

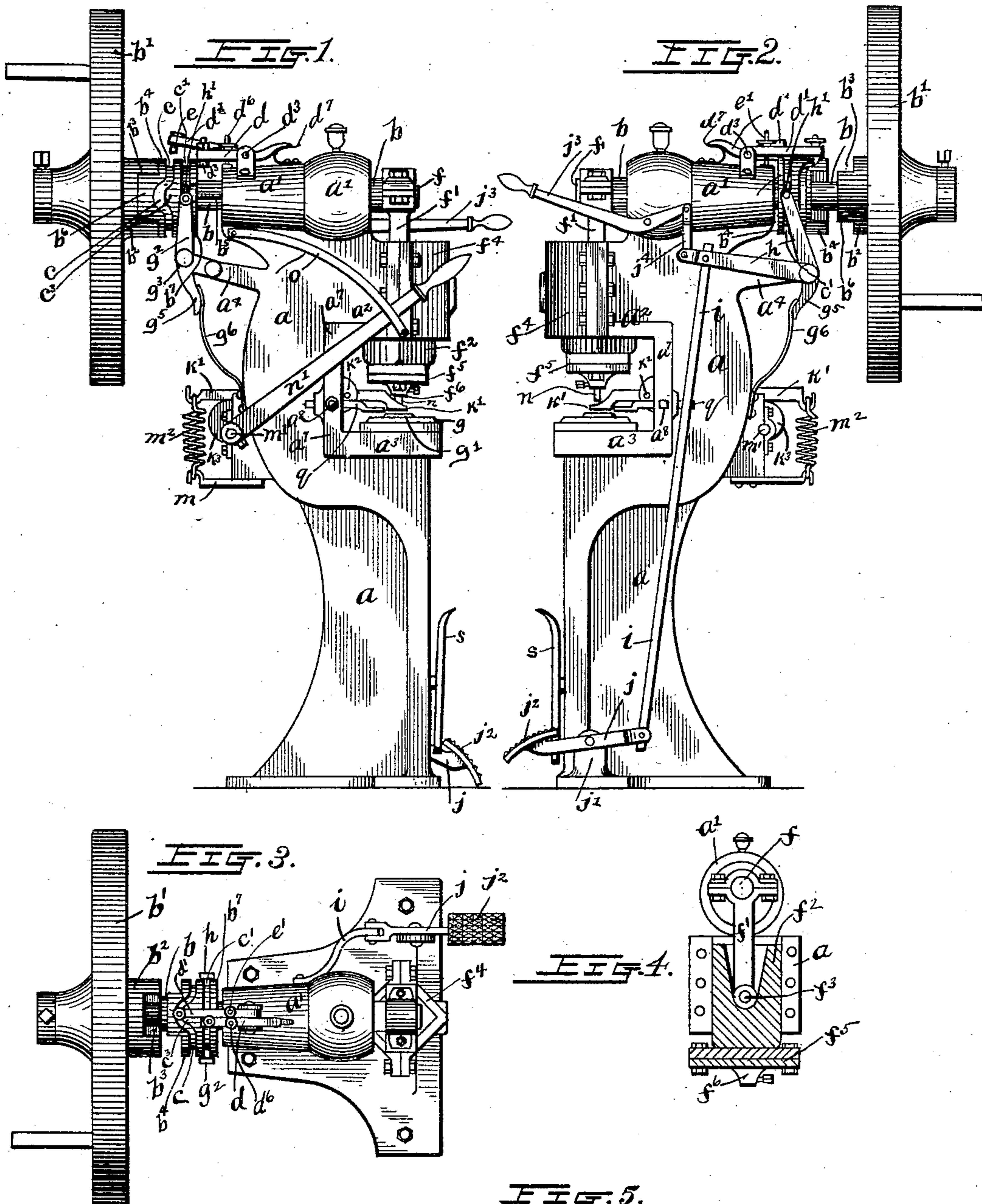
(No Model.)

