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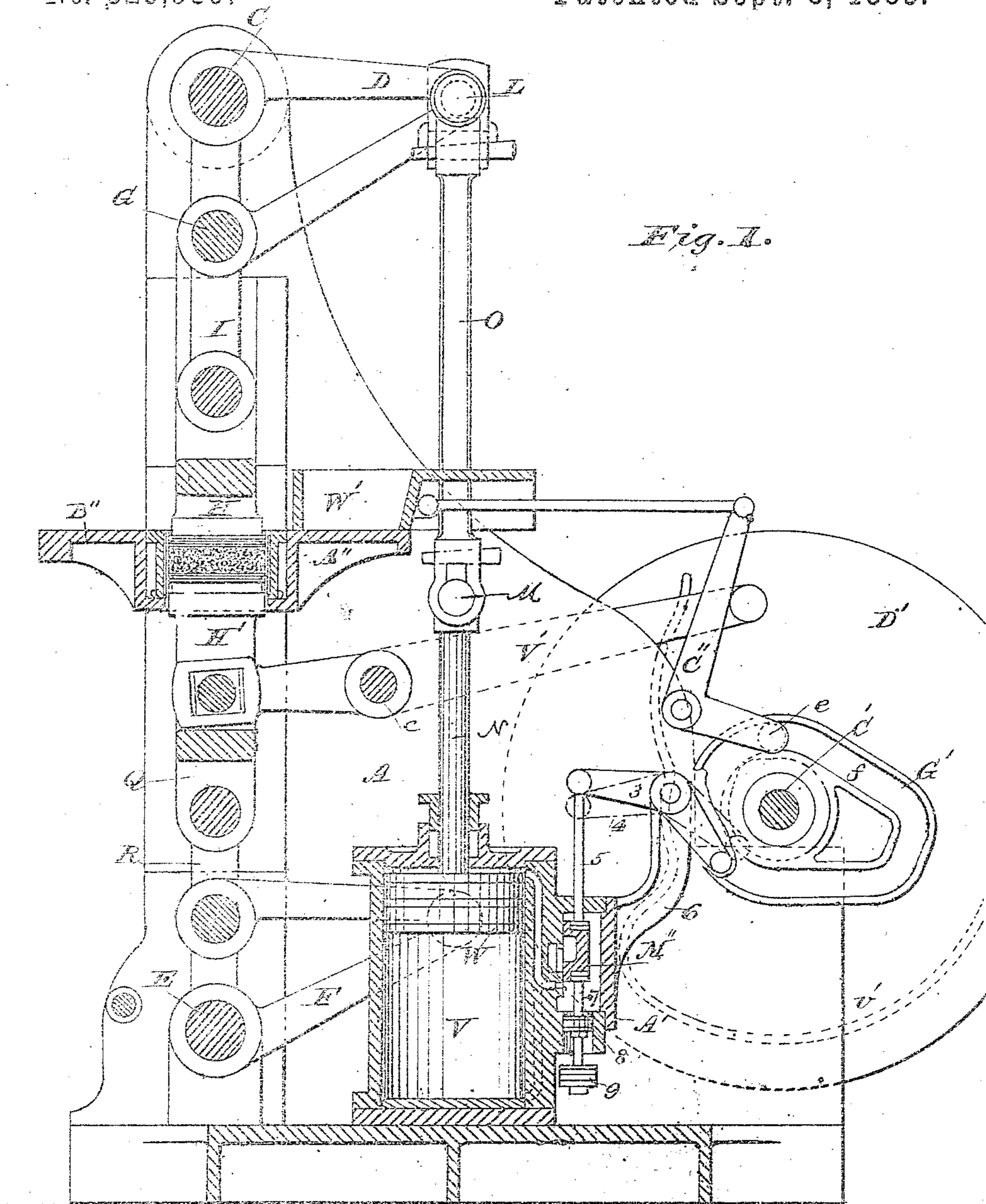
5 Sheets—Sheet 1.

L. B. KENNEDY.

BRICK MACHINE.

No. 325,939.

Patented Sept. 8, 1885.



Witnesses:

F. E. Brecht.

W. L. Linsbaugh

Inventor

E B Kennedy

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(No Model.)

