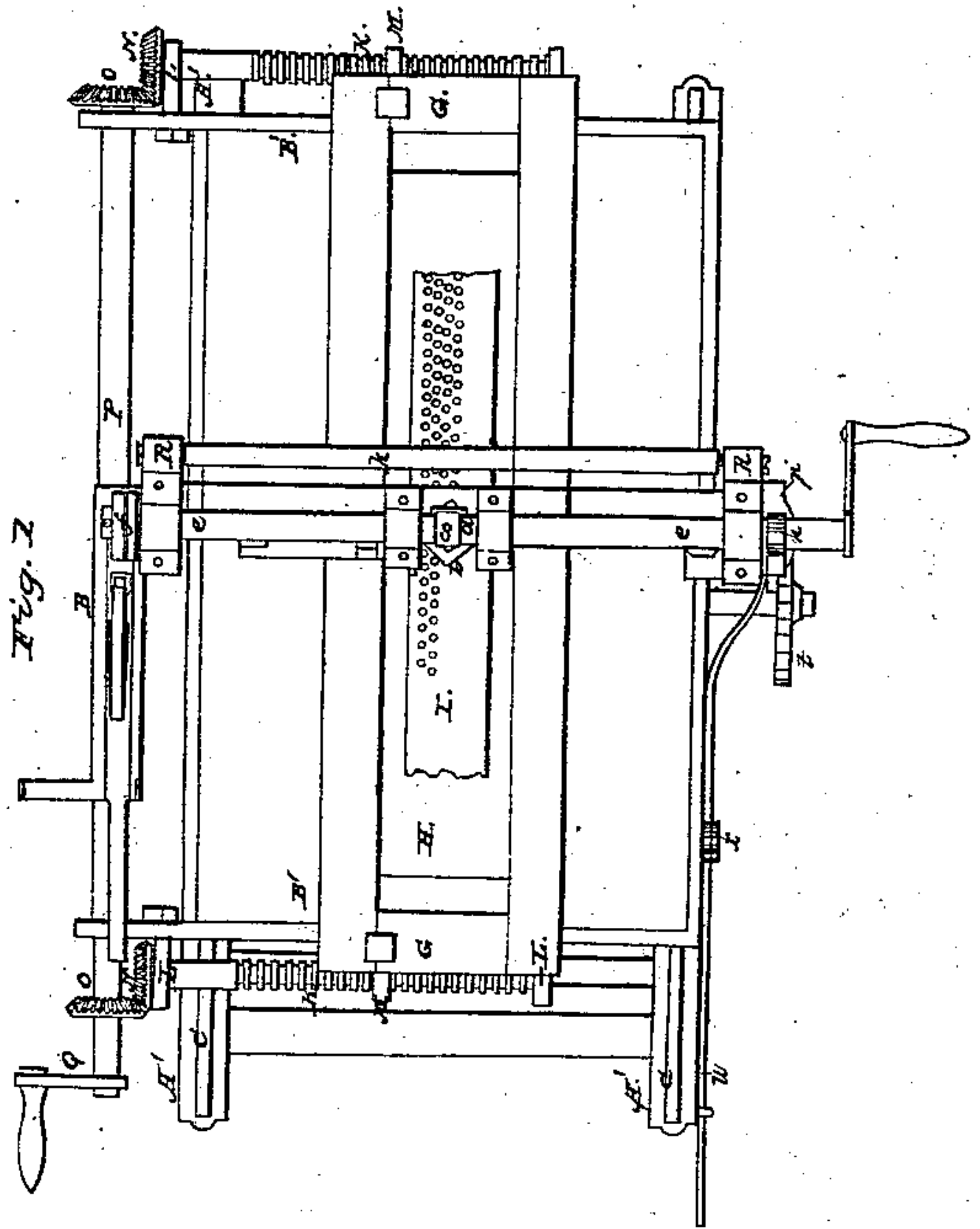
