

2 Sheets—Sheet 1.

W. A. GRAHAM.
BRICK-MACHINE.

No. 171,118.

Patented Dec. 14, 1875.

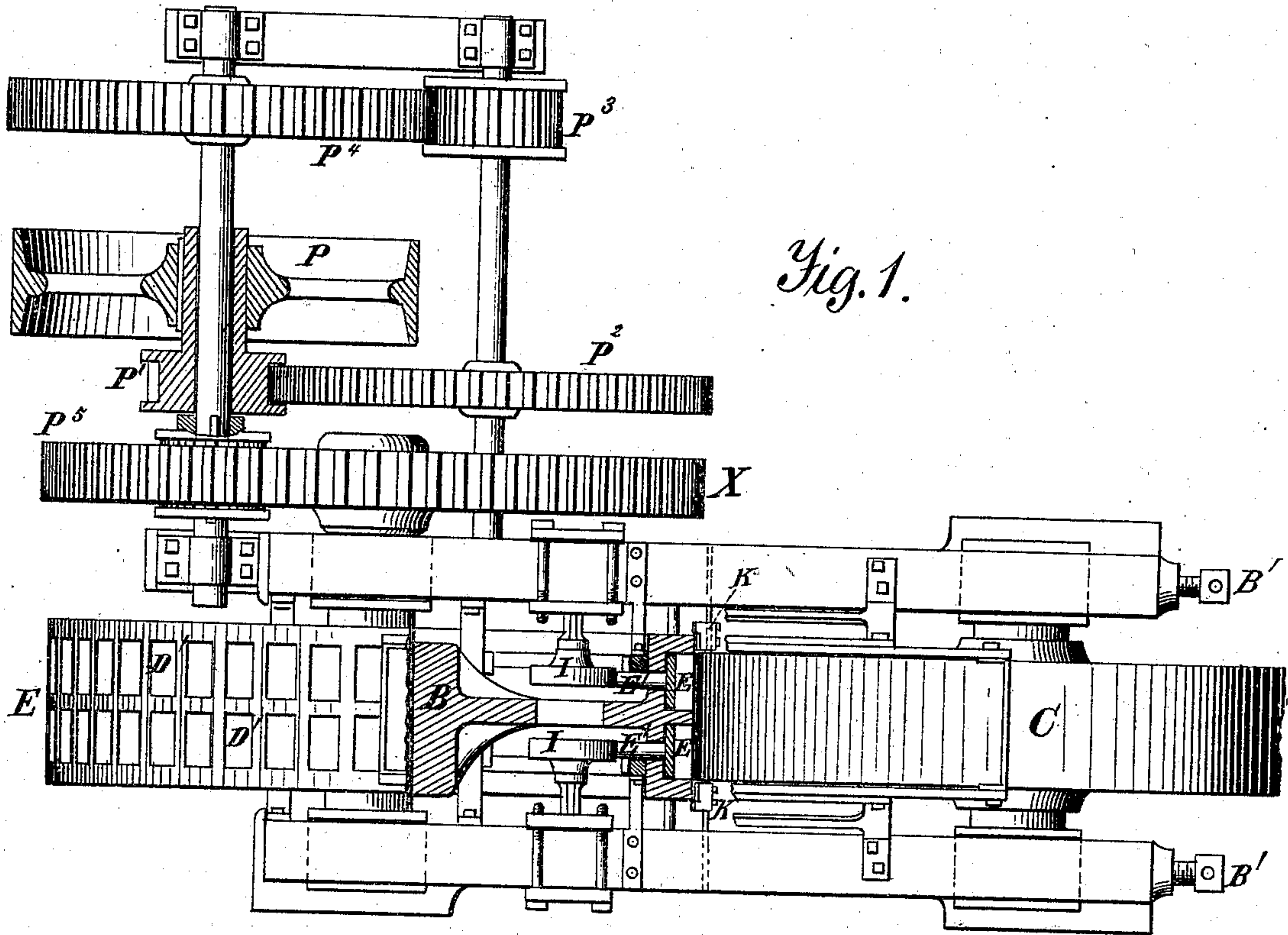


Fig. 1.

