

No. 639,793.

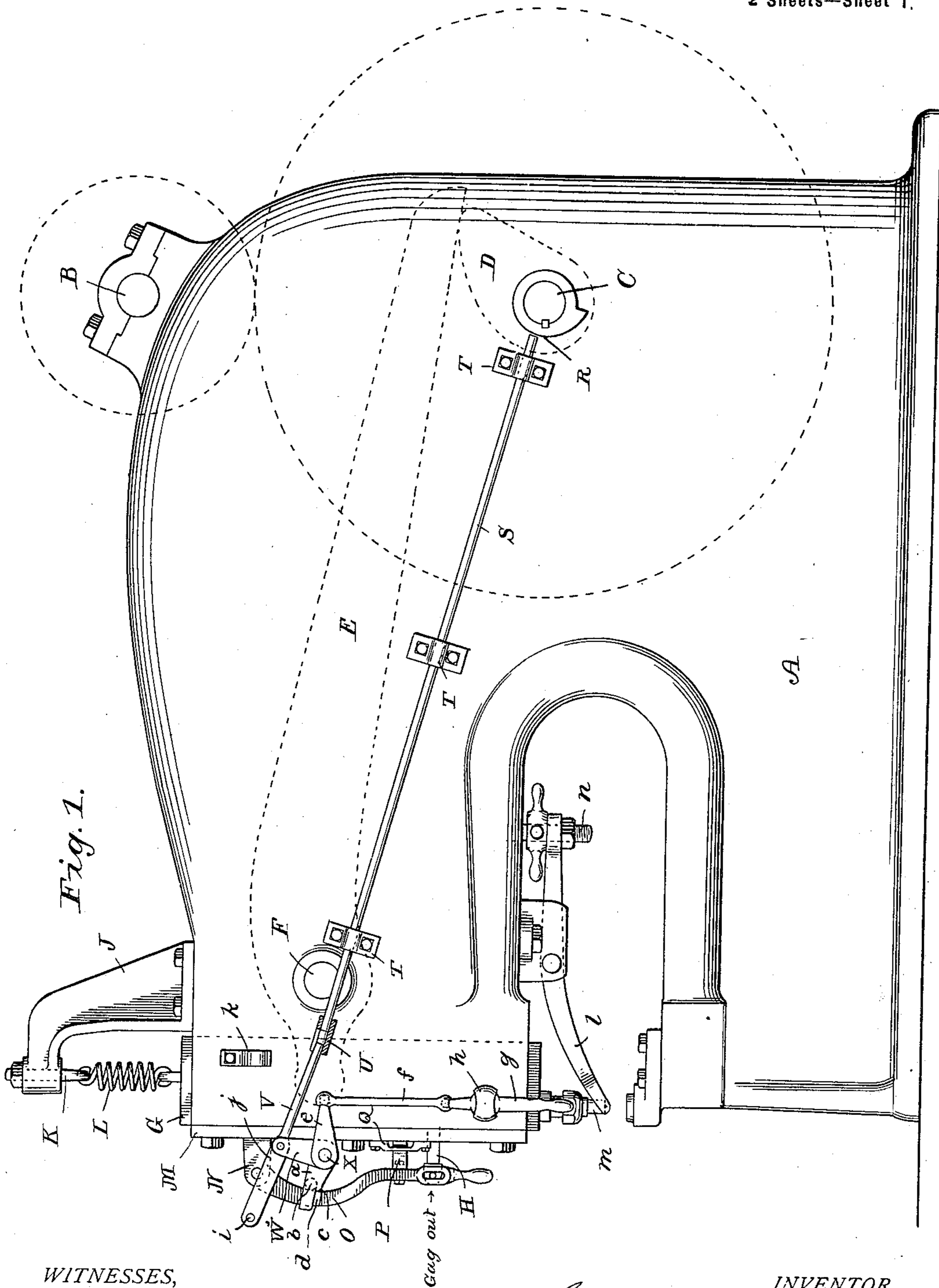
Patented Dec. 26, 1899.