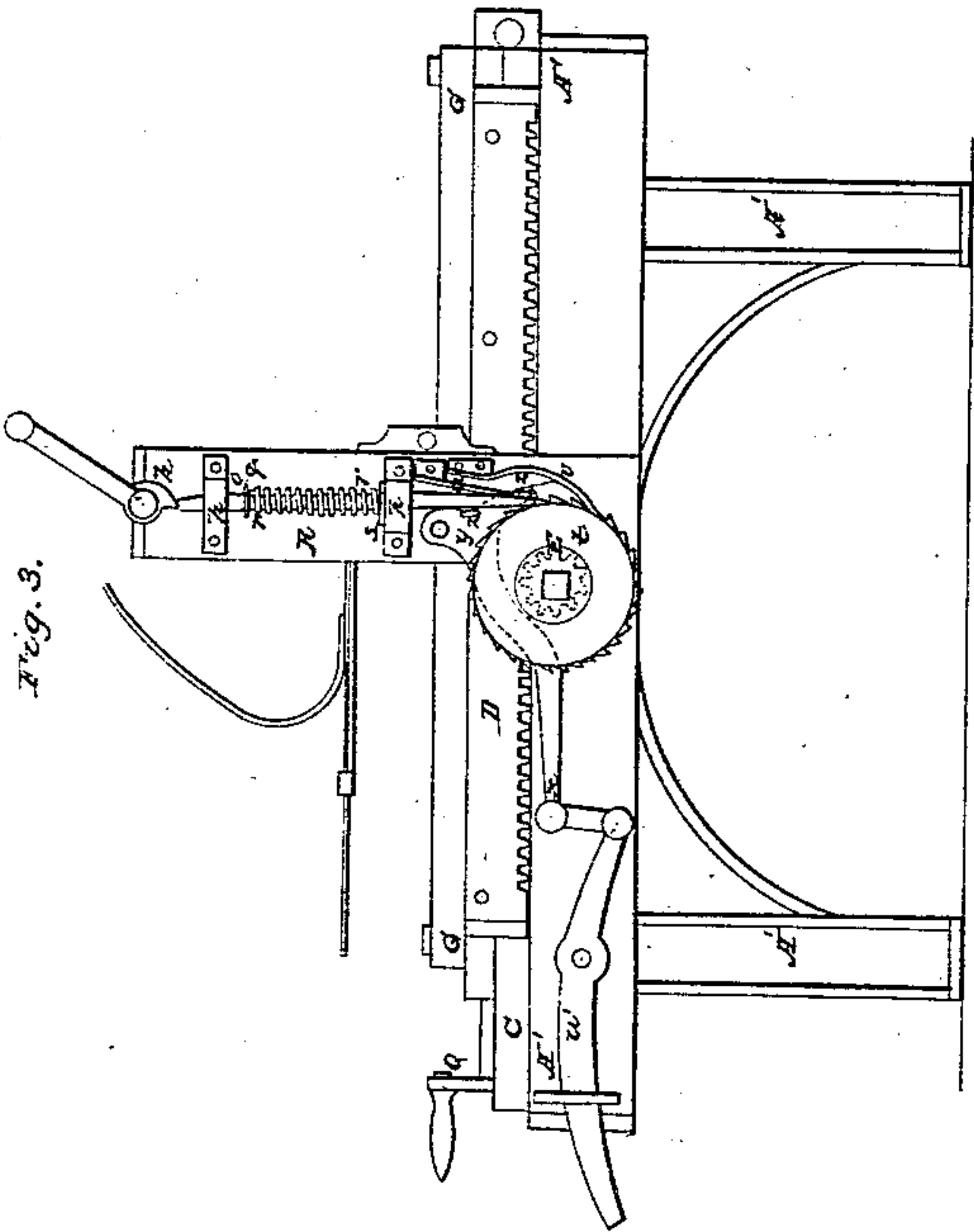
