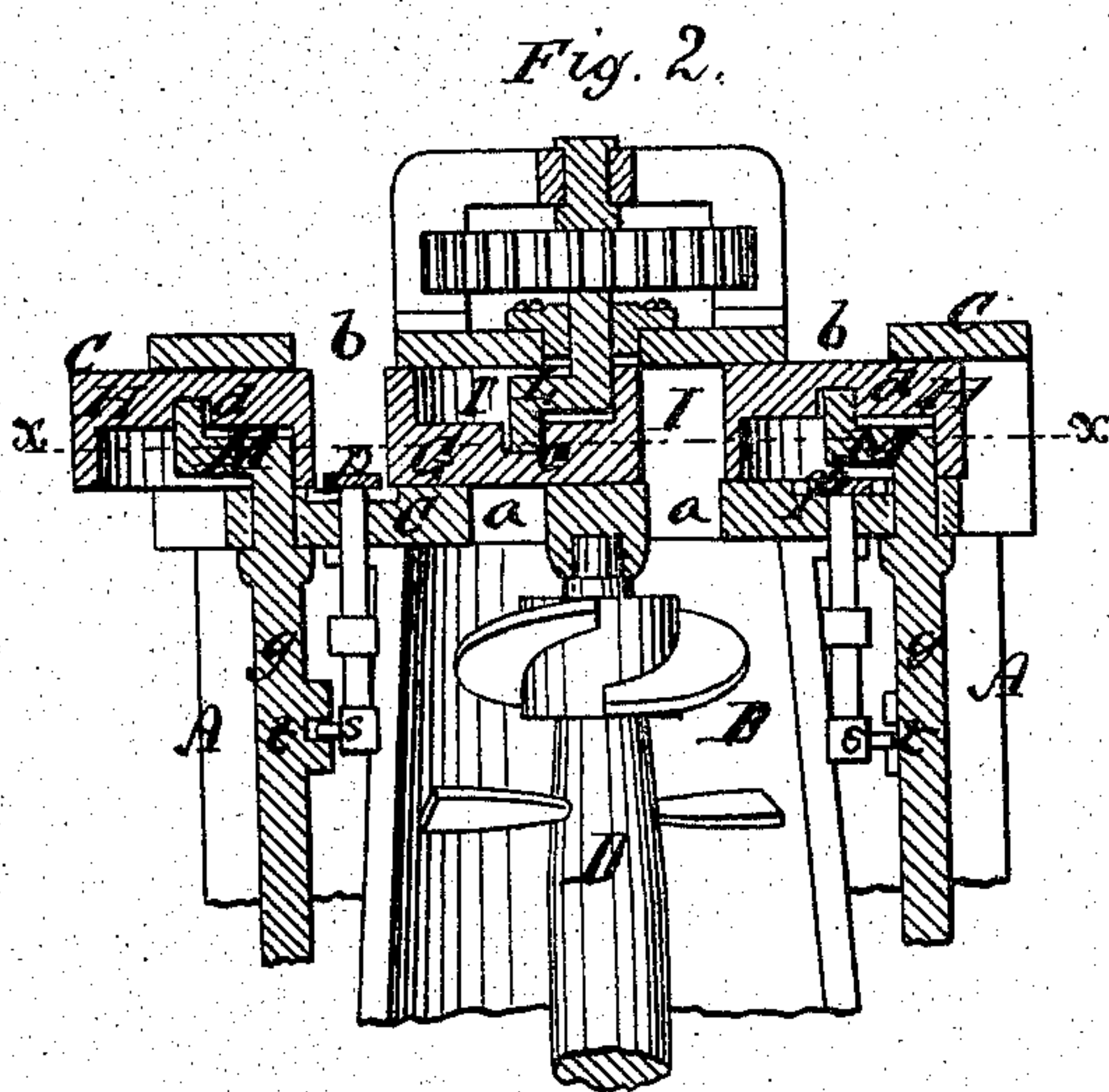