G. B. TENNANT.
METAL PUNCHING APPARATUS.

(Application filed Oct. 16, 1899.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES,

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H. L. Bailey.

INVENTOR.

George B. Tennant

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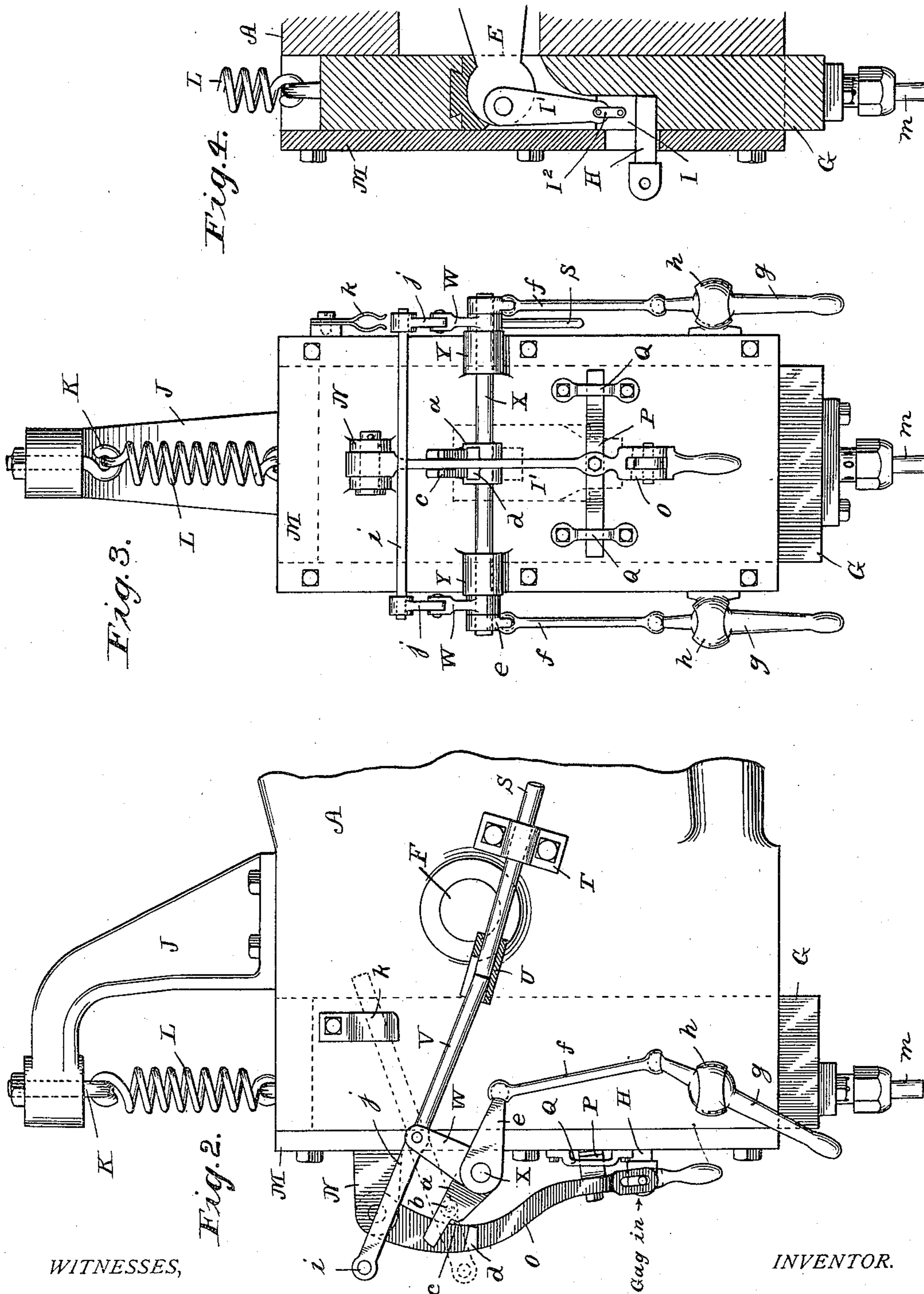
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C. M. Newman
H. L. Gayle

INVENTOR.