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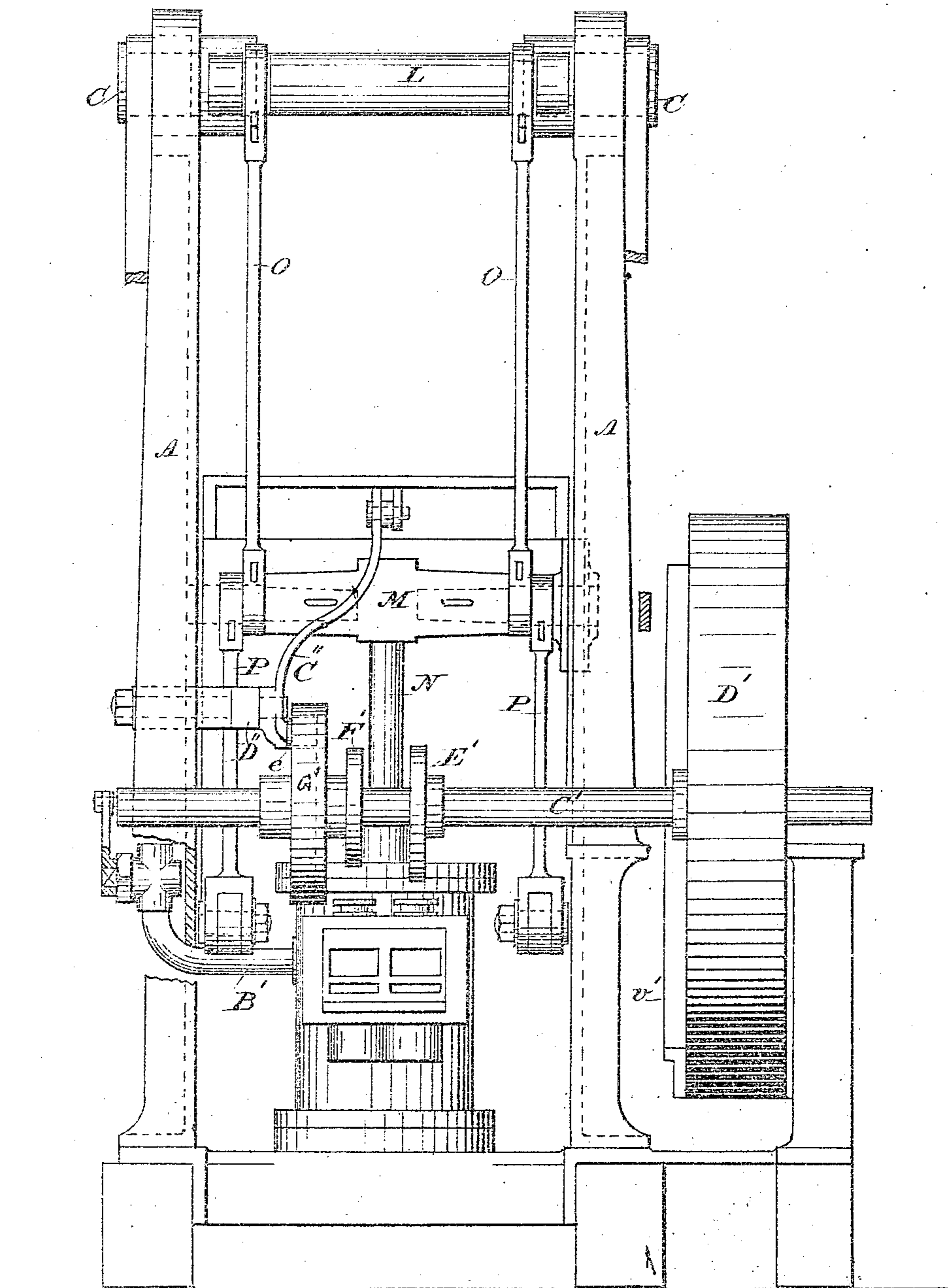
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Fig. 2.



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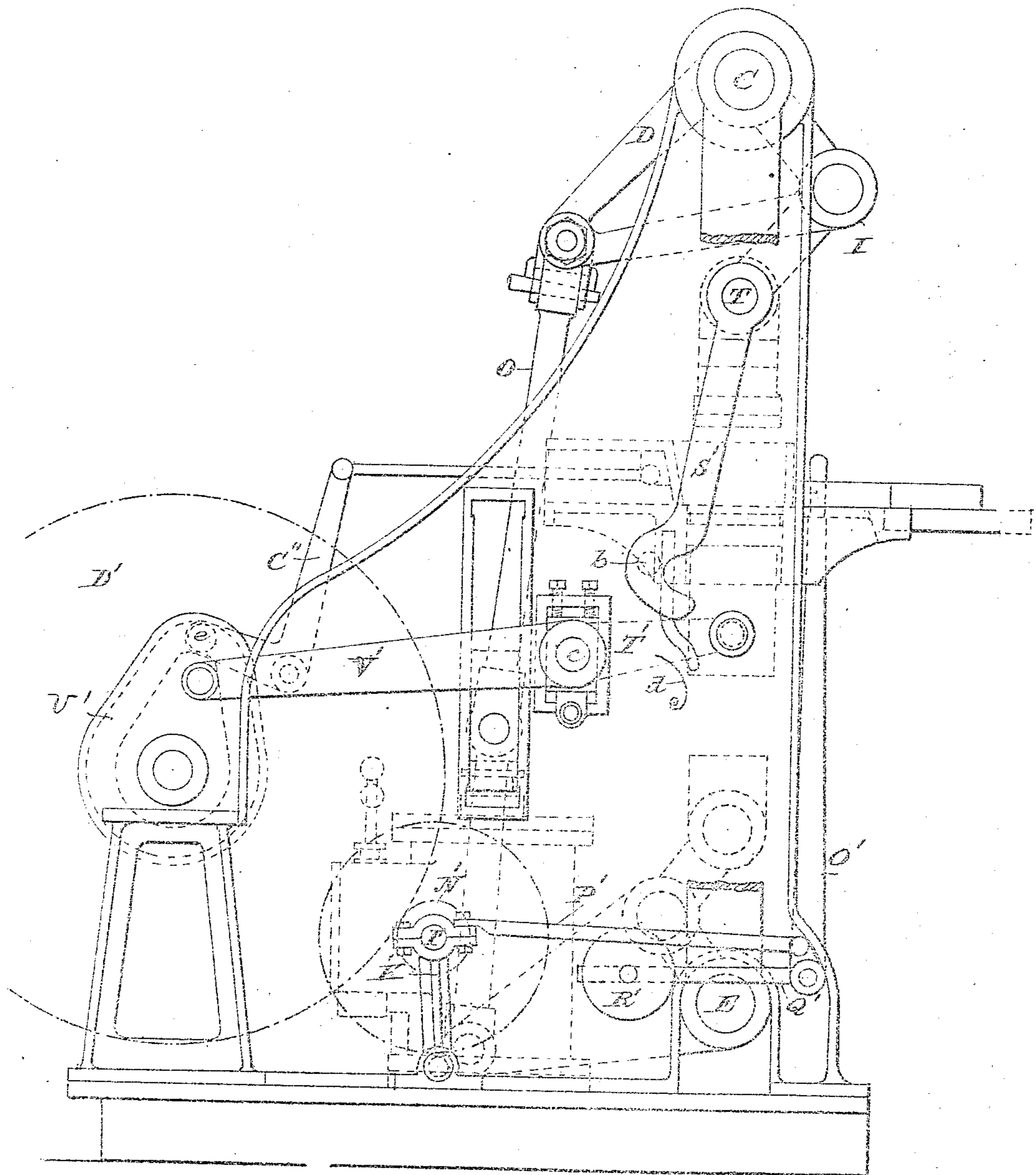
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Fig. 3.