2 Sheets—Sheet 1.

G. J. SAURBREY.
PUNCHING AND SHEARING MACHINE.

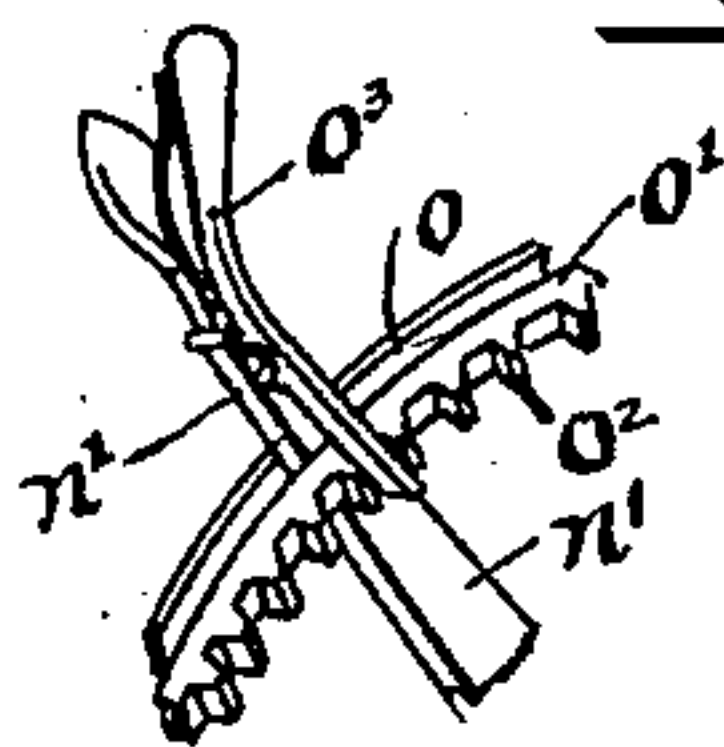
No. 453,363.

Patented June 2, 1891.



WITNESSES:

J. M. Gravel.
C. E. Bragg.



INVENTOR
George J. Saurbrey
BY
Staley and Shepherd
ATTORNEYS

(No Model.)