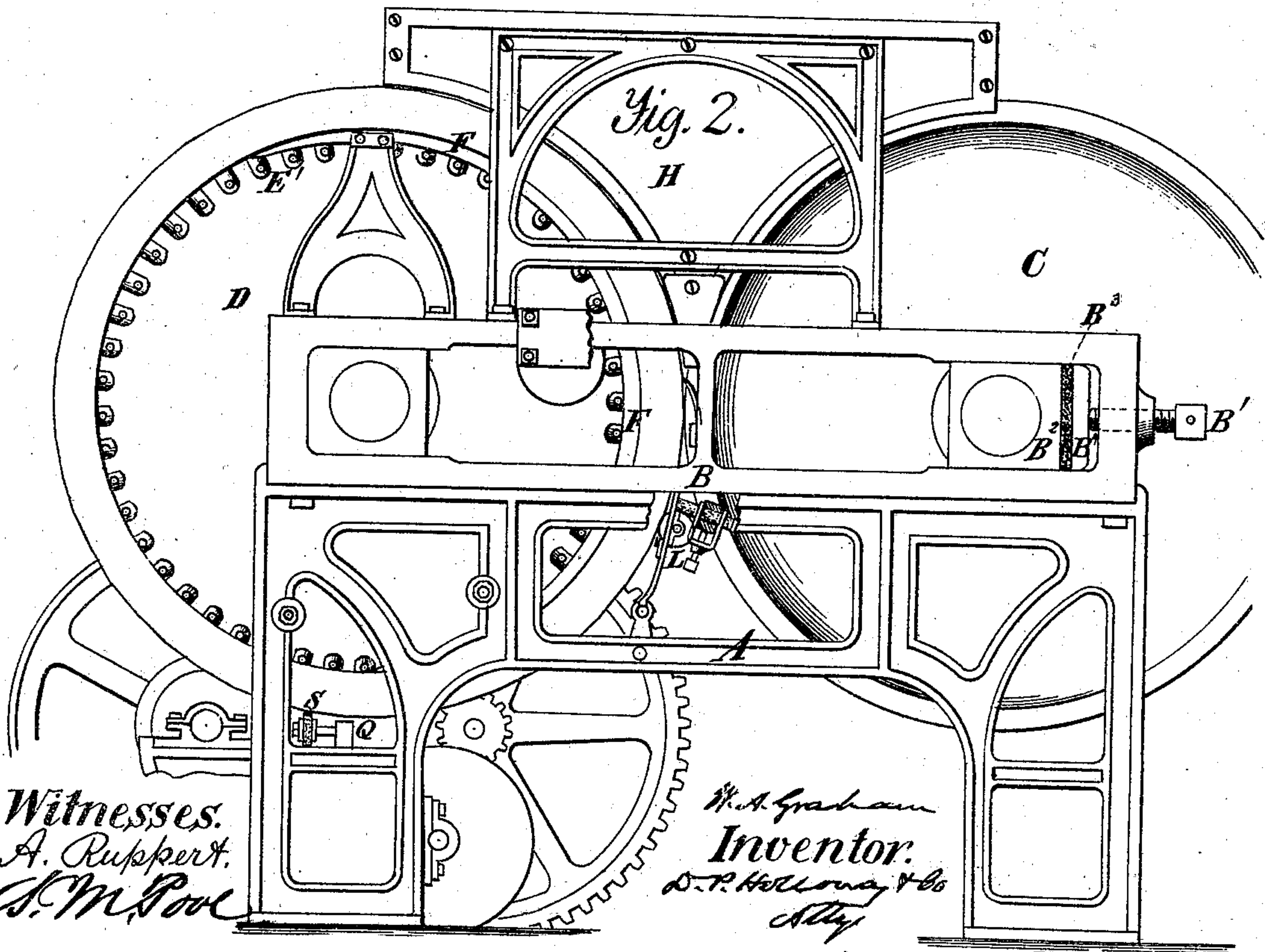


Fig. 2.

