

No. 771,375.

PATENTED OCT. 4, 1904.

G. F. LEIGHTON.
SHAFT CLUTCH FOR PUNCHING MACHINES.

APPLICATION FILED NOV. 2, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

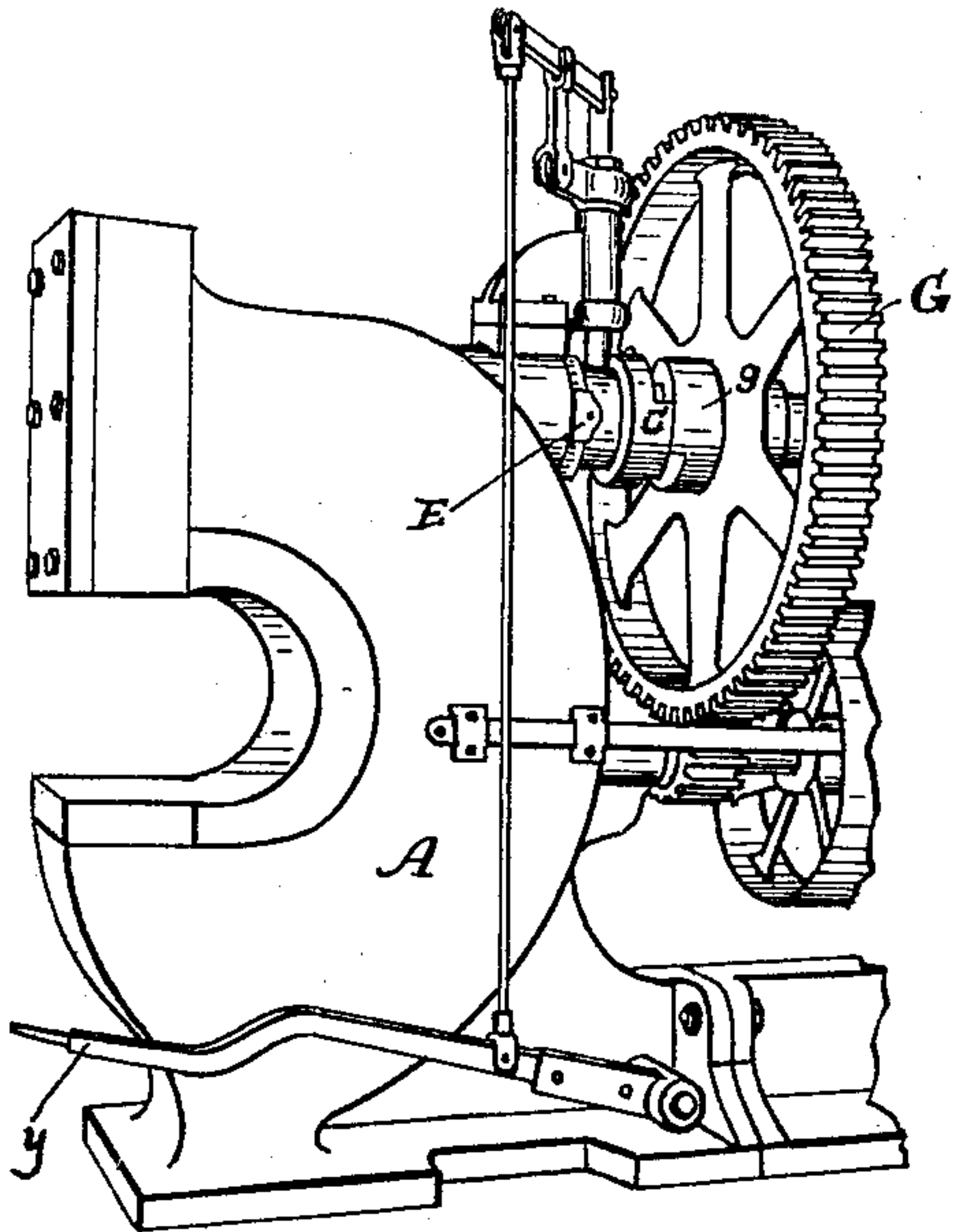


Fig. 2.