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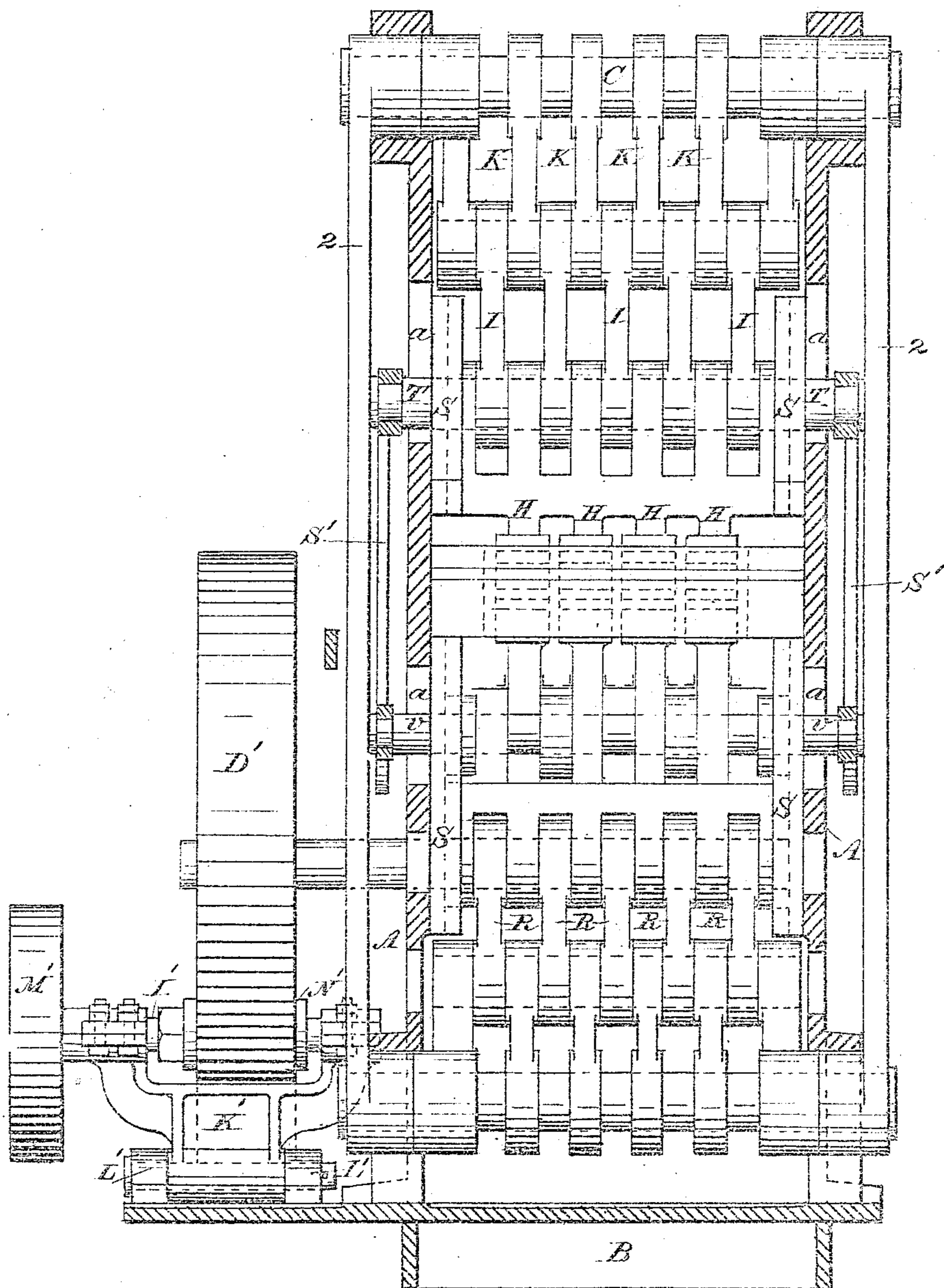
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Fig. 4.