Witnesses.
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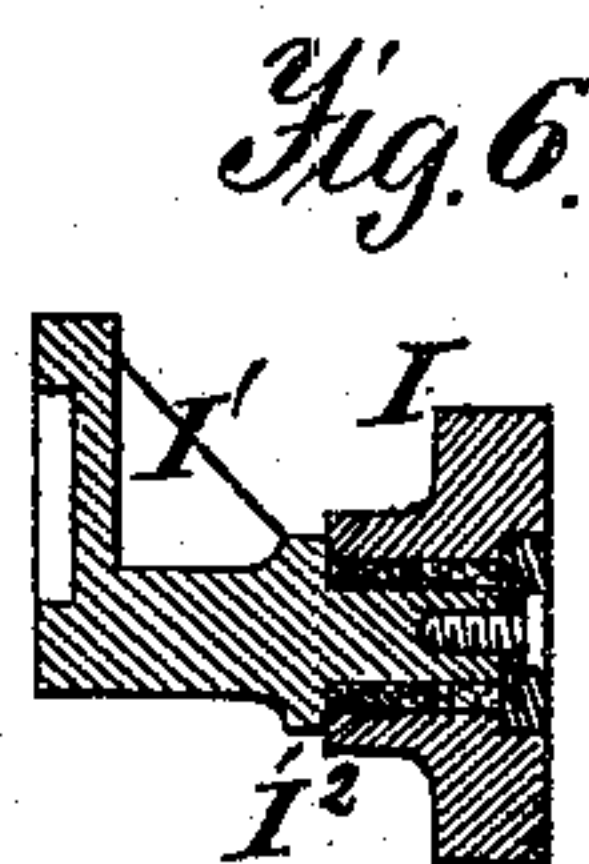