2 Sheets—Sheet 2.

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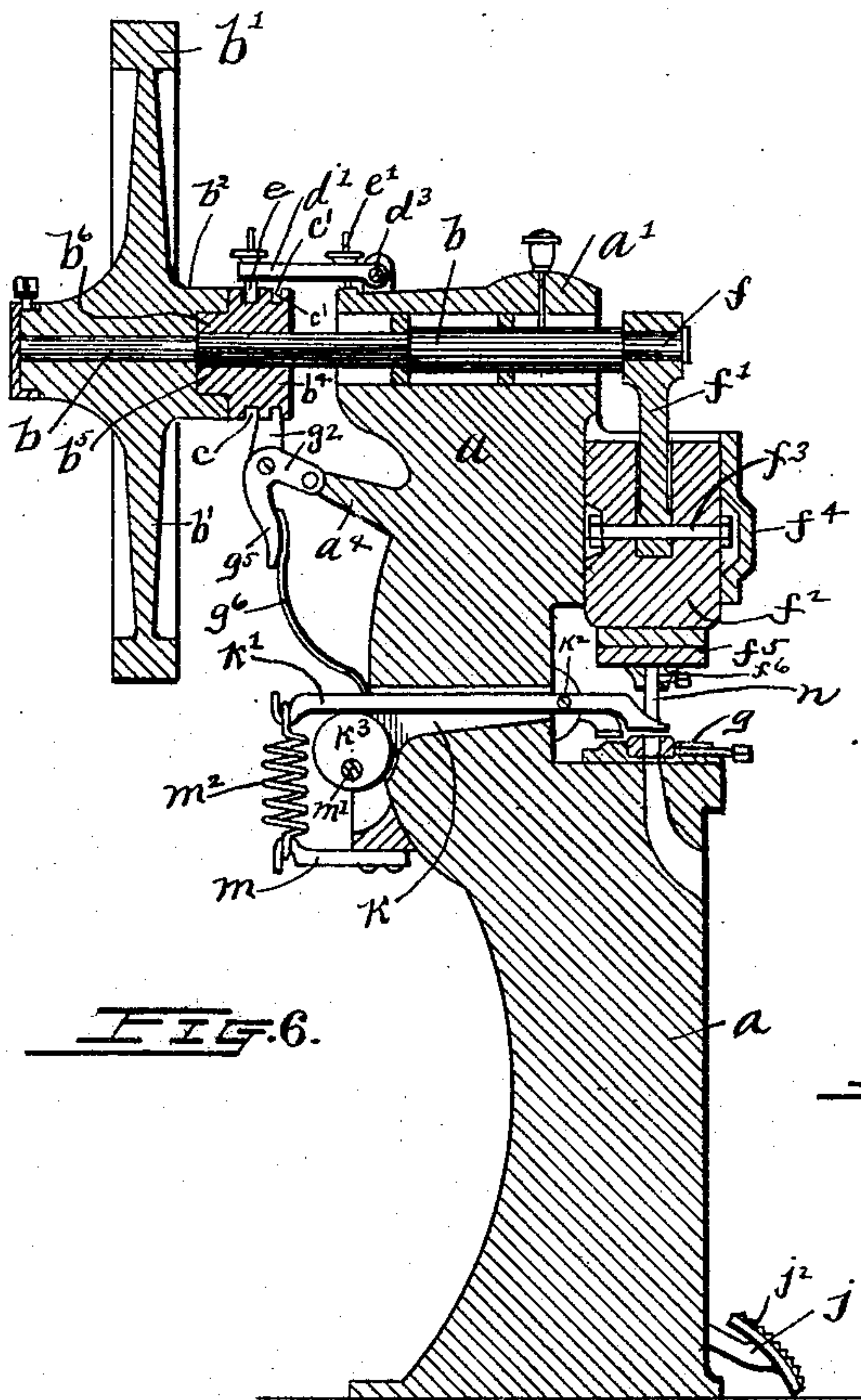


FIG. 6.