George B. Tennant

UNITED STATES PATENT OFFICE.

GEORGE B. TENNANT, OF JOHNSTOWN, PENNSYLVANIA.

METAL-PUNCHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 639,793, dated December 26, 1899.

Application filed October 16, 1899. Serial No. 733,756. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. TENNANT, a citizen of the United States, residing at Johnstown, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Metal-Punching Apparatus, of which the following is a specification.

My invention relates to means for controlling the operative movement of a punch mounted on a sliding head, consisting of mechanism for inserting a gag between a surface of said head and the surface of a reciprocating block driven by a lever or otherwise and mechanism for automatically withdrawing said gag.

With the above objects in view my invention consists of the novel construction and combination of parts shown upon the accompanying two sheets of drawings, which form part of this specification and in which similar characters of reference denote like or corresponding parts.

Figure 1 is a side elevation of a punching-machine fitted with my improved mechanism for operating the gag, and in this view the gag is out or in a non-operative position. Fig 2 is an enlarged side view of the head of the punching-machine shown in Fig. 1, the gag-operating mechanism being tripped, with the gag in its operative position. Fig. 3 is a front view of the mechanism shown in Fig. 2 with the exception that the rod *i* is moved downward a short distance for the sake of clearness of illustration. Fig. 4 is a central vertical section of the head, illustrating the function of the gag in its operative position, with the sliding head at the end of its downward stroke.

Referring to the characters of reference marked upon the drawings, A indicates an ordinary type of punching-machine, and B the driving and C the driven shaft, both of said shafts being geared together, as indicated in Fig. 1 by dotted circles.

D represents in dotted lines a cam on the shaft C for operating the lever E, which latter is pivoted at F and serves to reciprocate the sliding head G, which is mounted vertically in suitable ways of the frame. The sliding head G is designed to make a complete throw only when the gag H is inserted, and

to this end the lever E, with its links I' I² and block I, is loosely fitted in a recess of said head, so as to allow an idle downward movement therein. When the gag H is inserted, however, the block I will engage the same when nearing the bottom of the stroke and by means of its link connections I' I² with the lever E will carry the gag and sliding head with it, thus causing a stroke of the punch.

I provide a counterbalance comprising a bracket J, having an adjustable eye K, to which one end of a spring L is secured, the opposite end being attached to the sliding head G before mentioned. This spring serves to support the head after it has moved downward by its own weight the desired distance, the amount of said movement being determined by the adjustment of the spring. In practice the spring is so adjusted that the sliding head will descend by gravity until the punch M is near to the surface of the material to be punched.

Upon the face-plate M, covering the sliding head G, is a lug N, to which is hinged a depending curved operating-lever O, the lower end of which is slidably attached to the head of the gag H before mentioned. The lower end of this arm is provided with a spring P for the purpose of drawing the operative end of said arm inward and inserting the gag, as shown in Fig. 2. In the drawings I have shown a flat spring attached at its center to said lever, with its free ends engaged by straps Q, as shown; but any proper form of spring may be used.

The mechanism for withdrawing the gag and holding it out of engagement is positively operated from the driven shaft of the machine through the following connections:

Upon the outer end of the driven shaft C, as shown in Fig. 1, is a cam R, which serves to engage and operate a sliding rod S, mounted in suitable bearings T, secured to the side of the machine. On the forward end of this rod is secured an open sleeve U to receive the abutting end of the connecting-rod V, pivoted to a vertically-disposed rocker-arm W, which latter is secured to the rocker-shaft X. Said rocker-shaft, as shown in Fig. 3, is journaled in suitable bearings Y, secured to the face-plate M, and mounted upon said rocker-shaft is a central rocker-arm *a*, the

free end of which is forked to straddle the operating-lever O before mentioned. The central rocker-arm *a* contains a roller *b* between its forks to engage the curved edge of the operating-lever O when said central rocker-arm is moved downward in contact therewith, which movement is effected through the medium of the rocker-shaft X, vertical rocker-arm W, connecting-rod V, sliding rod S, and the cam R. Said central rocker-arm *a* is further provided with beveled shoulders *c* to engage catches *d* upon the operating-lever O, by means of which said lever is held after having been withdrawn by the swinging engagement of said central rocker-arm.