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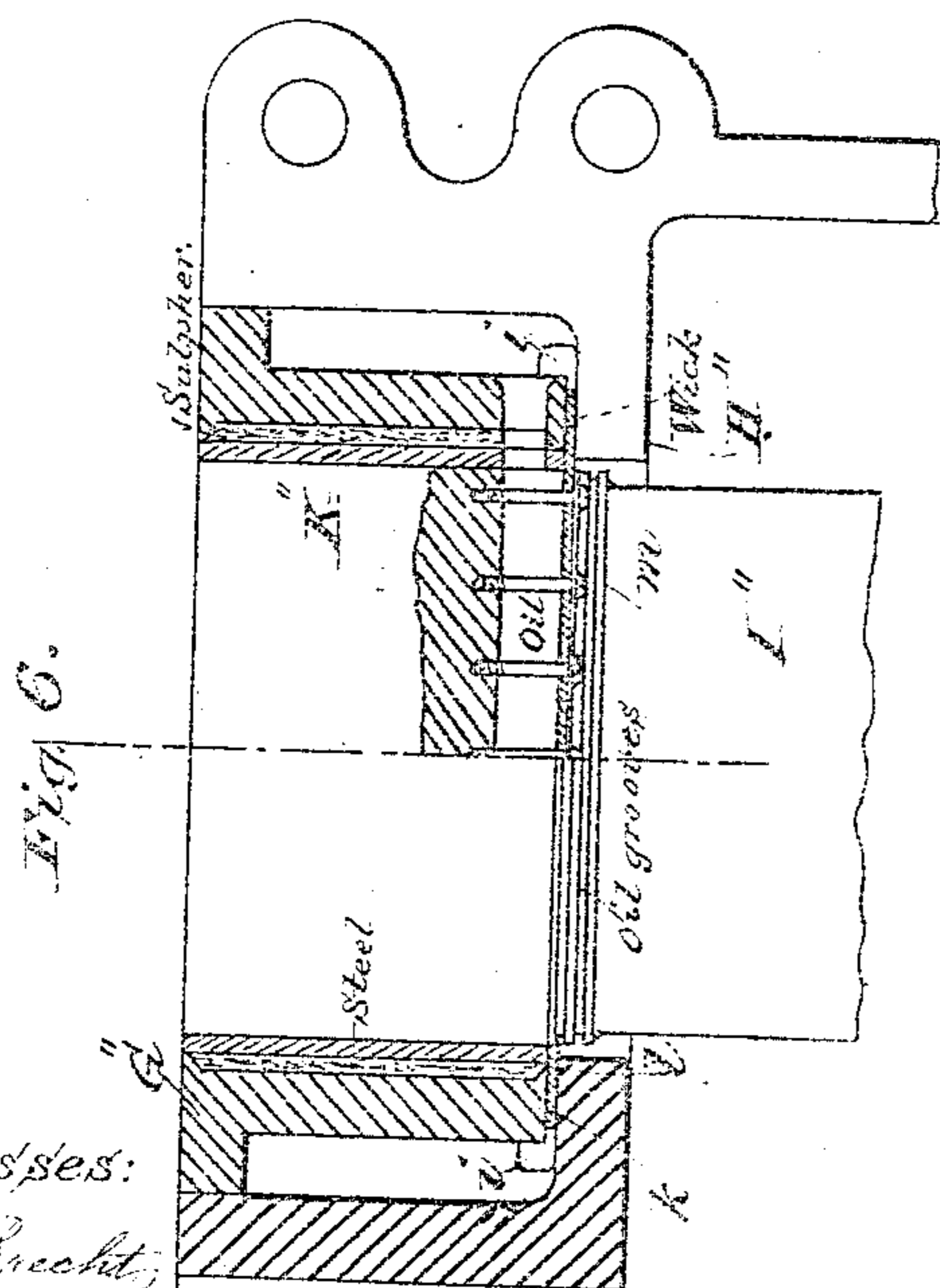
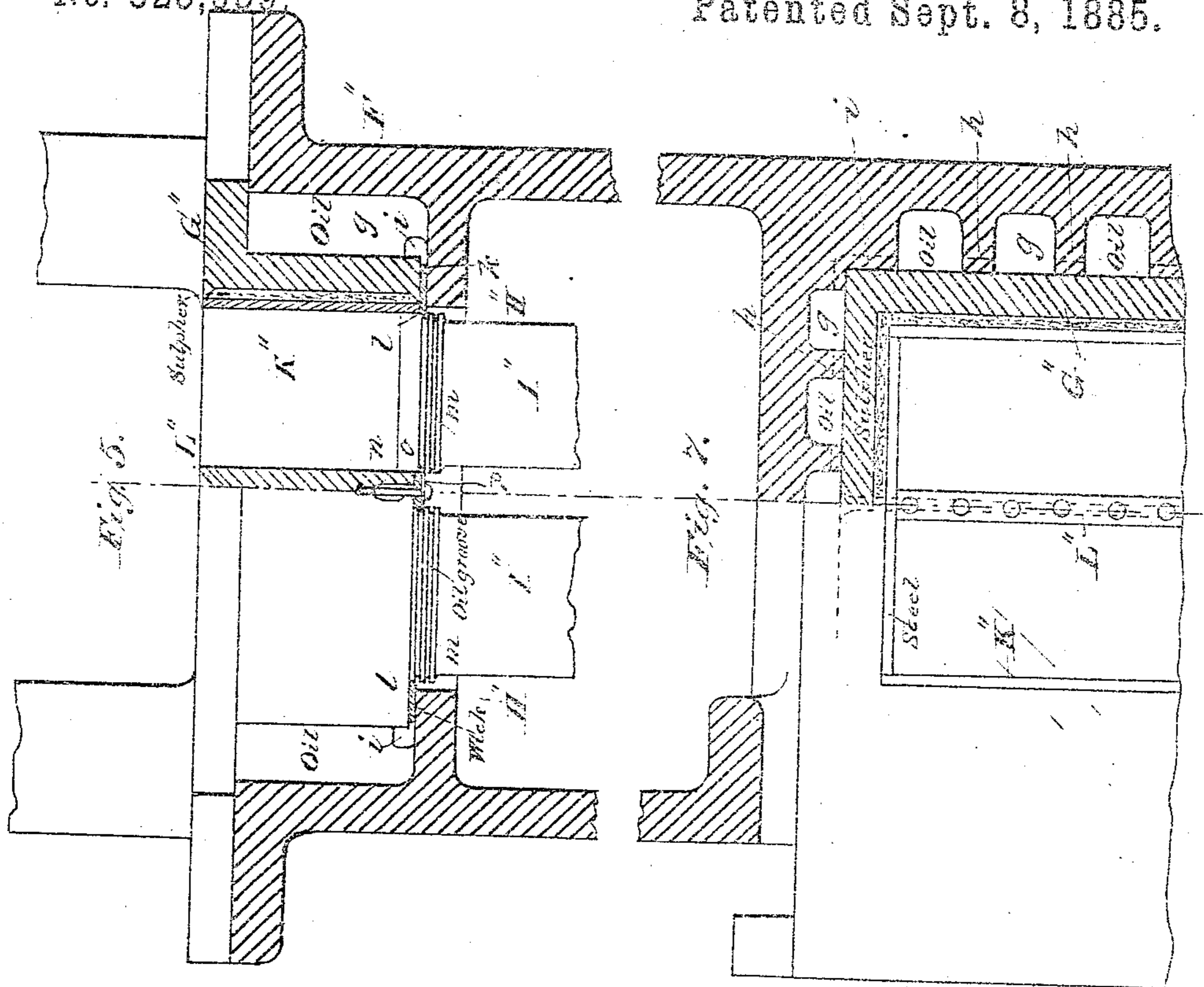
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BRICK MACHINE.