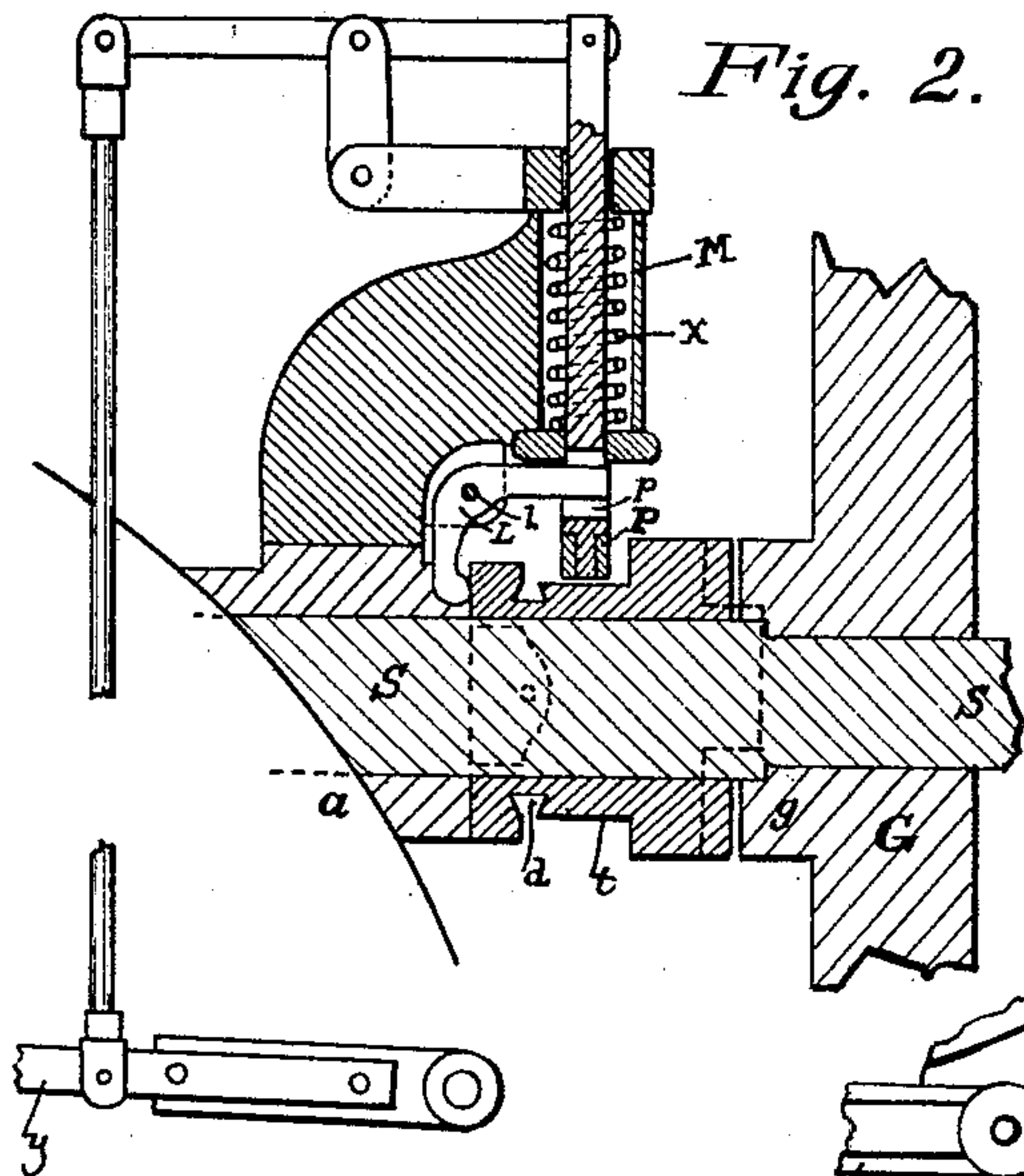