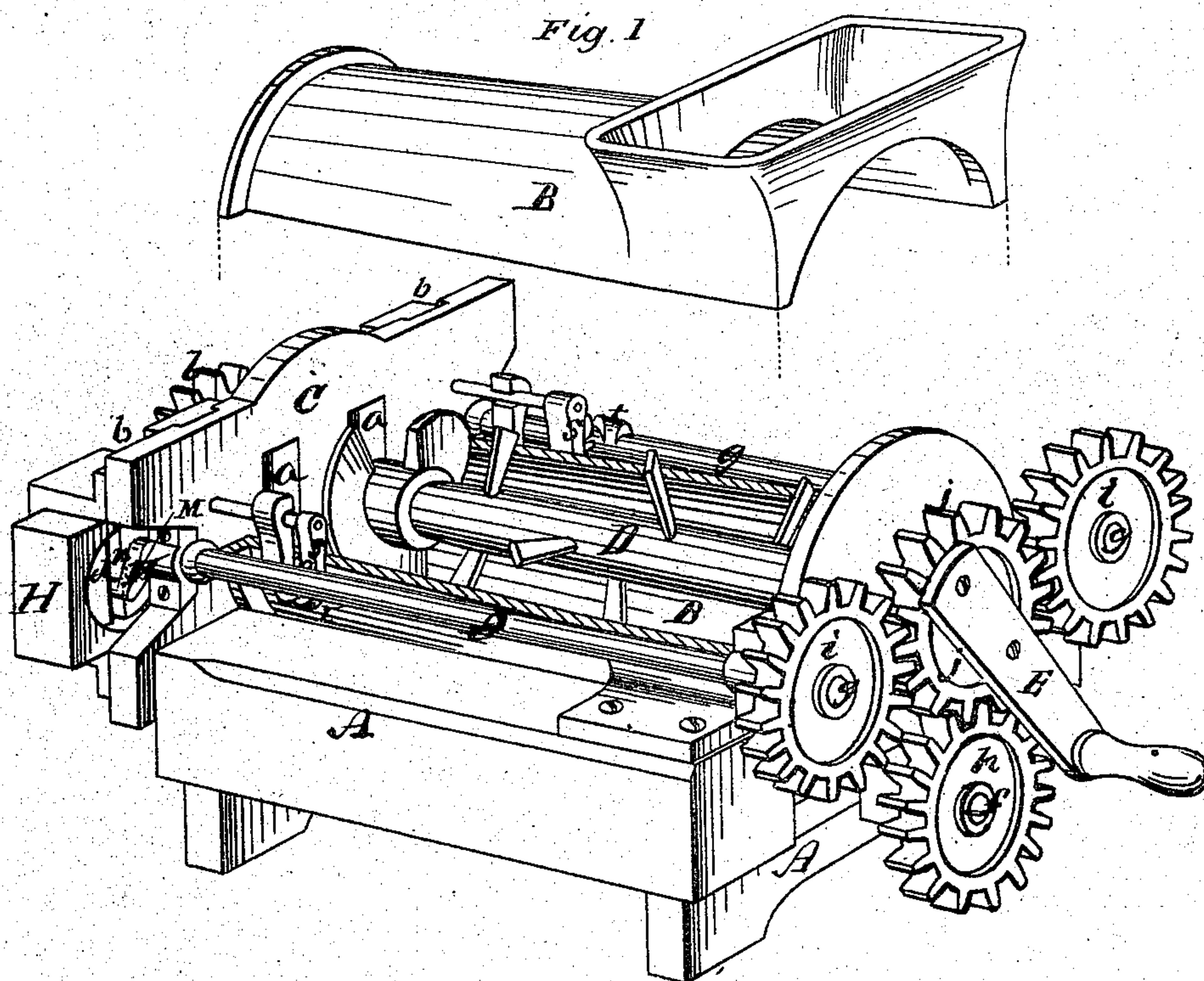