No. 325,939

Patented Sept. 8, 1885.



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UNITED STATES PATENT OFFICE.

LEWIS B. KENNEDY, OF ST. LOUIS, MISSOURI.

BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 325,939, dated September 8, 1885.

Application filed June 17, 1885. (No model.)

To all whom it may concern:

Be it known that I, LEWIS B. KENNEDY, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Brick-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in brick-machines.

The object of my invention is to provide a brick-machine in which the upper and lower plungers are operated by levers and toggles, said levers being manipulated from a piston driven by steam, air, or hydraulic pressure.

My invention consists in connecting the upper and lower plungers of a brick-machine to a piston-rod which is operated by steam, air, or hydraulic pressure to move the plungers toward each other simultaneously.

My invention consists, further, in pivoting in the upper and lower portions of the frame of the machine one or more angle-levers, and connecting the same to the plungers by means of toggle or knuckle joints, said levers being connected to and operated by the piston of a steam, air, or hydraulic engine.

My invention consists, further, in providing the shaft which operates the feed-box with cams for controlling the steam-ports, so that the operation of the parts is properly timed to fill the molds with clay, exert the proper pressure to form the brick, and eject the finished brick from the mold.

My invention consists, further, in securing hooks to the cross-head which carries the upper plungers and adapting said hooks to engage with lugs on the cross-head which carries the lower plungers, whereby the lower plungers are caused to move upward with the upper plungers and eject the brick from the mold.

My invention consists, further, in providing the walls of the molds with internal oil-receiving cavities which communicate with the sides of the plunger by strips of felt or other absorbent material, whereby the plunger and sides of the mold are oiled or lubricated by the upward and downward movement of the lower plunger.

Other novel and important features of my machine will be fully described hereinafter, and pointed out in the claims.