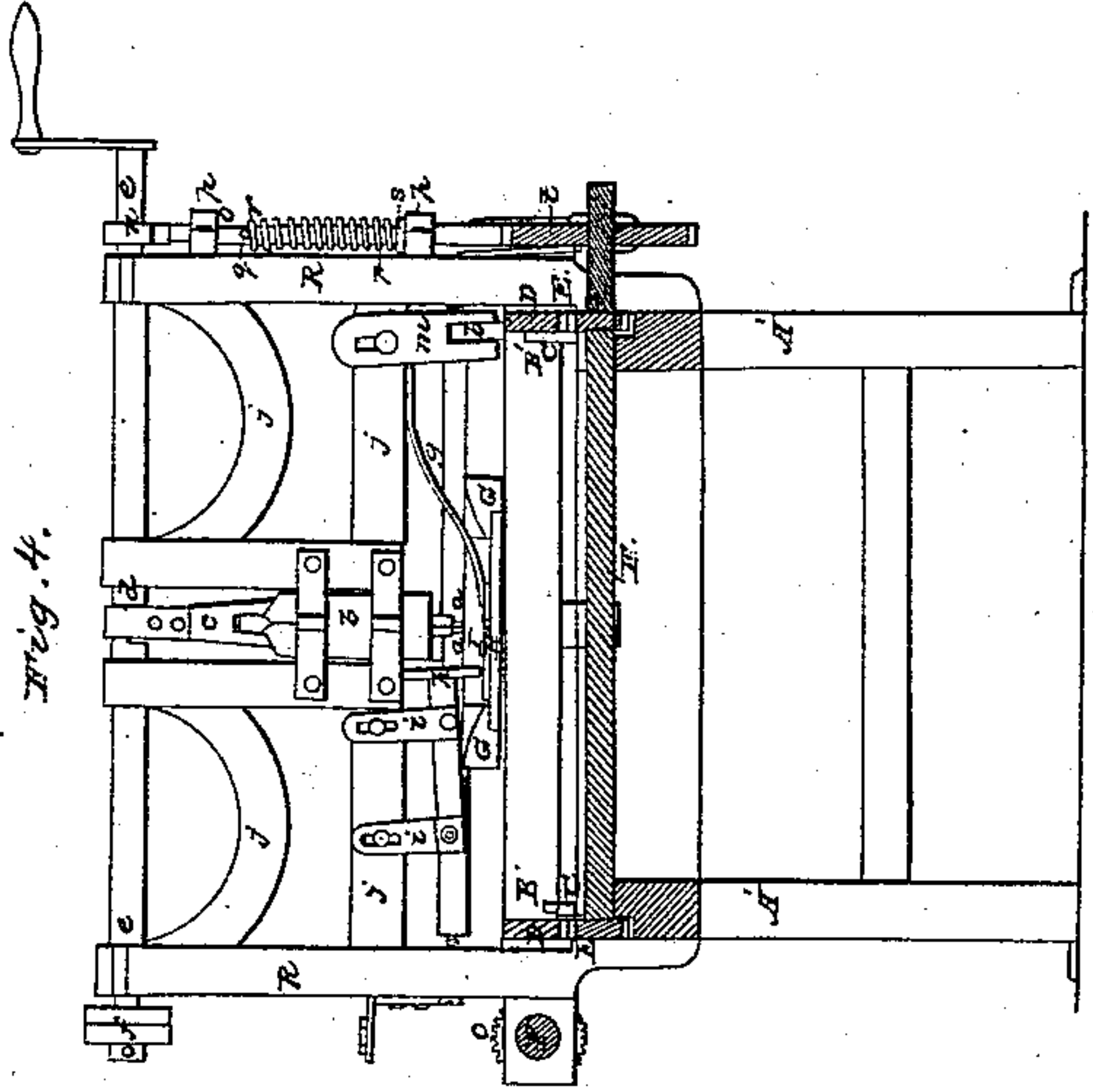