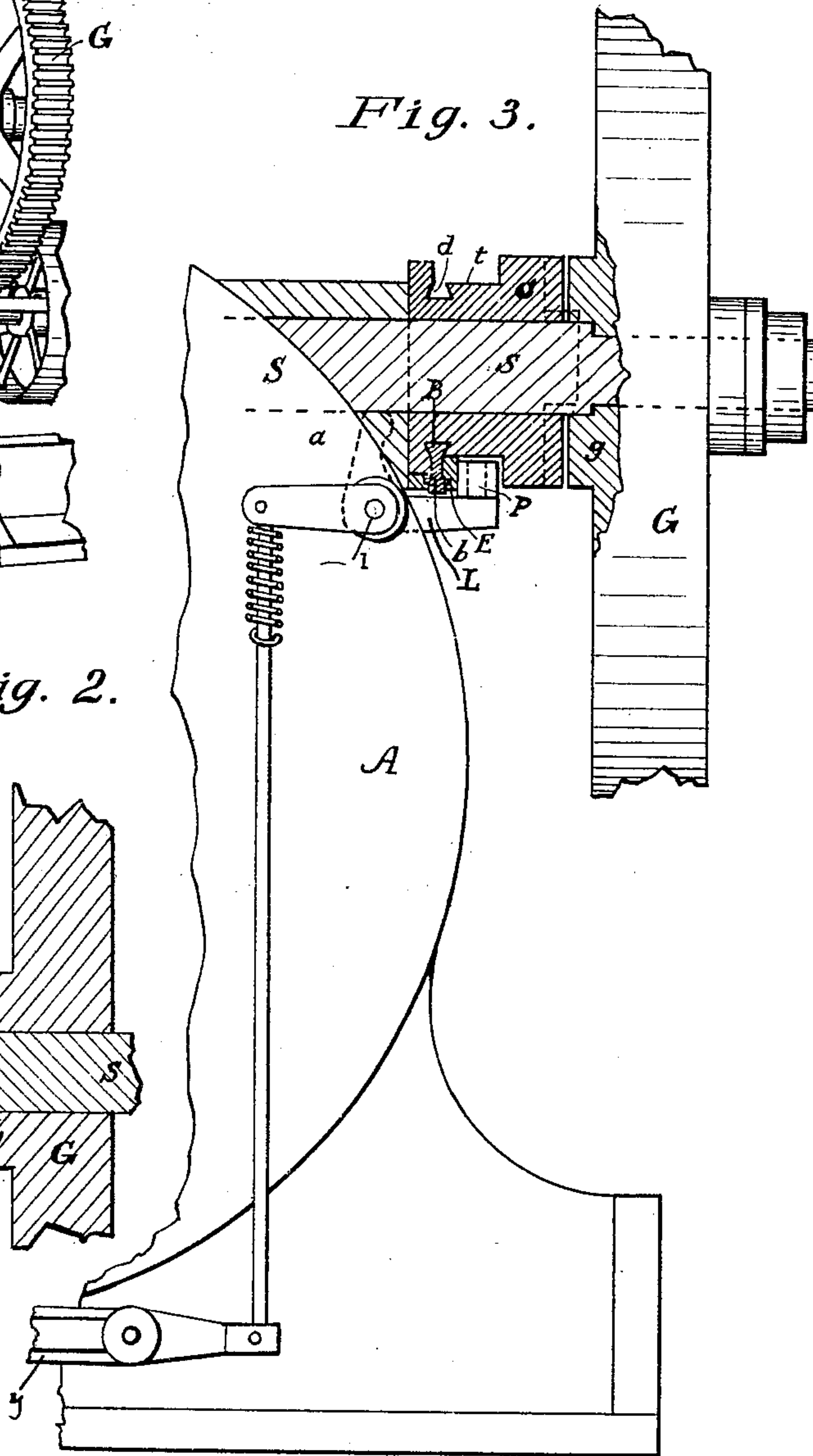