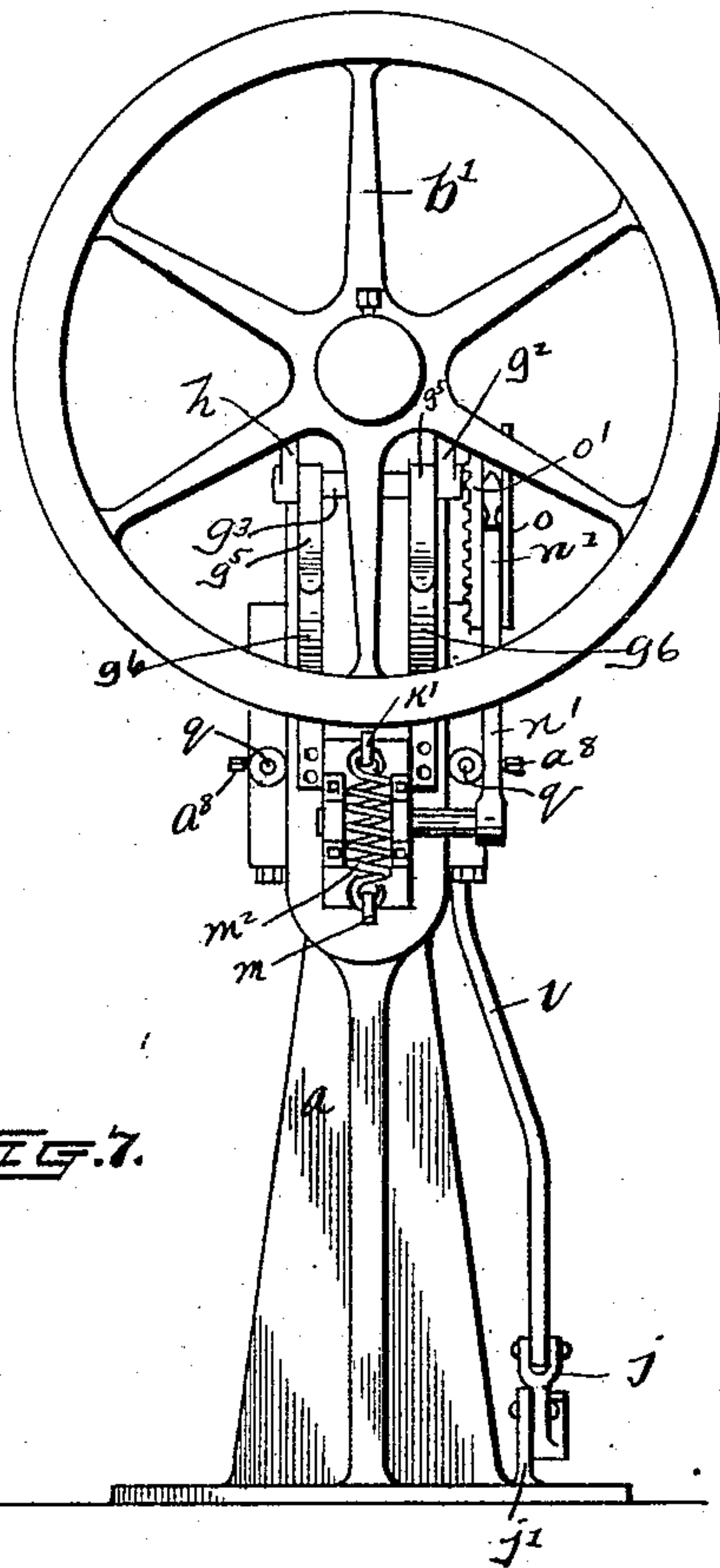


FIG. 7.

FIG. 8.