Referring to the drawings, Figure 1 is a vertical longitudinal sectional view of my machine. Fig. 2 is a rear view in end elevation with the plungers and toggle-levers omitted. Fig. 3 is a side elevation. Fig. 4 is a front view of the machine, with a portion of the frame in section to show the slots which carry the cross-rods. Figs. 5 and 6 are sectional views of my improved mold having hollow walls for the reception of a lubricant; and Fig. 7 is a top or plan view of the same partly in section.

My present invention is designed as improvements on the machines for which I have received Letters Patent Nos. 206,247, 230,611, 267,542, 280,316, and 295,019. In these machines the underlying principle or feature which has proved successful in the manufacture of the best brick from dry or comparatively dry clay is that the upper and lower plungers are operated simultaneously in opposite directions, to exert a uniform pressure on both sides of the clay within the mold, by two levers of the first order.

A indicates the sides or frame of the machine, which are secured to or mounted on a suitable base, B, and stayed or strengthened by suitable cross rods or bolts in a firm and substantial manner.

C is a cross rod or bar mounted in suitable bearings in the upper ends of the frame A, to which the angle or bell-crank levers D are pivoted or otherwise secured. E is a similar cross rod or bar mounted in the lower portion of the frame, and to which the angle or bell-crank levers F are secured. The ends of the cross-bars C and E are connected together by means of the stay or brace bars 2, thus relieving the sides or frame of the machine of pressure-strains from the plungers.

In the upper portion of the machine the short arms of the angle or bell-crank levers are connected together by a cross-bar, G, and to the upper plunger or series of plungers, H, by the links I, which form toggle or knuckle joints, the cross-bar G being connected to the cross-bar C by a series of links or bars, K. In the present instance in Fig. 4 I have shown a machine having four plungers and the toggle-levers arranged to operate the same; but it is obvious that a smaller number of plungers can be used and the number of toggle-lever connections reduced to correspond therewith with-

out departing from the spirit of my invention.

The long or forward ends of the toggle or bell-crank levers D are connected together in a substantial manner by the cross-bar L, said cross-bar being connected to the cross-head M of the piston N by means of the rods or links O, said cross-head being adapted to work in guideways in the sides of the machine, the outer or long ends of the angle or bell-crank levers F, which operate the lower plungers, being also connected to the cross-head M by means of the rods or links P.

The short arms of the angle-levers F are connected to the cross-bar Q by means of the links or sections R, the lower plungers, H', being disconnected from the cross-bar Q and arranged to rest thereon during the pressing operation, but capable of a further upward movement to eject the brick from the mold by the devices which will be described hereinafter.

The upper and lower plungers, H H', and cross-bar Q are adapted to travel in ways or guides S, formed in the sides of the frame, so that when the ends of the angle-levers are raised or lowered the toggles will be thrown out of or brought into a vertical line, thus raising or lowering the plungers. As a further guide to the plungers, and also as a means for raising the lower plunger to eject the brick from the mold, as will more fully hereinafter appear, the cross-rods T and U project through openings or slots a in the sides or frame of the machine.

V is a cylinder mounted vertically on the bed of the machine, in which the piston-head W is free to move back and forth when acted upon by steam, air, or water pressure in the usual manner, the piston-rod N being connected to the piston-head and to the cross-head M.

As before indicated, the angle or bell-crank levers are connected to the cross-head of the piston rod by means of the rods or links O and P, so that when the piston is forced to the top of the cylinder the angle-levers will stand in a horizontal plane, the toggle or knuckle joints will be in a true vertical plane and the pressure exerted to form the brick in the mold, as shown in Fig. 1. A reverse movement of the piston bends the knuckle-joints in reverse direction, and thus withdraws the plungers from pressing contact with the brick.

A' is a steam-chest located on the side of the cylinder V, provided with the usual slide-valve and ports for the passage of steam or other motive agent to the cylinder, and is supplied with steam from any suitable source through the pipe B'.

C' is a shaft mounted in suitable bearings in the frame A, and is provided with a wheel, D', cams E' and F', for operating the slide-valves which control the steam-ports of the cylinder, and also a wheel, G', having a cam-groove in its side, for imparting a forward and

backward movement to the feed-box, as will more fully appear.

I' is a shaft mounted in bearings in the upper ends of the bifurcated support or bracket, K', said bracket being pivoted in the bearings L', secured in the base of the machine.

M' is a pulley-wheel secured to the outer end of the shaft I', adapted to receive a belt which is driven from a band-pulley on the engine, or from any other suitable source of power.

N' is a friction-wheel, made of paper or paper-pulp, secured to the shaft I' and adapted to be thrown out and into engagement with the wheel D' by means of the hand-lever O', which is pivoted at its lower end to the sides of the machine and connected to the swinging arm or bracket K' by means of the rod P', so that by moving the lever O' back or forth the operating parts of the machine may be started or stopped, as occasion requires.

Q' is an arm secured to the lower end of the lever O', and at right angles thereto, to the outer end of which is adjustably secured the weight R', which tends to keep the friction-wheel N' at all times in contact with the wheel D', except when held out of engagement by the operator. As before intimated, the movements of the piston-head and other operating parts connected thereto are governed by the cams E' and F' on the shaft C'.