Fig. 3.



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Witnesses

Chas. Robert Jones
Joseph R. Gardner

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2 SHEETS—SHEET 2.

Fig. 4.

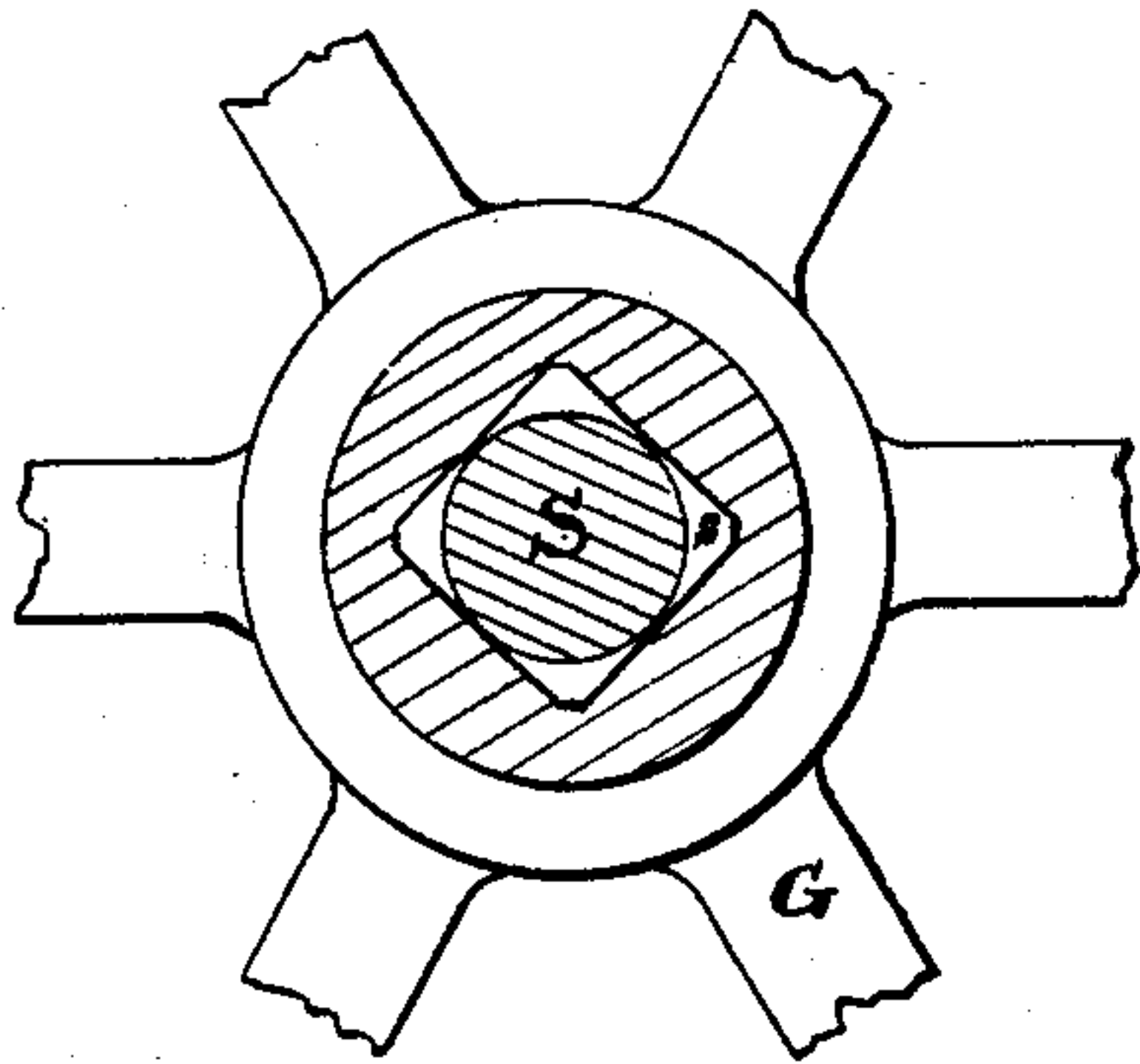


Fig. 6.