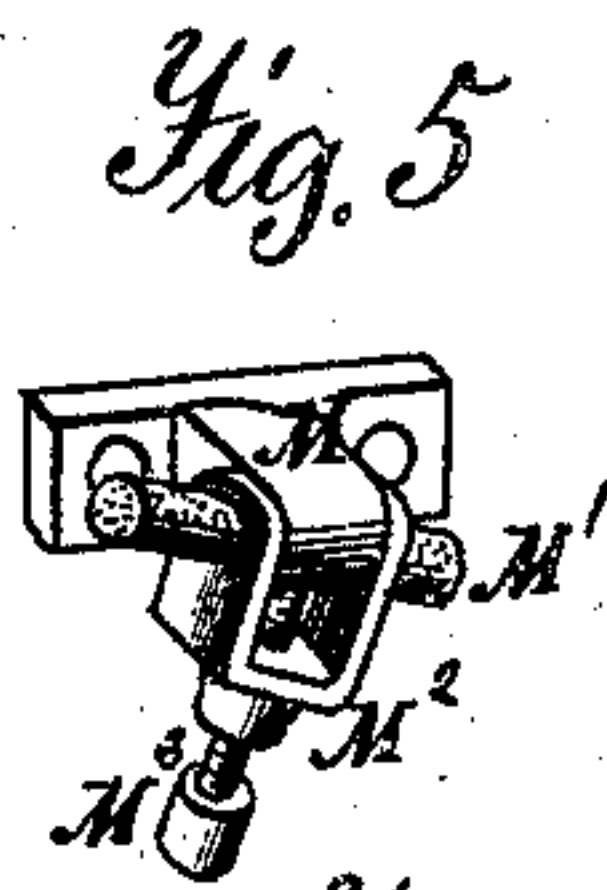
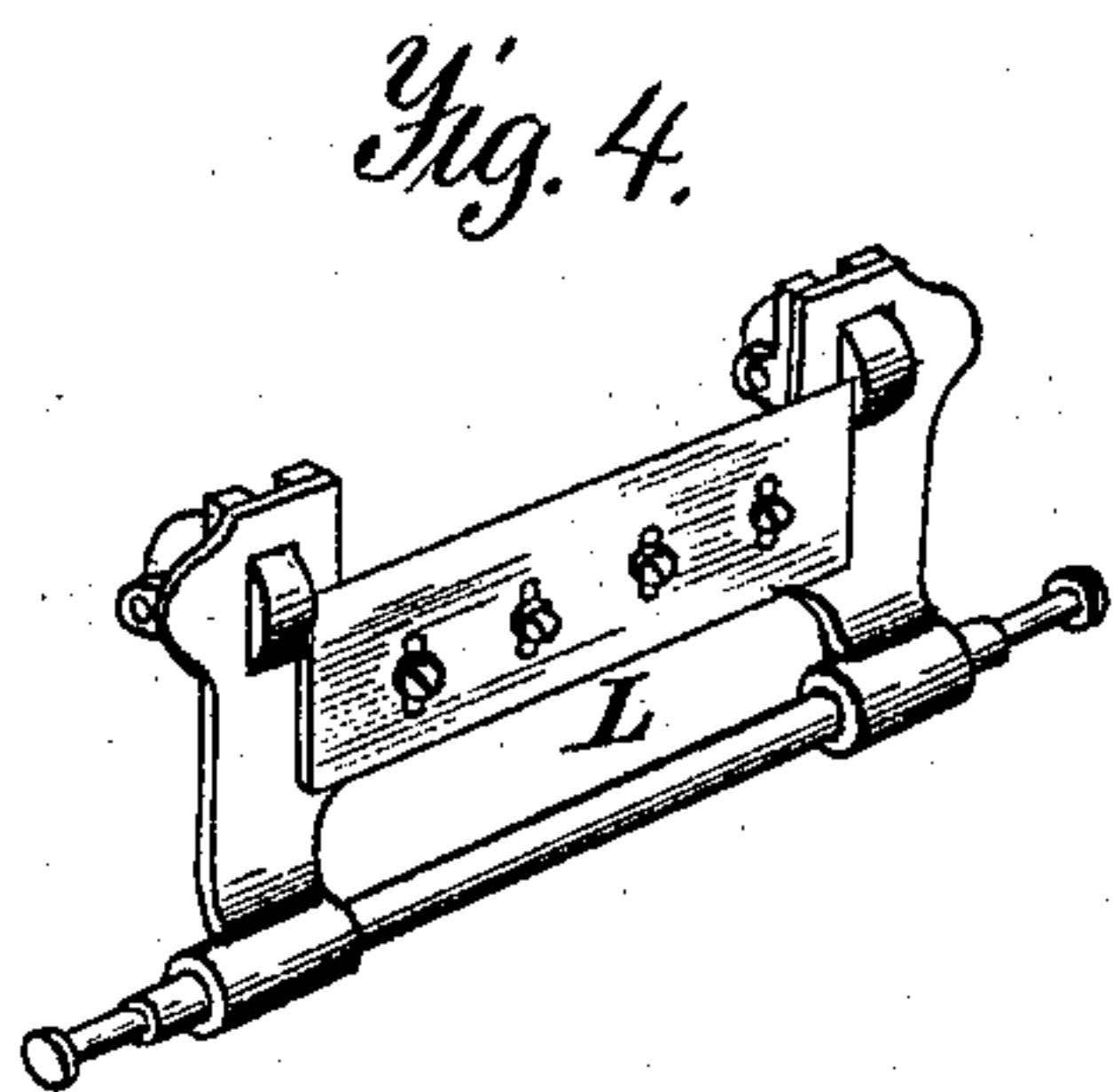
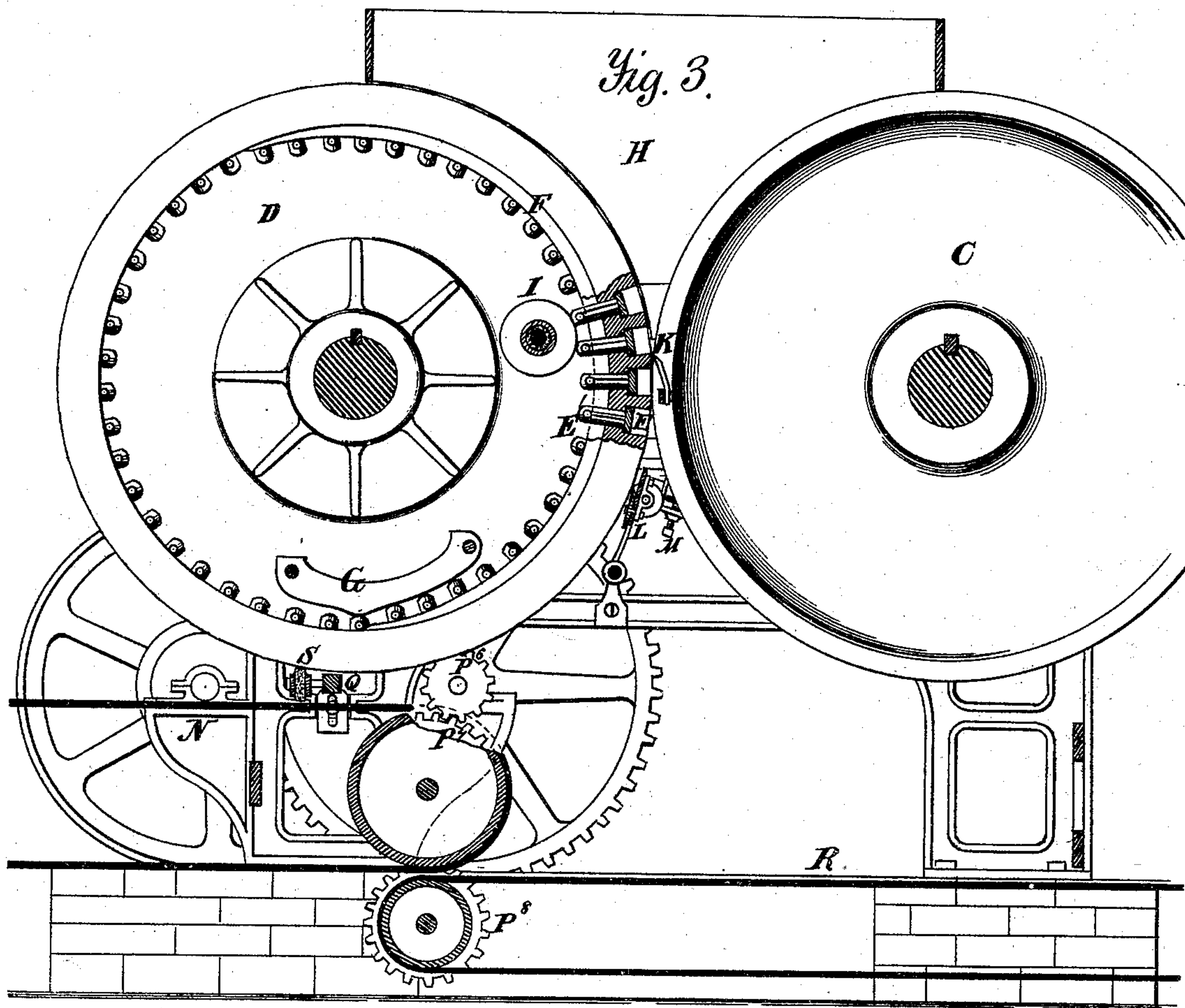