The slide-valves M'', which control the passage of steam from the steam-chest to the cylinder, are connected to the levers 3 4 by the rods 5, said levers 3 4 being pivoted to the bracket 6, secured to the steam-chest. The rear ends of the levers 3 4 project over into the path of the cam disks E' F', and are forced down by them ultimately, thus raising the valves to admit the steam to the bottom or top of the cylinder, as the case may be.

The lower ends of the valves M'' are provided with rods 7, which project through apertures in the lower side of the steam-chest, said rods being provided with a piston, 8, which is forced down by the pressure of the steam to close the ports when the levers are not in contact with or operated by the cams E' and F'. As a further safeguard and to insure the return of the slide-valves to close the ports, weights 9 are attached to the lower ends of the rods 7.

The slide-valve M'', for controlling the port leading to the upper side of the piston-head, is the only one I have shown in the drawings; but it will be understood that a similar slide-valve is used for controlling the port leading to the bottom of the piston-head or to the lower end of the cylinder.

Having described the parts which operate to press the brick into form, I will now describe the devices which eject the brick from the mold, and the devices which move the mold-filler back and forth to charge the molds with clay.

As heretofore stated, the lower plunger or plungers are disconnected from the cross-bar

Q, but arranged to rest thereon and be operated thereby during the pressing operation, a further upward movement being given the lower plungers to eject the brick from the mold, which is accomplished in the following manner:

S' S' are bars pivoted at their upper ends to the cross-bar T, the lower ends of the bars S' S' being formed into a hook and adapted to hook over or engage with the outer ends of the cross-bar U when the plungers have reached the point of greatest compression, and thus lock the upper and lower plungers together. As the outer ends of the angle or bell-crank levers D are depressed by the downward motion of the piston the upper plungers are raised, carrying with them the lower plungers and the newly-formed brick between them, and when the lower plungers have reached the top of the mold the hooked rods S' are disconnected from the bar U by the studs *b* coming in contact with the cam-plates T', secured to the frame of the machine. At this juncture, or when the hooks have been disengaged from the lower plungers, the cam U' is brought into engagement with the outer end of the lever V', said lever being pivoted to the frame of the machine at the point *c*, while the forward end of said lever is connected to the lower plungers. The action of the cam U' on the lever V' tends to hold the upper side of the lower plungers flush with the top of the molds until the feed-box has moved over to push the newly-formed bricks therefrom. The peculiar shape of the cam U' then permits the lower plungers to gradually settle until they rest on the cross-bar Q. In practice I may give such a configuration to the cam U' as to operate on the lever V' to wholly raise or assist in raising the lower plungers. On the downward movement of the upper plungers the hooked rods S' are guided forward by the spring or cam *d*, so as to again engage with the ends of the bar U.

W' is the clay-hopper or mold-filling box, adapted to slide back and forth in ways on the table A'', said table being extended to form a platform, B'', at the front of the machine, onto which the newly-formed bricks are pushed by the forward movement of the hopper.

C'' is a bell-crank lever pivoted to a stud or bracket, D'', in the side or frame of the machine. One end or arm of the bell-crank lever C'' is secured to the rear end of the feed-hopper by means of the rod E'', while the other end or arm of said lever is provided with a stud, on which is placed a friction-wheel, *e*, adapted to enter and engage with the cam-groove *f* in the side of the disk or wheel R', so that by the rotation of the shaft C' the feed box or hopper W' is moved over the mold cavities at the proper time to charge the molds with clay.

I will now describe the devices by which the molds are oiled or lubricated.

F'' is the main frame or body of the mold-seat, which is cast with cavities *g* and inter-

mediate ribs or strengthening-pieces, *h*, against and within which the mold proper, G'', is seated and secured in any suitable or convenient manner. The cavities *g* communicate at their lower ends by means of passages or ducts *i*, through which the oil passes from one cavity or chamber to another around the entire periphery of the mold G'', so that one filling-orifice is all that is required. The mold G'' is mounted in the frame F'' so as to leave a narrow space, *k*, between the bottom edge of the mold and the projecting ledge H'' of the frame F''. The space *k* being filled with felt, wicking, or other suitable material, which projects over into the path of the plunger I'', the oil or other lubricant is conducted by capillary attraction from the cavities *g*, by means of the felt or wicking *l*, and deposited on the sides of the plungers. The plungers are provided with peripheral cavities or grooves *m*, which may be filled with a packing of felt or wicking, which absorbs the oil conveyed to it from the oil-chambers through the felt strips *l*, and as the plunger is raised through the mold to eject the newly-formed brick therefrom the packing on the plunger deposits the lubricant over the inner face or lining of the mold.

K'' is the lining of the mold, which may be of steel or any other suitable metal, and is secured to the main body of the mold in any suitable manner.

For brick-machines having double, triple, or quadruple molds the division-walls L'' of the molds, as shown in Figs. 5 and 7, are provided with cavities *n*, which communicate with the oil-cavities *g* in the main frame.