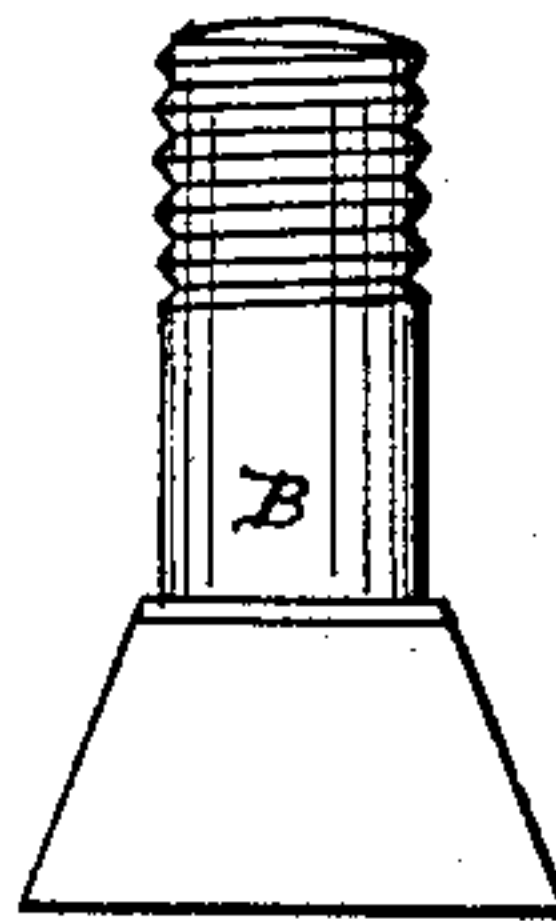


Fig. 7.

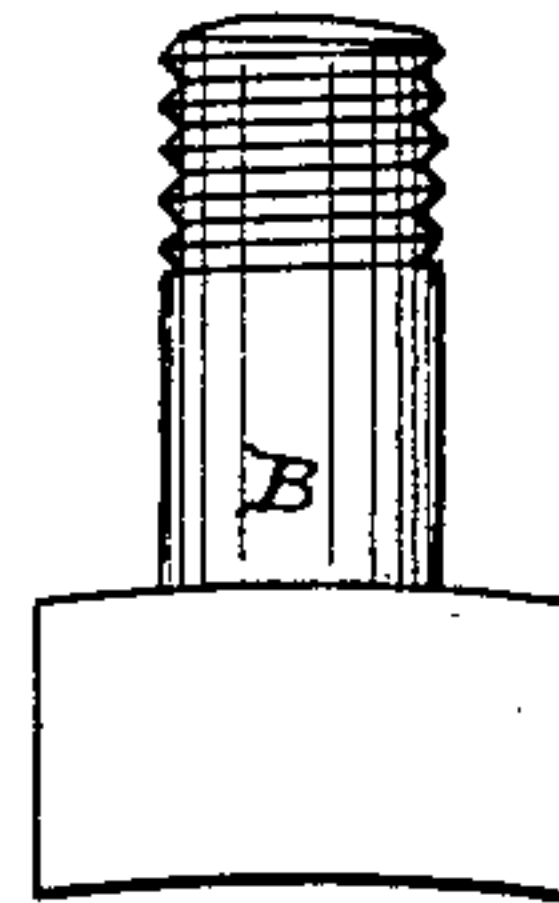


Fig. 8.

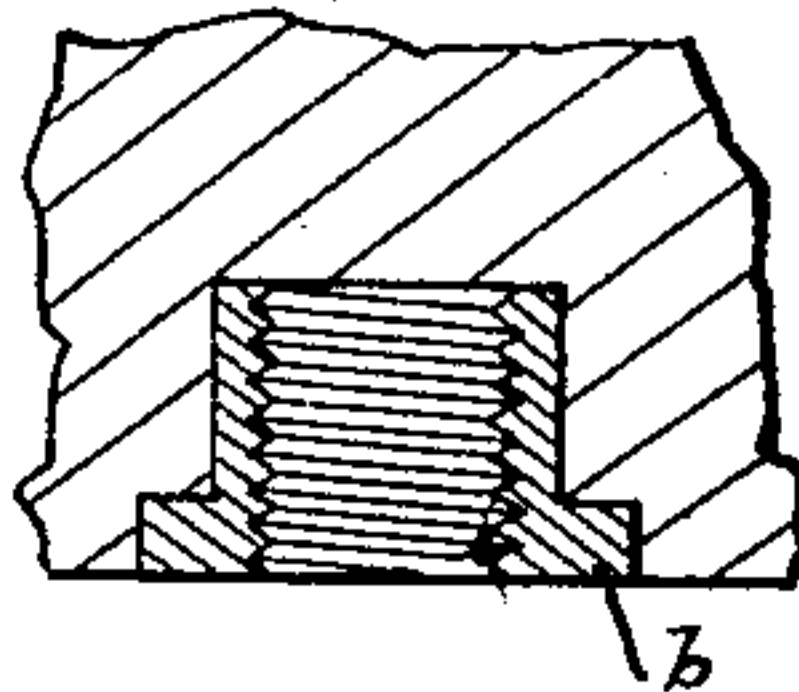


Fig. 9.