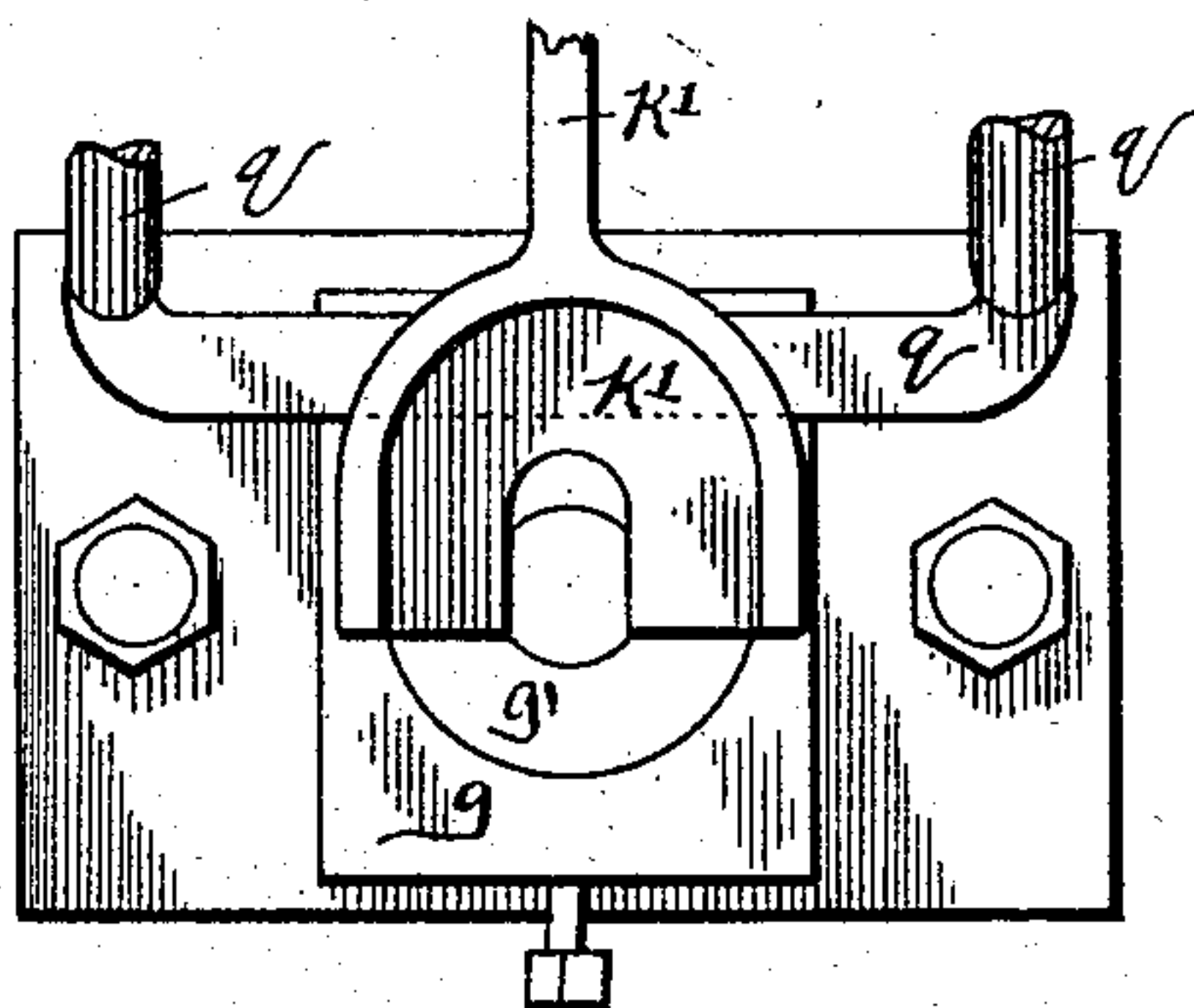


FIG. 9.

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UNITED STATES PATENT OFFICE.

GEORGE J. SAURBREY, OF COLUMBUS, OHIO.

PUNCHING AND SHEARING MACHINE.

SPECIFICATION forming part of Letters Patent No. 453,363, dated June 2, 1891.

Application filed September 11, 1890. Serial No. 364,698. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. SAURBREY, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Punching Presses and Shears, of which the following is a specification.

My invention relates to hand-power punching-presses; and the objects of my invention are to provide an improved form of punching and shearing press which may be operated by hand through the rotation of a fly-wheel; to provide improved mechanism for engaging the fly-wheel and operating-shaft and disconnecting the same at each revolution of the fly-wheel; to insure the disengagement of the shaft and fly-wheel when the cross-head is at its highest point in its bearings; to provide such construction as will admit of the machine being thrown into gear by hand or foot power; to provide an improved work-holding device and superior means for operating the same; to construct said punching-machine in a substantial and neat form, and to produce other improvements, which will be more fully hereinafter set forth. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved punching-press, showing the position of the parts when the same is running. Fig. 2 is a similar view of the opposite side of the press from that shown in Fig. 1, showing the position of the clutch and other parts when the machine is at rest. Fig. 3 is a plan view of the head or upper portion of the machine, omitting for the sake of clearness some of the parts which appear below the head. Fig. 4 is a sectional view of the cross-head, showing the outer half of the cross-head boxing removed. Fig. 5 is a detail view in perspective of the upper portion of the lever which operates the work-holding device and showing the means of locking said lever at the desired angle. Fig. 6 is a central vertical longitudinal section of the machine. Fig. 7 is a rear view of the same. Fig. 8 is a plan view in detail of the die-bed and work-holding arm. Fig. 9 is a transverse section of the operating-shaft, taken between the sliding clutch and the frame.

Similar letters refer to similar parts throughout the several views.

a represents the upright frame or body of my machine, which has formed on its upper side a horizontal cylindrical shaft-bearing box *a'*. The forward side of the frame *a* is provided, as shown, in its upper half with a transverse recess or mouth, above which is thus produced a short forwardly-extending jaw *a*² and below which is provided a die-block seat or lower jaw *a*³.