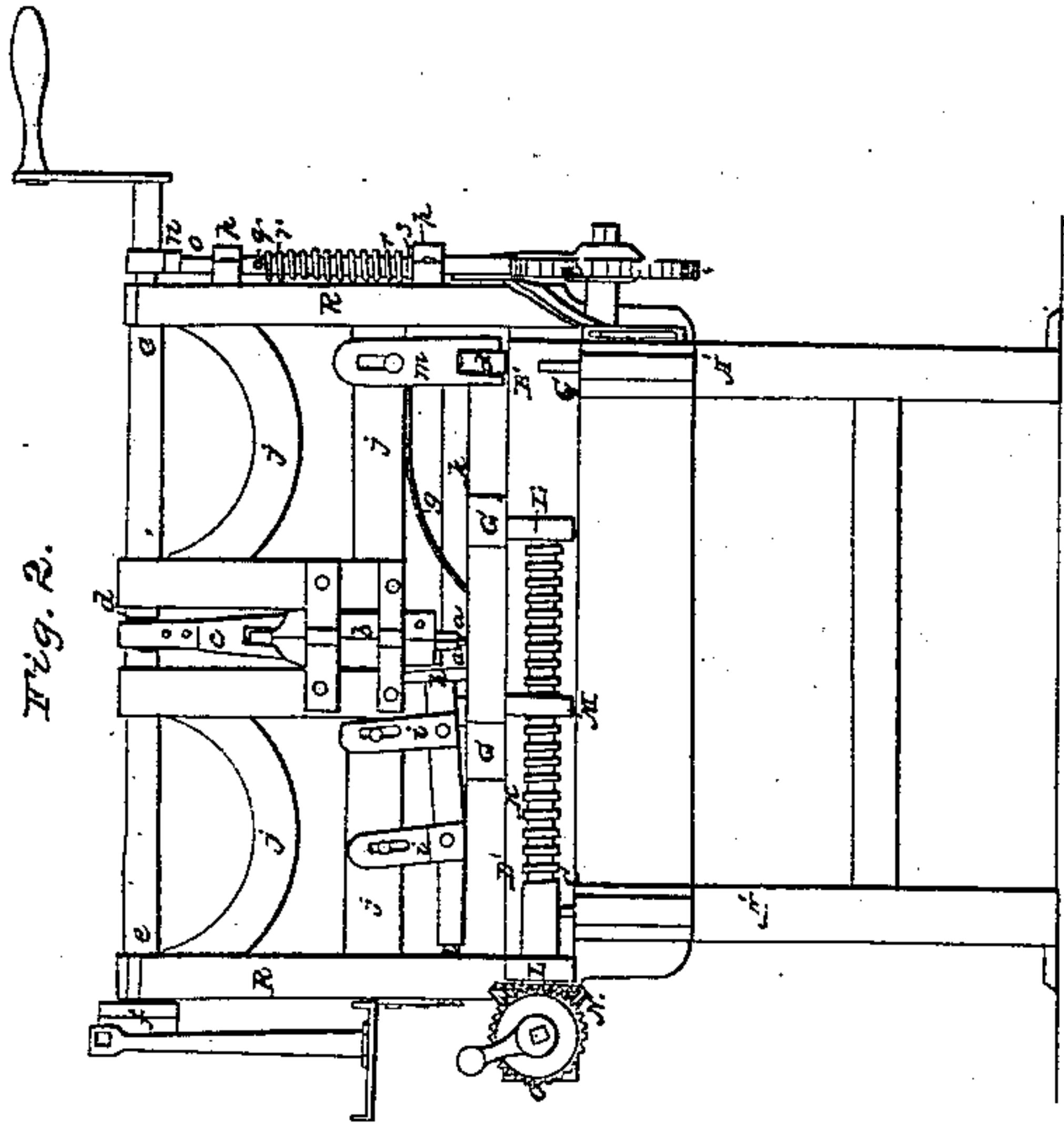