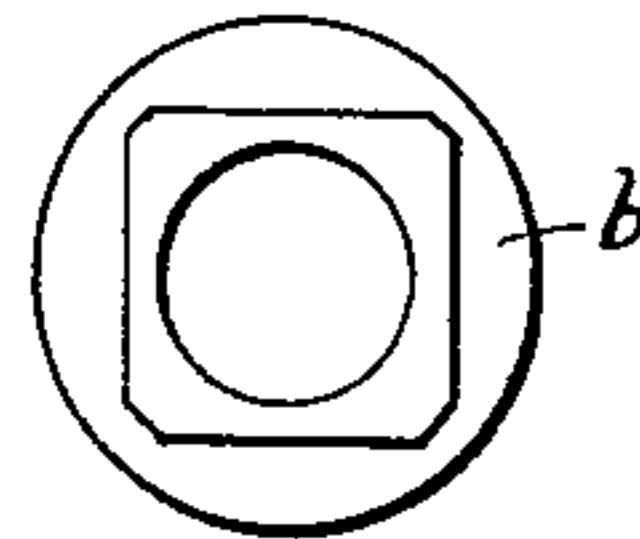
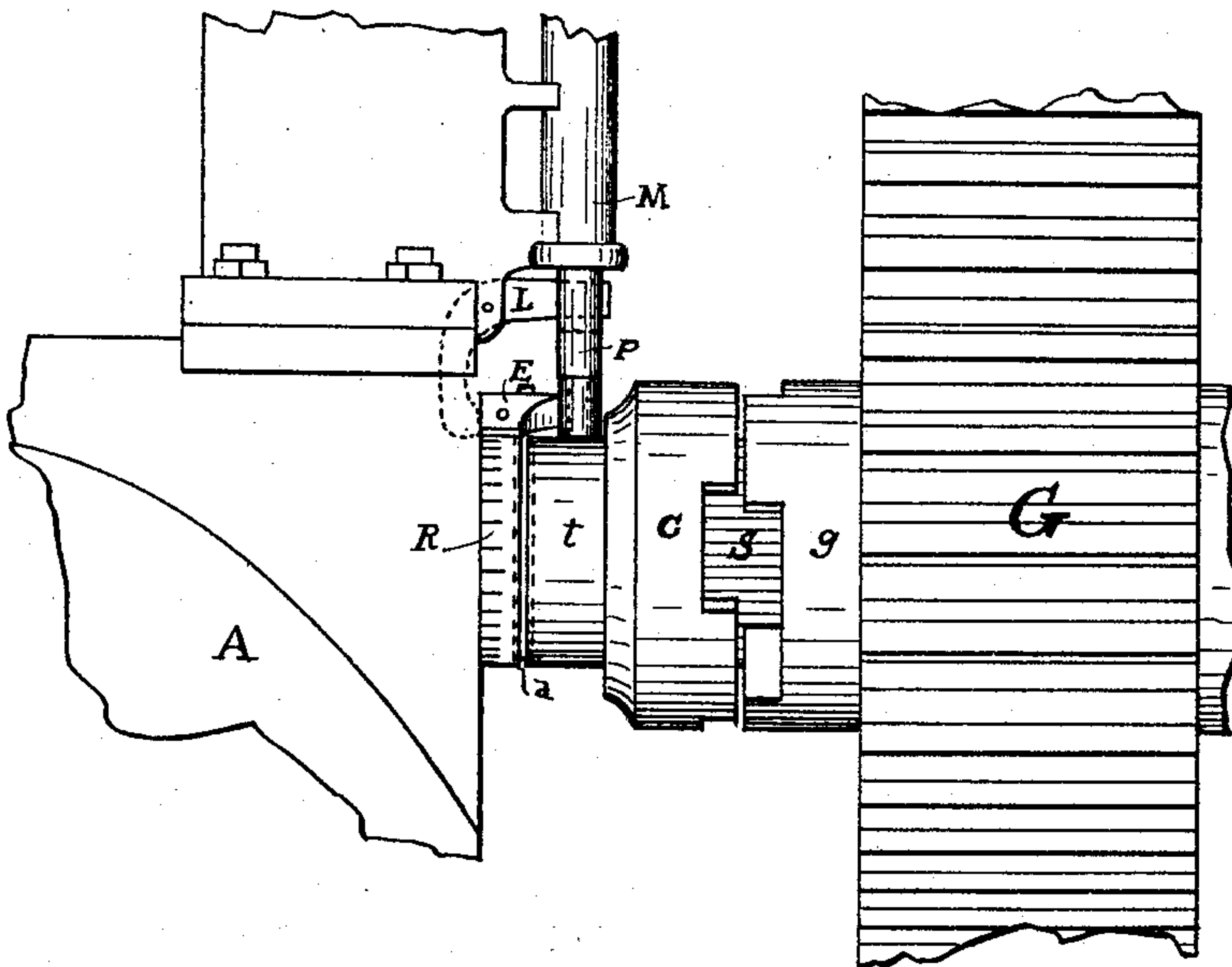