Upon the outer ends of the rocker-shaft X are secured rearwardly-extended lever-arms *e*, which are connected by the connecting-bars *f* with the hand-levers *g*, which in turn are attached to the main frame A by the universal joints *h*.

From the foregoing it will be seen that if either of the hand-levers *g* is operated in any direction the connecting-bar *f* and the lever-arm *e*, connected therewith, will be drawn down in a manner to rock the shaft X and swing up the central rocker-arm *a*, thus releasing the beveled shoulders *c* from engagement with the catches *d* of the operating-lever O and permitting it to throw in the gag by the action of the spring P.

When a stroke of the punch is desired during the operation of the punching-machine, either of the levers *g* is moved, which throws the gag into its operative position, as above described, whereupon the sliding head, carrying the punch, is moved downward by the action of the lever E and its connections. After the punch has thus made an operative stroke the gag is automatically thrown out of engagement with the sliding head G by the revolution of the cam R, acting upon the sliding rod S, which pushes forward the connecting-rod V, which in turn rocks the shaft X by means of the vertical rocker-arms W, thus swinging the central rocker-arm *a* downward, with its roller *b* bearing on the inner curved surface of the operating-lever O, thereby pushing said lever outward and securing it in this position by means of the engagement of the beveled shoulders *c* with the catches *d*, and as the gag H is attached to said lever it is therefore automatically withdrawn. After this is done the gag may again be thrown into operative engagement by moving either of the hand-levers *g*, whereupon the various movements above described are repeated.

In order to permit the gag to remain in and secure a continual operation of the punch, I simply lift the connecting-rod V from the sleeve U by bearing down on the cross-rod or handle *i* of the integral extension *j* of the connecting-rod V before mentioned, thus securing the said connecting-rod V within the spring pocket or holder *k*, this position being as indicated in dotted lines in Fig. 2.

Referring to Fig. 1, a common form of strip-

per is indicated at *l*, which operates to relieve the punch *m* of the stock through which it has passed, and *n* is a screw by means of which said stripper is adjusted.

I do not limit myself to the details of construction shown, but may make such modifications as are fairly included in the scope of my invention.

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

1. In a metal-punching machine, the combination of a reciprocating block loosely mounted within a slidable head, a gag adapted to be inserted between said block and said head, a lever connected with said gag and provided with operating mechanism driven from a cam on the machine-shaft whereby said gag is automatically withdrawn.

2. In a metal-punching machine, the combination of a reciprocating block loosely mounted within a slidable head, a gag adapted to be inserted between said block and said head, a lever connected with said gag and provided with a catch, a rocker-arm bearing against said lever and having a shoulder for engaging said catch, mechanism for operating said rocker-arm from the machine-shaft whereby said operating-lever is moved outward and the gag thereby automatically withdrawn.

3. In a metal-punching machine, the combination of a reciprocating block loosely mounted within a slidable head, a gag adapted to be inserted between said block and said head, a lever connected with said gag, a rocker-arm mounted on a rocker-shaft and bearing against said lever, means for operating said rocker-arm comprising another rocker-arm mounted on said rocker-shaft, a connecting-rod pivoted to the latter rocker-arm and connected with a cam on the machine-shaft.

4. In a metal-punching machine, the combination of a reciprocating block loosely mounted within a slidable head, a gag adapted to be inserted between said block and said head, a lever connected with said gag, a rocker-arm mounted on a rocker-shaft and bearing against said lever, another rocker-arm mounted on said rocker-shaft, a connecting-rod pivoted to the latter rocker-arm, a sliding rod abutting against said connecting-rod, said sliding rod bearing against a cam on the machine-shaft.