Adams & Hammond,

Metal Punch,

N^o 3077-

Patented May 8, 1843.



UNITED STATES PATENT OFFICE.

WILLIAM ADAMS AND ARTEMUS HAMMOND, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR PUNCHING HOLES IN IRON OR OTHER METALLIC PLATES.

Specification forming part of Letters Patent No. 3,077, dated May 8, 1843.

To all whom it may concern:

Be it known that we, WILLIAM ADAMS and ARTEMUS HAMMOND, both of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful machine for punching holes in iron or other metallic plates, so as to give said holes the peculiar "burr" on their inner or under sides which is indispensably requisite for "sparkers" of locomotives; and I do hereby declare that the following description of our improvements, taken in connection with the accompanying drawings hereinafter referred to, forms a full and exact specification of the same, wherein we have set forth the nature and particulars of our invention by which it may be distinguished from others of a similar class, together with such parts or combinations as we claim and wish to have secured to us by Letters Patent.

The object of our improvements is to produce the holes with the burr, as above suggested, more rapidly or expeditiously than they have hitherto been made, and at the same time (and by a peculiar connection or combination of the punching machinery with that which moves the plate to be punched along) to form the holes very near to each other and at regular distances apart.

In the drawings above mentioned, Figure 1 is a plan or top view of our punching-machine. Fig. 2 is a front elevation. Fig. 3 is a side elevation, and Fig. 4 is a transverse vertical section on the line A B, Fig. 1.

A' A' A' A' in the several drawings represent the frame-work, which may be constructed in any suitable manner to enable it to support the machinery during its operation.

B' B' is a strong bed-piece or table of wood or iron, which is arranged so as to move forward and back longitudinally on the guide-rails C C, Figs. 1, 2, 3, and 4, a distance equal to the length of the longest sheet of metal to be punched.

On each side of the table B' B' a rack-plate D is fixed, the teeth of which engage with those of the pinions E E, properly situated or placed on the turning shaft F, as shown in Fig. 4, which shaft has proper bearings in the frame-work.

A rectangular adjustable frame G G rests on the top of the table B' B', in which a simi-

larly-shaped plate or tablet H, Figs. 1 and 4, of lead or other suitably soft metal, is arranged in any proper manner so as to be controlled by or moved with the said frame G G, and on this tablet or plate H the sheet or strip of metal I to be operated upon is properly confined, as will be more fully explained hereinafter.

The frame G G and consequently the tablet H and sheet I are moved laterally to and fro any required distance by means of the revolving screws K K, Figs. 1 and 2, arranged, as seen in the drawings, one at the front and the other at the rear of the table B' B'. These screws rest and revolve and are confined so as not to advance in the projections L L L L from each end of the table B' B'. Nuts M M, with proper screws formed therein, depend (one from each end) from the adjustable frame G G, which nuts move forward and back on the screws K K in accordance with the revolutions of said screws, and consequently change the position of the frame G G as desired. Each of the screws K K has a beveled geared pinion N N, which two pinions engage with the teeth of similar ones O O on the long shaft P, Figs. 1, 2, and 4, and by turning said shaft through the medium of the crank Q the screws K K will be equally and simultaneously revolved and the frame G G moved regularly in either direction.

The apparatus for punching is arranged at about the center of the machine and between the two upright standards R R, which are fastened to the exterior of the frame-work A' A'. The punches or tools *a a*, Figs. 2 and 4, for forming the holes are fixed, two or more of them, in the vertical piston *b*, which moves up and down in proper guides and is connected at its top to one end of a connecting-rod *c*, Figs. 2 and 4, said connecting-rod at its opposite end being secured in any proper manner to the bell-crank *d* of the driving-shaft *e e*, Figs. 1, 2, and 4. This shaft *e e* is provided with a fast and loose pulley at *f* and a sliding lever-staple arranged near it, as shown in Fig. 1, which serves to change or shift the belt in the usual manner. A bent spring *g*, attached to the under side of the frame-work *j j j j* between the standards R R, (which frame-work may be arranged as seen in Figs. 2 and 4 or in any other sufficiently

strong manner,) and a guiding wheel or roller *h*, attached to the side of the adjustable frame-piece *i i*, serve to prevent the plate of iron from being drawn up with the tools or punches after it has been pierced by the same. A roller or cylinder *k*, suitably supported, as shown in Fig. 1, assists the spring *g* and wheel *h* in keeping the frame *G G* and parts moving with the same in contiguity with the table *B' B'*, and the said table *B' B'* is kept in its horizontal position during its motion forward and back by the roller *l* in the adjustable block *m*, screwed to the frame *j j*, &c., as shown in Figs. 1, 2, and 4.