Fig. 7.

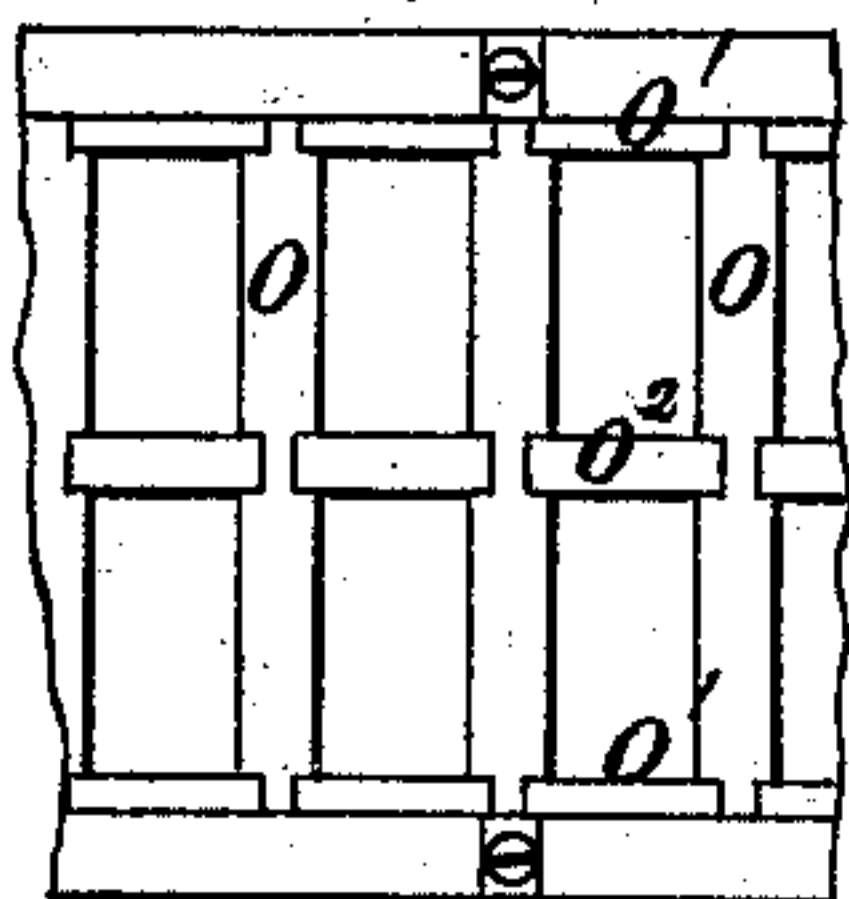
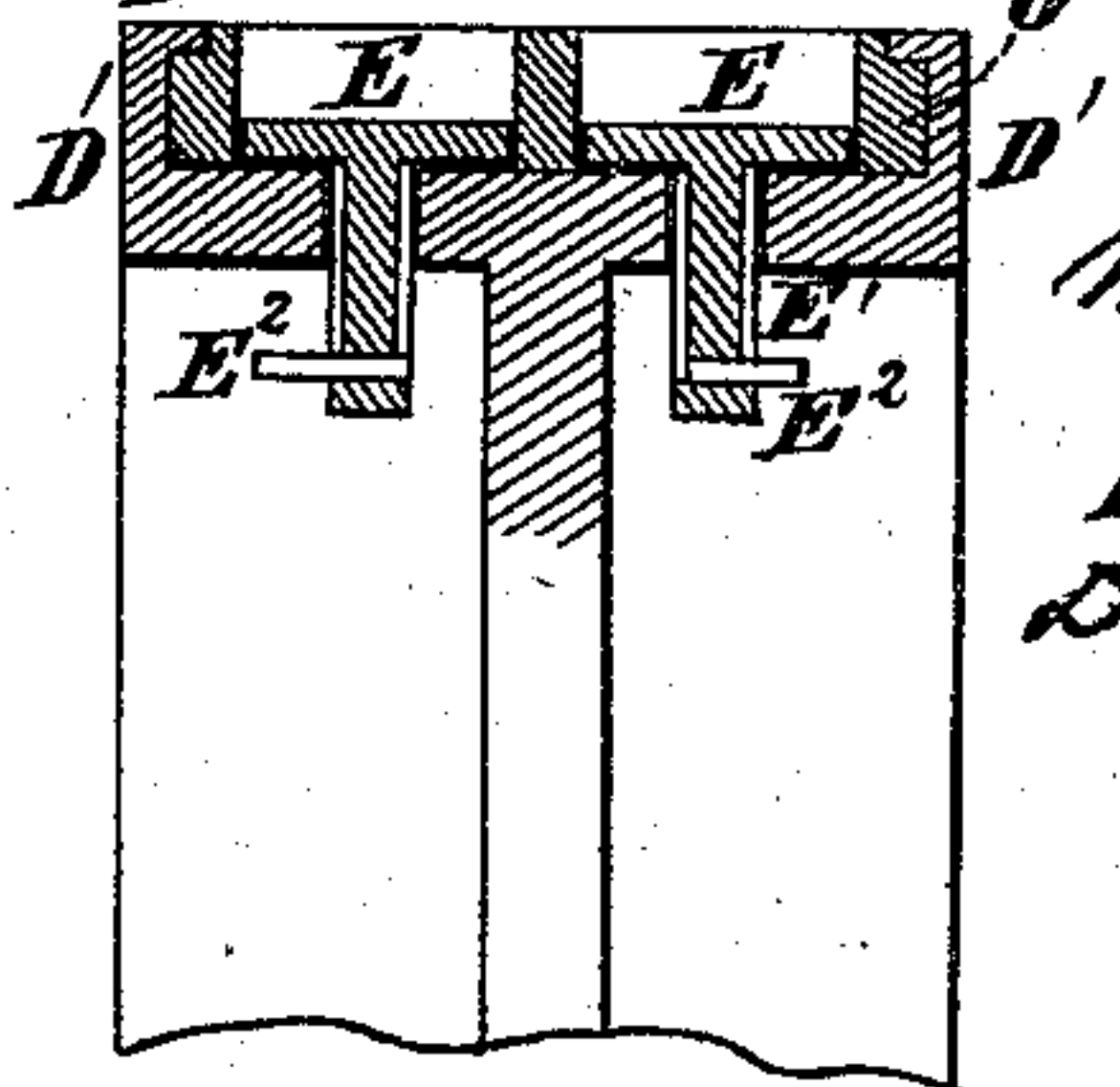