Journaled within the frame-boxing *a'* is the forward portion of a horizontal shaft *b*. Upon the rear extremity of this shaft is loosely mounted a fly-wheel *b'*, said fly-wheel having formed in its hub a forwardly-projecting clutch-head *b*², which is provided on opposite sides with clutch-notches *b*³.

Loosely mounted on the shaft *b* is a sliding clutch *b*⁴, the latter being supported between the clutch-head *b*³ and the rear end of the boxing *a'*, and being prevented from turning on the shaft by a horizontal key *b*⁵. This sliding clutch has projecting rearwardly therefrom oppositely-located tongues *b*⁶, which are of such form as to enter and fit loosely within the clutch-head notches *b*³. As shown in the drawings, the sliding clutch has sufficient play on the shaft to admit of it being drawn backward such distance as to completely disconnect its tongues *b*⁶ from the clutch-head.

Formed in the clutch *b* and encircling the same are two peripheral grooves or guideways *c c'*. The rear or outer guideway *c* at a point opposite one of the clutch-tongues *b*⁶ describes an outward bend, thus producing at this point a greater thickness between the grooves *c* and *c'* and resulting in the formation on the clutch of a cam-shaped projection *c*³. The forward groove or guideway *c'* describes a circle about the clutch near the forward end thereof. The circumferential flange or rim *b*⁷ thus formed on the clutch between the groove *c'* and the forward end thereof is provided, as shown in Fig. 9 of the drawings, with a notch *b*⁸.

Journaled between the upright lugs projecting from the upper side of the shaft or frame-head *a'* are two parallel clutch-holding arms *d d'*. These arms are pivoted or journaled, as shown, on a transverse pin *d*³, the arm *d* being supported thereon at about the center of its length, and having its rearward-

ly-extending end portion provided with a vertical pin b^4 , which carries on its lower end, beneath said arm d , a small friction-roller, being adapted to bear, as hereinafter more fully explained, against the forward rim of the sliding clutch. A set-screw d^6 passes through the arm d in rear of its pivot-point and bears on the boxing a' . The forward end of the arm d is normally pressed downward by a spring-strip d^7 , which bears, as shown, beneath the rear projecting end of said arm and the upper side of the frame-head a' . The arm d' extends beyond the termination of the arm d , and is provided, as described for said arm d , with a downwardly-projecting friction-roller e , which may be made to extend within the clutch-groove c . This arm d' is also provided with a set-screw e' , which passes vertically therethrough and comes in contact with the frame-head. The forwardly-projecting end of the operating-shaft b has extending therefrom out of center a short eccentric-pin f . Suitably journaled on this eccentric-pin is the upper end of a downwardly-extending drive-arm f' . This drive-arm loosely enters an approximately-V-shaped socket or recess formed in a vertical cross-head f^2 , within which the lower end of said drive-arm is pivotally held by a transverse pin f^3 . The body of the cross-head is movably supported in a vertical bearing-box, one half of which is formed in the forward side of the frame-jaw a^2 and the outer half of which is formed by a half-boxing plate f^4 , the projecting flanges of which are bolted to corresponding flanges on said frame-jaw. The lower end of the cross-head is provided with a suitable tool-holding plate f^5 , with a socketed tool-holding lug f^6 depending centrally therefrom. As shown in the drawings, the cross-head and its boxing are approximately square in cross-section, thus providing the cross-head with angular bearing-surfaces.

The lower jaw or die-bed a^3 is provided with a suitable die-holding plate g , said plate having a central seat or depression for the reception of a die-block g' .

Projecting rearwardly from the upper portion of the frame a is a lug or shoulder a^4 . One end of the lug a^4 is pivoted to the lower and forward end of a bell-crank lever g^2 . This lever g^2 has formed therewith at its angle or junction of its arms a transverse rod g^3 , which, extending beneath the clutch, is journaled in the opposite end of the lug a^4 and has its extremity connected or formed with the angle of a bell-crank h , as prescribed for the bell-crank g^2 .

Each of the bell-cranks have their upper arms terminating at a point opposite the center of the height of the shaft b and supports at its upper end and inner side a small idler or friction-block h' , which bears against the periphery of the sliding clutch and within the groove c' .