Fig. 5.



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UNITED STATES PATENT OFFICE.

GEORGE F. LEIGHTON, OF CINCINNATI, OHIO, ASSIGNOR TO THE CINCINNATI PUNCH & SHEAR COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

SHAFT-CLUTCH FOR PUNCHING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 771,375, dated October 4, 1904.

Application filed November 2, 1903. Serial No. 179,451. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. LEIGHTON, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented new and useful Improvements in Shaft-Clutches for Punching-Machines, of which the following is a specification.

My invention relates to that class of machine-tools—such as punches, shears, and the like—whose work is performed intermittently; and its object is to provide means whereby the great strain which is thrown suddenly upon certain operative parts may be borne without harm to the mechanism and at the same time increase instead of diminish its positive action and easy manipulation, for upon strength, ease, and precision of operation the value of this class of devices depends.

Heretofore much difficulty has been experienced in gaging the stroke of such machines, their setting being of necessity mostly a matter of "guesswork" and the experience and judgment of the operator being the only available criterion. Then as parts became worn, sprung, or displaced by the violent wrenching incident to the operation of the machine even this approximate setting became unreliable, if, indeed, the machine did not cease to be operative at all. These uncertainties and this weakness my improvements avoid, making it possible to stop positively and accurately at any point of stroke, as for center punch-mark in operating power-punches. The mechanism is simple, less expensive to make than the older device, and effects a great saving as to the repairs necessary.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a power-punch, showing that part of a power-punch upon which are placed my improvements and the contiguous portions of the frame of machine with other parts broken away. Fig. 2 is a view showing in vertical section parts which show adjustment and transmission of power to illustrate construction. Fig. 3 is a lateral section of movable cam and bearing to show construction and method of assembling and

also alternative arrangement and construction of contiguous operative parts with parts of frame broken away. Fig. 4 is a cross-section of shaft and clutch to show construction. Fig. 5 is a detail elevation of clutch-shaft, cam, plunger, &c., on an enlarged scale. Figs. 6 and 7 show bolt that is fitted into cam and serves to hold the same in position in grooved track. Figs. 8 and 9 show countersunk nut used on cam-bolt.

Referring now to the drawings in aid of the following description, A designates the main casting or frame of the punch or other machine on which my device is used, and a designates the housing.

S designates the main shaft connected with the driven gear G, and s represents that portion of the shaft which is of a square shape, so formed as the strongest possible form of connection with a clutch to transmit power. The sharp corners are cut off the squared shaft, making it an irregular octagonal shape, thus admitting of a less bulky construction without materially affecting the effectiveness and strength of the bearing.

The letter g designates that portion of the clutch which is cast onto the gear G and forms an integral part thereof. C is the movable portion of clutch which slides back and forth on the part s, while t designates the circumferential plunger-track on the part C, and d the circumferential slot in which the head of the cam-bolt B is fitted and which bolt serves to hold the cam E in place, and b is the cam-bolt nut, which may be partly or wholly countersunk in the cam E.