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM A. GRAHAM, OF CARLISLE, PA., ASSIGNOR TO WILLIAM H. PHILIP,
TRUSTEE FOR HIMSELF AND OTHERS.

IMPROVEMENT IN BRICK-MACHINES.

Specification forming part of Letters Patent No. 171,118, dated December 14, 1875; application filed
December 4, 1875.

To all whom it may concern:

Be it known that I, WILLIAM A. GRAHAM, of Carlisle, in the county of Cumberland and State of Pennsylvania, have invented a new and useful Improvement in Brick-Machines, of which the following is a specification:

On the 17th day of March, A. D. 1868, I took out Letters Patent of the United States for an improved brick-machine, numbered 75,542, which contained a mold-wheel and pressure-wheel, both polygonal. In experimenting with that machine I have found that the opposition of two flat faces is objectionable, and that the work of forming the bricks in the mold will be much better performed where the pressure-wheel is cylindrical on its face.

My first improvement consists in combining with a polygonal mold-wheel, such as is described in my said former Letters Patent, a cylindrical pressure-wheel, held by the compression of a screw against the surface of the mold-wheel by an adjustable pressure applied in the line of the axis of the two wheels, and having a spring of india-rubber, or equivalent springs, supporting the strain, so as to afford a yielding resistance, to accommodate itself to a varying strain, so that by the contraction and expansion of the springs the clay may be uniformly packed into the molds at the point of contact of the two wheels—under the hopper.

My second improvement consists in combining with the mold and pressure wheels a cylindrical or equivalent inclined cam or bearing, resting against an elastic support placed above the point of contact of the two wheels, in such position as to engage the inner ends of the stems of the plungers and force them slightly outward, for the purpose of imparting a pressure to the bricks, while being formed, from both sides, first from the side of the plunger or bottom of the mold, and then from the side of the pressure-wheel or outside of the mold, for the purpose of compressing the clay in the mold with a more equal density throughout its thickness than will be imparted where the compression comes entirely from one side.

My third improvement consists in combining with the polygonal mold-wheel and knife, held against the wheel, or in near proximity to it, by an elastic pressure, its frame being supported by friction-wheels, as set forth in my said former Letters Patent, an auxiliary knife, having an elastic support, for shaving the clay from the solid sides of the mold-wheel, so as to make a clean track on the metal for the friction-wheels.