W. E. GARD.
Brick-Machines.

No. 158,584.

Patented Jan. 12, 1875.



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UNITED STATES PATENT OFFICE.

WALTER E. GARD, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN BRICK-MACHINES.

Specification forming part of Letters Patent No. 158,584, dated January 12, 1875; application filed July 20, 1874.

To all whom it may concern:

Be it known that I, WALTER E. GARD, of Chicago, in the county of Cook and State of Illinois, have invented an Improved Brick-Machine; and I do hereby declare that the following is a full and exact description, reference being had to the accompanying drawings making part of this specification—

Figure 1 being a view of the machine in perspective, the top of the pug-mill being shown as lifted from the machine; Fig. 2, a horizontal section of the working end of the machine in the plane of the axis of the driving-shaft; Fig. 3, a vertical section thereof through the molds and plungers, in a plane indicated by the line *x x*, Fig. 2.

Like letters designate corresponding parts in all of the figures.

This improved machine is organized to powerfully compress the bricks at the moment of molding them, the clay being driven from the pug-mill into stationary molds in one end or in the bottom thereof, and subjected therein to the forming and compressing action of transversely-moving plungers, while the driving force of a screw in the pug-mill is pressing the clay into the said molds.

There are also several peculiarities in the construction and operation of the compressing-plungers, and in a device for delivering the bricks therefrom.

In the drawings, A represents the frame or bed of the machine; B, the pug-mill; C, the mold-box at the end thereof; and D the driving-shaft, being also the working-shaft of the pug-mill, the power being communicated to the machine at the end of the said shaft, as indicated, by the crank E.

The machine is represented as a horizontal one; but it may be vertical, and the mold-box C will then be the bottom of the pug-mill.

The mold-box C is a simple case with a rectangular aperture, of uniform size, extending longitudinally through its entire length transverse to the pug-mill; and in this aperture three plungers move—a central or inner plunger, G, and two outer plungers, H H—each having the requisite reciprocating motions. The inner surfaces of the mold-box form four faces of the bricks, generally the two ends and the two side edges, and the plungers form the two sides of the bricks. There are two molds

or die-spaces, I I, respectively, between the two outer plungers and the two ends of the inner plunger; and bricks are molded in them alternately as the plungers reciprocate, so that a brick is forming in one mold while another brick already formed is being delivered from the other mold. Two apertures, *a a*, open from the pug-mill B respectively into these molds, and two more apertures, *b b*, are formed in three sides of the mold-box, at some distance nearer the ends thereof than the apertures *a a*, through which outer apertures the bricks are delivered from the machine.

All the plungers (G H H) move simultaneously in the same direction.

In Figs. 2 and 3 the plungers are represented as having just completed their movement to the left, receiving clay from the pug-mill into the right-hand mold, and delivering a brick at the left-hand delivering-aperture.

The proper reciprocating movements of these plungers I find can be produced in the simplest and best manner by means of a set of cranks, L M M, the crank L turning in a vertical or transverse cam-slot, *c*, in the inner plunger G, and the cranks M M similarly turning in vertical or transverse cam-slots *d d* in the respective outer plungers H H.

The revolving motions of these cranks, which are all to move in the same direction at equal speeds, are easily produced by extending three shafts, *f g g*, to the other end of the machine, and providing them with pinions, *h i i*, of equal size, into all of which a single cog-wheel, *j*, on the driving-shaft D gears.

The shafts *g g* may be simple extensions of or identical with the shafts of the outer cranks M M; but, since the axes of all the cranks are in line with each other, the lower shaft *f*, being necessarily out of line with the other two, is connected by two cog-wheels, *k l*, of equal size with the shaft *m* of the middle crank L.

The cranks are at such distances apart as to produce in that part of their revolution where the bricks are finally formed the proper thickness thereof; but when the plungers are in position to receive the clay from the pug-mill, as shown at the right-hand mold in Figs. 2 and 3, the plungers are separated considerably more to introduce the requisite

amount of clay to compact the bricks as required in compressing.