Around and in the track t is designed to travel when depressed the plunger P, which then engages the cam E. Around the inclosed portion of the plunger P within the piston M is coiled the spring x, which normally holds the plunger P depressed and in engaging relation with the cam E. There is a slot p in the plunger P, toward the lower end thereof and below the piston M, into which slot extends one arm of the right-angle lever L, which is pivoted at l, so that when the plunger P is elevated by depressing the foot-lever y the portion of said lever L operating

within the slot *p* is forced upward by contact with the part of the plunger *P* forming the lower end of said slot *p*, and thus pressing the other finger of said lever *L* against the clutch *C*, throwing it into engaging relations with the other half of the clutch, (designated as *g*.)

Fig. 3 shows a construction of the lever and plunger which does away with the piston and attendant mechanism and combines in the lever *L* the usual function of said lever—viz., throwing the clutch into mesh—and the function of a separate plunger by throwing the clutch out of mesh when the plunger makes contact with cam *E* as attached to clutch *C*.

In either form of construction the cam is in such a position when the clutch is in mesh and the plunger depressed that the cam lies in the path of the plunger toward one side as the clutch revolves, and the pressure of the plunger against the cam serves to throw the part of the clutch designated as *C* away from and out of engaging relations with the part of the clutch designated as *g*. The cam is held in place by the beveled head of the bolt *B*, which is nicely fitted into the correspondingly circumferentially beveled slot *d*, a straight opening being cut in at one point in the part *C* next the slot *d* to admit said bolt-head. The bolt *B* is passed through the cam *E* and the nut *b* screwed onto the threaded end of said bolt. Before the nut is tightened down the cam is slid around into the desired position and the nut then tightened down to hold it there.

A scale *R* may be described on or attached to the circumference of the part *C*, at the end of which the cam is fitted and a mark placed on the adjacent portion of the cam, so that a setting may be made without trial or calculation.

Formerly in this class of machines the clutches were splined to the shaft, and the great wrenching strain soon sprung such splines enough to make the parts bind, so that the machine was incapable of operation at all until repaired. My use of the squared shaft and clutch instead of the splines has made accurate settings and the use of a scale or gage possible. On the drawings the scale is designated by the letter *R*.

In all cases as my improvements are here shown the machine runs free normally, the clutch being kept out of mesh by the plunger and operating when and so long as the foot-lever lifts the plunger out of the track *t* and immediately thereafter causes the finger of the bent lever *L* to press against the free member of the clutch, causing it to mesh with the other member of the clutch, which is attached to the driven gear.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. In a machine of the character described the combination of a shaft made angular in cross-section, a clutch member on said shaft,

a clutch member slidable on the shaft and opposing the first-named member, an annular track formed on said loose member, a cam fitted to said loose member and adapted to project into said track, and means attached to the frame of the machine for throwing the clutch into and out of mesh at will, said means including a part which is movable into and out of said track, a lever fulcrumed between its ends and having one end engaging said movable part and the opposite end to engage the loose member of the clutch, and means for operating the lever to withdraw the track member from the range of action of the cam and simultaneously move the sliding clutch member into engagement with its companion member.

2. The combination with a shaft and a clutch member thereon, of a companion clutch member slidable on the shaft and provided with an annular trackway, a cam adjustably secured to said loose member and projecting into said trackway, and means for operating the loose member said means including a bell-crank lever having one arm to engage said loose member, and a reciprocating member adapted to engage said trackway and movable into and out of the range of action of the cam, said reciprocating member and said lever being so connected that when the trackway is engaged by the member the cam holds the two parts of the clutch out of engagement, and means for removing the reciprocating member from the trackway and the range of action of the cam and coordinately rocking the lever to cause the loose member of the clutch to engage its companion member.

3. In a machine of the character described the combination of a shaft, a driven gear or pulley having one member of a clutch attached thereto, a slidable clutch member said shaft squared upon the portion over which said movable member operates, and said slidable clutch member provided with an annular track, a cam fixed to the slidable member and adjustable relative to said track, a reciprocating spring-pressed plunger movable into and out of the trackway and the range of action of the cam, a bell-crank lever having one end engaged by the plunger and the other end engaging the slidable clutch member, and a treadle mechanism for actuating the plunger in one direction whereby the plunger is removed from the cam and the slidable clutch is moved into engagement with its companion, and a spring for returning the plunger into the range of action of the cam to disengage the clutch members.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE F. LEIGHTON.

Witnesses:

JOSEPH R. GARDNER,
FRED G. MOHR.