Each of the bell-cranks $g^2 h$ has depending from the junction of its arms and formed

therewith a downwardly-extending finger g^5 . Against the forward side of these fingers press the upper ends of spring-strips g^6 , which extend downwardly and forwardly and have their lower portions bolted or otherwise secured to the rear side of the main frame a . The lower arm of the bell-crank h is longer than the corresponding arm of the bell-crank g^2 , and has pivotally connected with its outer end portion the upper end of a rearwardly-extending pitman-rod i . The lower end of this pitman is pivotally connected with the rear end of a treadle-arm j . This treadle-arm is pivoted at about the center of its length to a lug j' , which projects upwardly from the frame-base near the forward side thereof, and has on its forwardly-projecting end a suitable foot-plate j^3 .

j^3 represents a lever, which is pivoted at a point in its rear half to the outer side of the frame-head, and which is jointedly connected in rear of its pivot-point with the forward end of the lower arm of the bell-crank h by a link or short rod j^4 .

Formed through the frame a of the machine and leading to the punching-mouth thereof is a mortise k , through which passes loosely, as shown, a work-holding arm k' , the latter extending within the frame-mouth to a point slightly past and beneath the center of the cross-head and being pivoted, as shown, to said frame or a lug projecting therefrom, as shown at k^2 . The rear and projecting portion of the arm k' bears upon the upper side of a cam or eccentric wheel k^3 , which is supported on a short transverse shaft, the ends of which are journaled in suitable boxings supported from the rear side of the frame. The rear extremity of the arm k' is connected with a lower outwardly-projecting frame-arm m by a vertical coiled spring m^2 , the tension of which serves to hold the rear portion of the work-holding arm in contact with the eccentric k^3 . That portion of the work-holding arm immediately beneath the cross-head is, as shown in detail in Fig. 8 of the drawings, bifurcated or slotted at the center of its width to allow the tool n to pass therethrough into the die-block g' .

The eccentric k^3 is operated by hand-lever n' , which has its rear and lower end rigidly connected with the shaft m' and extending upwardly and forwardly passes between the two curved and parallel arms of the stop-bracket o . The two curved arms which form said stop-brackets have their ends secured to and supported from the side of the main frame, the inner arm o' thereof having formed on its inner side at regular intervals teeth o^2 , as shown in detail in Fig. 5 of the drawings. The upper portion of the lever-handle n' above said bracket has hinged thereto the upper portion of an ordinary spring-actuated lever-pawl o^3 , the lower end of which is normally supported between two of the teeth o^2 .

g represents a horizontal U-shaped gage-rod, the ends of which pass through and are

adjustably held within the vertical side flanges a^7 of the frame-mouth by means of two set-screws a^8 . The forward portion of this gage rod or bar extends in over the die-bed or lower jaw of the frame and is adapted to be brought into contact with the rear edge of the material to be punched.

s represents a treadle latch-bar, which, being pivoted at about the center of its length to the forward side of the frame a at a point above the treadle-bar, is of such length as to admit of its lower outwardly-curved end being forced over the upper side of the treadle-bar near the foot-plate thereof and serves to hold the latter down by contact with the treadle-bar. As is usual in this class of machines, this downward movement of the cross-head drives the tool n into or through the work to be punched, which rests upon the die-block.

In case it is desired to run the machine continuously—i. e., without throwing the machine out of gear at each stroke—the clutch-holding arm d' is so elevated by turning its set-screw e' as to withdraw the roller or pin e from the guideway c , as shown in Fig. 1 of the drawings. In this case the machine is retained in gear by either keeping the treadle foot-plate under pressure of the foot or by, so turning the latch-bar s as to cause it to hold said foot-plate down in position shown in Fig. 1, and the roller d^5 of the arm d is allowed to run against the forward end of the sliding clutch.