The oil-cavities *g* are provided with small openings or ducts *o*, leading down to and through the lower edge of the division-walls L'', over which is placed a strip of felt, *p*, which conveys the oil to the inner side of the plungers, and thus all the four sides of the mold are lubricated when the plungers pass up and down through it.

The top of the plunger I'' may be lubricated also by having a brush or felt roller saturated with oil passed thereover after the brick has been removed therefrom, as is now the common practice.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A brick-machine in which the upper and lower plungers are moved toward each other simultaneously from a piston rod of a steam-cylinder, as set forth.

2. A brick-machine of the character described, the upper and lower plungers of which are connected to and operated by bell-crank and toggle levers attached to the cross-head of a piston, said piston being driven by steam or other suitable power, as set forth.

3. In a brick-machine, the angle or bell-crank levers D F, secured to cross-bars pivoted in the sides of the machine, said levers being connected or adapted to operate on the plungers by means of links or knuckle-joints

which yield or work in opposite directions, the angle-levers being secured to and operated upon by a vertically-moving piston, as set forth, whereby the plungers are simultaneously brought to bear on the clay within the mold, as set forth.

4. In a steam cylinder or engine for operating the upper and lower plungers of a brick-machine, a steam-chest connected to said cylinder, provided with valves for controlling the supply of steam to the cylinder, said valves being connected to levers which are operated by cams on an independently-driven shaft, as set forth.

5. In a brick-machine, the angle or bell-crank levers D F, for operating the upper and lower plungers, connected to the cross-head of a steam-actuated piston, the cylinder of which is provided with ports, said ports being opened for the passage of steam into the cylinder by means of slide-valves operated upon by cams secured to a continuously-rotating shaft, as set forth.

6. A brick-machine in which the upper and lower plungers are operated simultaneously from a steam-actuated piston, the slide-valves for controlling the supply of steam to the cylinder being raised by a system of levers and cams, as described, to open the ports, said ports being closed by the pressure of steam in the steam-chest when the levers are free from the action of the cams.

7. A device for operating the plungers of brick-machines, consisting of a steam-cylinder having the usual steam-ports, a steam-chest, and slide-valves operating in the same to control the passage of steam to each end of the cylinder, said slide-valves being connected at their upper ends to cam-actuated levers, as described, while the lower ends of the valves are provided with pistons or weights which return the valves to close the ports when the valve-levers are not operated upon by the cams, as set forth.

8. In devices for operating the plungers of brick-machines, the slide-valves M'', provided with the rods 7 and pistons 8, adapted to work in openings in the steam-chest, in combination with the rods 5, pivoted levers 3 4, and cams E' and F', mounted on the rotating shaft C', as set forth.

9. In a brick-machine, the hooked rods S', secured to the upper plungers and adapted to engage with lugs on the lower plungers, whereby the upper and lower plungers are locked together and raised by the action of the upper plungers until the brick has been ejected from the mold, as set forth.

10. The lower disconnected plungers adapted to rest on and be operated by the cross-bar Q, in combination with the hooked bars S', secured to the upper plungers, and the operating parts, substantially such as described, for operating the plungers, whereby the lower plungers are raised to eject the brick from

the mold by the same power which raises or withdraws the upper plungers, as described.

11. The hooked bars S', provided with the lug b, in combination with the cams T', whereby the hooks are disengaged from the lower plungers when the same have reached the top of the mold.

12. The hooked bars S', provided with the lugs b, in combination with the guides or springs d, whereby the hooked bars, in the downward movement of the upper plungers, are brought into engagement with the lugs on the lower plungers, as set forth.

13. The lever V', pivoted in the frame, as described, the forward end of which is secured to the lower plungers, in combination with the cam U' on the wheel D', adapted to operate on the rear end of the lever V' in the manner set forth, whereby the lower plungers are held up after the bars S' have been unhooked and said plungers gradually lowered into proper position in the mold.

14. The swinging bracket K', in which the shaft I' is mounted and driven by the band-pulley M', in combination with the friction paper-wheel N', lever O', and connecting-bar P, whereby the friction-wheel N' is thrown into or out of engagement with the wheel D' to start or stop the machine, as set forth.

15. The lever O', connected to the swinging bracket or support K', in combination with the arm Q', and adjustable weight R, whereby the friction-wheel N' is held in contact with the wheel D', as set forth.

16. The shaft C', provided with the cams E' and F', for controlling the slide-valves of the cylinder, in combination with the cam-disk G', bell-crank lever C', and feed-hopper W', whereby the plungers and feed-hopper are worked alternately from the same shaft, as set forth.

17. In a brick-machine of the character described, the cross-bars C and E, mounted in bearings in the sides of the machine, in combination with the connecting-rods 2 2, whereby the sides of the machine are relieved of the end pressure of the plungers, as set forth.

18. In a brick-machine, the mold-carrying frame F'', provided with the communicating cavities g, in combination with the mold G'', felt strips l, and plungers I'', as set forth.

19. A brick-machine having two or more mold-cavities, the division-plates of which are made hollow and communicate with the cavities in the main frame, said division-plates being perforated on their lower edge, and provided with strips of felt, as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

LEWIS B. KENNEDY.

Witnesses:

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WM. F. NIEDRINGHAUS.