The table *B' B'*, frame *G G*, tablet *H*, and plate of metal *I*, arranged together, as hereinbefore described, are advanced a regular distance after each descent of the punching-piston by the following novel combination of machinery: A cam or eccentric *n*, shaped as seen in Fig. 3 and shown in Figs. 1, 2, and 4, is fixed on one end of the driving-shaft *e e*, which, as has been shown, operates the punching-piston *b*. The cam *n* works on the top of the vertical pawl *o*, which moves up and down in the guide-blocks *p p*, and is supported just beneath the upper guide-block by means of the pin *q* resting on the top of the spiral or helical spring *r r*, which spring is wound round the pawl *o* between the guide-blocks and rests at its bottom on a shoulder *s* on the top of the lower guide-block. The lower end of the pawl *o* engages with the teeth of the ratchet-wheel *t* on one end of the shaft *F*, on which the pinions *E E* are fixed, said pinions working the table *B' B'* forward and back, as hereinbefore explained. There is a spring *u* behind the lower part of the pawl *o* to keep it in its proper position and a secondary or spring pawl *v*, which engages with the ratchet-wheel *t* below the point where the main pawl *o* operates, said spring and pawl being properly secured to the outside of one of the standards *R*.

From the above specified arrangement of machinery it will readily be seen that at each revolution of the shaft *e e* and after each descent of the punching-piston the pawl *o* by the action of the cam *n* will cause the ratchet-wheel *t* to turn a distance equal to the space between any two of its teeth, thereby moving the table *B' B'*, and consequently the plate of metal *I*, a sufficient distance before the next descent of the punching-piston to leave the proper or requisite space between any two successive holes or sets of holes. After the

pawl *o* has moved the wheel *t*, as specified, the spring *r r* withdraws said pawl upward until the lower end comes in contact with the next tooth above that which it has previously operated upon, where it remains in readiness for the next revolution of the cam *n*. After holes have been punched throughout the length of the plate on one or a double line the pawls are thrown out of connection with the ratchet-wheel *t* by means of the compound lever *w x y*, having proper prongs *z z*, which press against the pawls, as shown in Fig. 3. When this is accomplished, the table *B' B'* may be moved back by means of the crank *a'* on the shaft *F* to its starting position. The frame *G G*, with the tablet *H* and plate *I*, are then moved sidewise a little, as hereinbefore shown, by turning the shaft *P*, and are then in position for forming another line or double line of holes.

The use of the leaden tablet *H* is an important feature in our invention, as the solid punch, which does not cut but a small particle of iron out of the plate, merely pierces the plate and sinks into the leaden tablet, and thereby forms that peculiar burr so indispensably requisite in sparkers for arresting the cinders, &c., which escape from the fuel-chambers of locomotives.

Having thus described our improvements, we shall claim—

The combination of the bed piece or table *B' B'*, which moves longitudinally, as specified, and rectangular frame *G G*, which is moved laterally, as set forth, and leaden or other suitably soft metallic tablet *H*, arranged in said frame *G G*, as described, with the punching-piston, in which the solid punches or piercing-tools are fixed, the whole being, substantially as hereinbefore described, for the purpose of punching successive holes or sets of holes in successive lines in a plate of metal and for giving said holes on one side the peculiar burr requisite in sparkers of locomotives.

In testimony that the foregoing is a true description of our said invention and improvements we have hereto set our signatures this 6th day of March, 1843.

WILLIAM ADAMS.
ARTEMUS HAMMOND.

Witnesses:

R. H. EDDY,
EZRA LINCOLN, Jr.