To effect this separation of the plungers while they are driven by the simple crank movements above specified the vertical cam-slots *d d* of the outer plungers have their inner surfaces hollowed out in concave form, opposite to the shafts of the cranks, as shown at *n n*, Fig. 3, while the surfaces *o o* of the central cam-slot *c*, which, for another purpose, are somewhat hollowed, are hollowed less than the surfaces *n n*, the effect of which relative constructions is, that when the cranks come round against these hollows, as seen in Fig. 3, the outer plunger *H* is not moved inward so far as the middle plunger *G*, thereby producing the requisite separation at the termination of their inward movement. Then, in the outward movement of the plungers, the crank *L* moves out of the hollow *o* into the straight part of the slot *c* sooner than the crank *M* moves out of its larger hollow *n* into the straight part of its slot *d*, and consequently the inner plunger approaches nearer and nearer to the outer plunger, thus compressing the clay in the mold, while the screw *N* of the pug-mill shaft continues to act and press or hold the clay in the mold with any degree of pressure desired. Thus the bricks are thoroughly compressed.

By the time that the inner plunger passes by the aperture *a* leading from the pug-mill, and the unused clay is forced back, if in excess, and cut off from the mold, the brick is fully compressed in the mold and completely formed, being inclosed on all sides, the outer plunger not yet having opened to the discharge-aperture *b*; but directly after this, in the outward movement of the plungers, the brick is pushed out to the said discharging-aperture, as shown at the left hand in Fig. 2.

As soon as the brick is completely formed and compressed in the mold, in order to prevent the puffing of the sides of the brick and the destruction of its perfect size and form, it is necessary that the plungers should again separate somewhat more immediately after the final formation of the brick, or before it begins to be exposed to the discharge-opening.

To effect this purpose, I make the outer cranks *M M* a little longer than the inner crank *L*; and since, at the moment spoken of, the inner and outer cranks are moving in the straight parts of their respective cam-slots, the outer plunger, in consequence of the more rapid throw of its crank, travels faster than, and is thereby farther separated from, the inner plunger, thus producing the requisite removal of the pressure from the brick.

As soon as the bricks are brought fully to the discharging-apertures *b b* they are automatically started or separated from the mold-box by means of followers *p p*, located in the mold-box, as shown in Fig. 2. At that moment they have an outward movement im-

parted to them, as indicated at the left hand in the same figure, by means of cam-grooves *t t* on the crank-shafts *g g*, and pins or projections *s s* on the stems of the said followers, or by any equivalent means. They are, by the same means, again immediately returned to their recesses in the mold-box, the position being indicated at the right hand in the said figure.

The hollowed surfaces *o o* in the cam-slot *c* of the inner plunger *G* are required at the termination of its outer movement, in order to hold the plunger stationary while the bricks are being discharged. The outer plungers *H H* during that time may continue to travel outward, the outer surfaces of their cam-slots *d d* being straight.

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

1. In a machine for molding and compressing bricks, a mold-box, *C*, forming the discharge end or bottom of the pug-mill, and provided with molding and compressing plungers *G H H*, which have a reciprocating movement therein, substantially as and for the purpose herein specified.

2. In a machine for molding and compressing bricks, the combination of compressing-plungers *G H H*, moving transversely to the pug-mill in a mold-box, *C*, with a screw or other driver, *N*, in the pug-mill, which presses the clay into the mold-box, substantially as and for the purpose herein specified.

3. The combination of a mold-box, *C*, having inner clay-receiving apertures *a a* and outer brick-discharging apertures *b b*, with reciprocating plungers *G H H*, which compress and mold the bricks therein, and pass them from the said inner to the said outer apertures, substantially as and for the purpose herein specified.

4. The combination of the plungers *G H H*, having respective vertical or transverse cam-slots *c d d*, with the driving-cranks *L M M*, the latter exceeding the former slightly in length, substantially as and for the purpose herein specified.

5. The hollowed inner surfaces *n n* of the cam-slots *d d* in the outer plungers *H H*, formed in relation to the cam-slot *c* of the inner plunger *G*, substantially as and for the purpose herein specified.

6. The hollowed surfaces *o o* of the cam-slot *c* in the inner plunger *G*, in combination with the discharging-apertures *b b* of the mold-box *C*, substantially as and for the purpose herein specified.

7. The brick-discharging followers *p p*, operating as described, in combination with the mold-box *C*, having discharge-apertures *b b*, substantially as and for the purpose herein specified.

Specification signed by me this 7th day of July, 1874.

Witnesses: WALTER E. GARD.
W. D. STURTEVANT,
PLUMER HAWORTH.