My fourth improvement consists in attaching an india-rubber or equivalent scraper, so as to bear on the surface of the mold-wheel after the bricks have been delivered, to scrub any adhering clay from the face of the wheel and plungers, and thus return the molds perfectly clean to the hopper to be refilled.

My fifth improvement consists in running the pressure-wheel at a different speed from that of the mold-wheel, so that the clay may be more perfectly packed in the mold. This may be accomplished either by allowing the former to run free, or by gearing it to run faster or slower.

Other minor points will be covered and indicated in the following specification and claims.

In the annexed drawings, making a part of this specification, Figure 1 is a plan view of the machine, partly in section. Fig. 2 is a side elevation thereof. Fig. 3 is a sectional elevation. Fig. 4 is a perspective view of the knife and its frame. Fig. 5 is a perspective view, showing the device for holding the knife against an india-rubber bearing. Fig. 6 is a section of the stud and wheel which gives the first compression to the clay by the outward thrust of the plungers. Fig. 7 is a plan; and Fig. 8 is a section, showing the manner in which the molds are formed of steel plates.

The same letters are employed in all the figures in the indication of identical parts.

In the annexed drawings the machine is represented as being supported upon a strong frame, A, to which the housing B is bolted. This housing carries the bearings of the pressure-wheel C and mold-wheel D. The screw B¹ passes through the end of the housing, and bears against a plate, B⁴. The bearing B² of

the pressure-wheel slides in the housing, and a solid sheet or thin block of india-rubber, B³, is compressed between the plate B⁴ and the box B². The screws B¹, acting against the ends of the shaft of the pressure-wheel through the parts B², B³, and B⁴, regulate, at the will of the operator, the force of compression with which the wheel C will act on the clay to force it into the molds.

In my former patent the wheel C was polygonal, and recesses across its face were formed to receive the angles of the polygonal mold-wheel.

In my present machine I make the pressure-wheel cylindrical and smooth upon its face. It is kept in constant contact with the face of the polygonal mold-wheel by the compression and expansion of the spring B³. As the pressure-wheel runs against the mold-wheel and is round, its tendency is to constantly push against the clay drawn down between the two, and force it into the mold, and to prevent its escaping between the faces of the two wheels. As the spring B³ is being constantly contracted by the passage of the points of the polygon, and expanded while the flat faces are passing the point of contact, it is evident that the clay will be packed into the molds, not by a mere dead pressure, but by an elastic and varying force, resembling in character and effect the kneading action of the human hands.

It will be seen that this is a different action from that of my said former machine, where two flat faces were presented, catching the clay between them, and forcing it with the direct action of a plunger into the molds, and compressing it with a force due to the strain brought on the wheel by the screw.

In this case I have illustrated a double mold-wheel, containing two sets of molds, side by side, in parallel rows. In other respects the construction is the same as that set forth in my said former patent. E are the plungers in the molds, having stems E¹, projecting radially toward the center, projected by the stationary cam G, and retracted, before passing under the hopper, by the cam F, which, engaging the pins E² on the side of the stems E¹, draws back the plunger so as to present an open mold to receive the clay from the hopper H. The curvature of the face of cam F is not such, however, as to draw the plunger, and hold it entirely at the bottom of the mold until it has passed the wheel I and been projected, when it is drawn entirely back and there held. This projection of the plunger is for the purpose of applying a preliminary pressure to the clay in the mold as soon as the approximation of the two wheels is such that the clay packed in the mold will be held in front sufficiently firmly to resist the forward thrust. This sudden impact will condense the clay in the bottom of the mold, and when pressure comes from the wheel on the other side, the alternate compression from each side will tend to compact the clay in the mold to

a uniform density. The cam I rests on a stud, I¹, attached to a plate on the frame. The cam may be made to turn on a sleeve, or it may be fixed; or, instead of being in the form of a circle, it may be any inclined surface placed to give impact to the clay by projecting the plunger. It should be supported upon india-rubber, (shown at I², Fig. 6,) so that it may yield to an excess of pressure without breaking or suddenly checking the mold-wheel. The knife K is a spring-blade resting on the solid rim of the mold-wheel, and intended to shear off adhering clay, so as to give a clear track for the friction-wheels of the frame of the knife L, which is placed so as just to clear the metal of the wheel D and sever the clay, leaving a smooth surface to the brick at the outside of the mold. If the edge of the knife bore against the wheel, it would be soon ground away, and need to be replaced. The frame f bears against blocks of india-rubber; but as all this part of the machine is fully shown in the former patent, it need not be described herein. M is an improved box for holding the rubber block, which sustains the pressure on the knife-frame. It is constructed with a lug, through which passes the india-rubber spring M¹, which is cylindrical or prismatic, and of such length as to pass through the lug, and be held in place by a yoke, M², which is drawn against it by the set-screw M³, so as to confine the spring. By this means the spring may be adjusted to bear against the knife-frame with more or less force, according to the quality of the clay, less pressure being required when the clay is very plastic than when it is very tenacious.