In case it is desired to throw the clutch out of gear after each stroke of the punch in order to gain time to adjust the work on the die-block, the foot-treadle may be released from the pressure of the foot after each stroke and the sliding clutch allowed through pressure of the springs g^6 to disengage itself from the clutch-head, when the friction-roller d^5 of the arm d passes into the notch b^8 of the clutch b^7 . This method of operating the punch, however, requires a prompt releasing of the treadle at the proper moment to prevent the notch of the clutch-rim passing the friction-roller, and thus producing a second stroke of the punch before the machine is thrown out of gear.

In order to insure the automatic disengagement of the clutch at each revolution, I have provided the irregular guideway c with a clutch-holding arm d' , which, when the arm d has been screwed up until its roller d^5 is disengaged from the clutch, may by the turning of its set-screw be allowed to assume the position shown in Fig. 2 of the drawings—i. e., with its pin or roller e bearing within the guideway c . At the completion of each stroke of the cross-head the cam c^3 , formed by the irregularity of the groove c , will, by contact with the pin e , have thrown the clutch out of gear.

The location of the notch b^8 of the friction-roller is such as to bring it opposite the friction-roller d^5 at the moment the cross-head is

at its highest point, thus leaving the cross-head in position for a full stroke when this friction-roller is in use.

It is obvious that the operation of the clutch may be accomplished by hand as well as by foot power by raising and lowering the lever j^3 , which, through its connection with the bell-crank h , as heretofore described, will result in the throwing of the sliding clutch backward and forward.

The work to be punched having been placed on the die-block in the desired position, it may be firmly held in place by forcing downward the lever n' until the cam k^2 , through the pressure thus caused on the lever-arm k' , will have firmly pressed the forward bifurcated end of said lever-arm against the work. This work-holding device will not only serve to secure the work in position, but will prevent the latter from being carried upward at the upstroke of the tool.

It is obvious that the herein-described machine may be run by power, if desired, and that a shearing or other tool may be substituted for the punching-tool shown.

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

1. In a punching-machine, the combination, with the main frame, an operating-shaft mounted in said frame, an eccentric-pin on said shaft, a cross-head boxing approximately square in cross-section, one-half of said boxing being detachable, as described, a reciprocating cross-head mounted in said boxing, and a drive-arm connecting said cross-head and shaft eccentric-pin, of a fly-wheel mounted loosely on said shaft and having a clutch-head in its hub, and a sliding clutch keyed on said shaft and adapted to be made to interlock with said clutch-head, substantially as specified.

2. In a punching-machine, the combination, with the main frame, a driving-shaft b , running therein, a fly-wheel b' , loosely mounted on said shaft and having a clutch-head b^2 , a sliding clutch keyed on said shaft, a peripheral guideway c' , and an end notch b^8 in said sliding clutch, of clutch-holding arm d , supported from the main frame and adapted to alternately press against the sliding clutch and enter the notch b^8 as the operating-shaft is rotated, substantially as described.

3. The combination, with the frame a , a driving-shaft b , mounted therein, a hand fly-wheel b' , having a hub clutch-head b^2 and loosely mounted on shaft b , a spring-actuated sliding clutch keyed on said shaft and adapted to interlock with said clutch-head, a peripheral guideway c , encircling said sliding clutch and curved to form thereon a peripheral cam c^3 , of an adjustable clutch-holding arm d' , journaled upon the frame-head at one end and having its opposite end entering the guideway c , and means for imparting a sliding motion to said sliding clutch upon said shaft, substantially as described.

4. The combination, with the frame *a*, having jaws *a*² *a*³, and a die-holding plate *g*, of a work-holding arm *k*', pivoted to said frame and having its forward bifurcated end projecting
5 over said die-block plate, a spring-pressure on the opposite end of said work-holding arm, and a cam-wheel upon which the rear portion of said work-holding arm bears, said cam-

wheel adapted to be turned to exert an upward pressure on the rear portion of said work-holding arm through a suitable lever *n*', substantially as described.

GEORGE J. SAURBREY.

In presence of—

C. C. SHEPHERD,
THOS. S. GATES.