5. In a metal-punching machine, the combination of a reciprocating block loosely mounted within a slidable head, a gag adapted to be inserted between said block and said head, a lever connected with said gag and provided with a catch, a rocker-arm mounted on a rocker-shaft and bearing against said lever, said rocker-arm being provided with a shoulder adapted to engage the catch aforesaid, means for operating said rocker-arm comprising another rocker-arm mounted on said rocker-shaft, a connecting-rod pivoted to the latter rocker-arm, a sliding rod abutting against said connecting-rod and bearing

against a cam on the machine-shaft whereby said gag is automatically withdrawn.

6. In a metal-punching machine, the combination of a reciprocating block loosely mounted within a slidable head, a gag adapted to be inserted between said block and said head, a spring-actuated operating-lever connected with said gag and provided with a catch, a rocker-arm having a shoulder adapted to engage the catch aforesaid, means for releasing the engagement of said catch and said shoulder whereby said gag is inserted into operative position by the action of the spring aforesaid.

7. In a metal-punching machine, the combination of a reciprocating block loosely mounted within a slidable head, a gag adapted to be inserted between said block and said head, a spring-actuated operating-lever connected with said gag and provided with a catch, a rocker-arm mounted on a rocker-shaft and provided with a shoulder adapted to engage the catch aforesaid, another rocker-arm mounted on said shaft having flexible connections with a hand-lever whereby said shoulder may be released from engagement with said catch and the gag inserted by the action of said spring-actuated operating-lever.

8. In a metal-punching machine, the combination of a reciprocating block loosely mounted within a slidable head, a gag adapted to be inserted between said block and said head, an operating-lever connected with said gag, said operating-lever being provided with a catch and a spring, a rocker-arm mounted on a rocker-shaft and provided with a shoulder adapted to engage the catch aforesaid, mechanism connected with the machine-shaft for swinging said rocker-arm whereby said operating-lever is moved and held in an outward position thus automatically withdrawing said gag, a hand-lever connected with said rocker-shaft for swinging said rocker-arm in a direction opposite to that aforesaid whereby said shoulder may be released from engagement with said catch and the gag inserted by the action of said spring.

9. In a metal-punching machine, the combination of a reciprocating block loosely mount-

ed within a slidable head, a gag adapted to be inserted between said block and said head, an operating-lever connected with said gag and provided with a catch and a spring, a return-arm bearing against said lever, said rocker-arm being mounted on a rocker-shaft and provided with a shoulder adapted to engage the catch aforesaid, another rocker-arm mounted on said rocker-shaft, a connecting-rod pivoted to the latter rocker-arm, a sliding rod abutting against said connecting-rod and bearing against a cam on the machine-shaft whereby said gag is automatically withdrawn and held in non-operative position, a hand-lever and connections attached to said rocker-shaft whereby said shoulder may be released from engagement with said catch and the gag inserted by the action of said spring.

10. In a metal-punching machine, the combination of a reciprocating block mounted within a slidable head, a gag adapted to be inserted between said block and said head, an operating-lever connected with said gag and provided with a catch and a spring, a rocker-arm bearing against said lever and provided with a shoulder for engaging the catch aforesaid, mechanism connected with said rocker-arm and the machine-shaft for swinging said rocker-arm whereby the gag is withdrawn and said shoulder is engaged with the catch aforesaid, and means for releasing the engagement of said shoulder and said catch whereby the gag is inserted by the action of said spring.

11. In gag-operating mechanism of the class described, the combination with the gag and operating-lever, of a rocker-arm mounted on a rocker-shaft and adapted to engage said operating-lever, another rocker-arm mounted on the rocker-shaft aforesaid, a connecting-rod pivoted to said latter rocker-arm and removably connected with operating mechanism driven from the machine-shaft.

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

GEORGE B. TENNANT.

Witnesses:

D. J. JONES,

WM. E. MCHENRY.