When the bricks have been expelled by the action of the cam G on the stem of the plunger, they fall upon an endless belt, N, by which they are carried away. Another endless belt, R, running in the opposite direction, is placed under the knives to catch the clay shaved off by their action, and carry it off to the tempering-mill to be mixed with the other clay. Under the mold-wheel there is attached an india-rubber scraper, S. This is a thick sheet of india-rubber fastened between two plates, by which it is held with its edge scouring the face of the plungers after the brick has been expelled.

The molds are made in the manner shown in Figs. 7 and 8. The mold-wheel is cast with a recessed face formed by the flanges formed on the sides, as shown in Fig. 8, at D¹ D². At one place in the wheel the horizontal flange D² is cut away, so as to permit the transverse steel plates O to be inserted into the recess on the face of the mold-wheel, when they may be moved to their place. Then the end pieces (also of steel) O¹ are inserted and placed under the flange D², and the partition-piece O² placed in the middle. Then another transverse piece, O, is inserted and brought up against the pieces O¹ O², and we have one pair of molds finished. In this manner all the molds are

successively formed. By this means I am able to make the mold of flat plates of steel, which may be formed on a planer and separately finished before being inserted. In single molds, of course, plate O² is not used.

The pulley P receives motion from the prime mover, and is keyed to the hollow and extended hub of the pinion P¹, which meshes into the spur-wheel P², on whose shaft is the pinion P³. This drives the spur-wheel P⁴ on a counter-shaft, which passes through the hub of pinion P¹, and carries a pinion, P⁵, which meshes into a spur-wheel on the shaft of the mold-wheel. A pinion, P⁶, on the shaft of the wheels P² P³, drives also the spur-wheel P⁷ and the belt N, and this wheel P⁷ gives rotation in the opposite direction to the pinion P⁸ and the endless apron R. Q is a bar which stops the bricks, and, if they should adhere to the face of the plunger, causes them to fall.

The pressure and feed wheel C may be driven by gearing meshing into the driver X of the mold-wheel. In machines heretofore made the pressure-wheel, arranged under the hopper, as mine is, has been geared to run at the same speed as the mold-wheel. I regard this as a mistake. It should be geared to run at a different speed—faster or slower. In the machine illustrated in the drawings I have dispensed with any driving-gear for the pressure-wheel. As the pressure-wheel will slip on the face of the mold-wheel it will run slower than the latter, and thus I obtain the same effect I would have by gearing it to run at a slower speed. This movement, I find, compacts the brick more perfectly than when I have used wheels geared to run at the same speed.

Running in the bottom of the hopper, the mold and pressure wheel, in revolving, tend to draw the clay down and compress it into the molds. Thus the wheel C is not only a pressure-wheel, but also, to some extent, a feed-wheel; and in my claims, when I use the expression "feed and pressure wheel," I wish it to be understood that I mean the wheel C running in the bottom of the hopper and performing these two functions, and not a mere finishing-wheel running against the face of the mold, outside of the hopper, to finish the bricks already formed in the molds, for I am aware

that such have been used with elastic bearings and free-running.

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

1. In combination with the hopper, the polygonal mold-wheel D and cylindrical feed and pressure wheel C, having its adjustable bearings elastically seated, forcing the wheels together in the line of their axes, substantially as set forth.

2. In combination with the mold-wheel and radial plungers and pressure-wheel C, the cam I, giving an impact to the clay in the bottom of the mold from the center outward, and then completing its compression by pressure applied in the opposite direction, substantially as set forth.

3. In combination with the mold-wheel and radial plungers, the cam I, resting on an elastic bearing, substantially as set forth.

4. In combination with the mold-wheel and knife L, supported against the solid rim of the mold-wheel, substantially as set forth, an auxiliary knife, K, bearing on the said rim to clean it of clay and give a clean track to the friction-wheels of the former.

5. In combination with the mold-wheel, with radial plungers and cam for projecting the latter, a rubber, S, for scouring the face of the wheel and plungers, substantially as set forth.

6. In combination with the hopper, the mold-wheel D and feed and pressure wheel C, adapted to run with different peripheral velocities, substantially as set forth.

7. In combination with the knife L and its frame, the india-rubber spring M¹, adjustably held in position by the yoke M² and set-screws M³.

8. The molds constructed in the recess on the periphery of the flanged mold-wheel by inserting the steel plates O O¹, substantially in the manner set forth.

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

WM. A. GRAHAM.

Witnesses:

R. MASON,
A. RUPPERT.