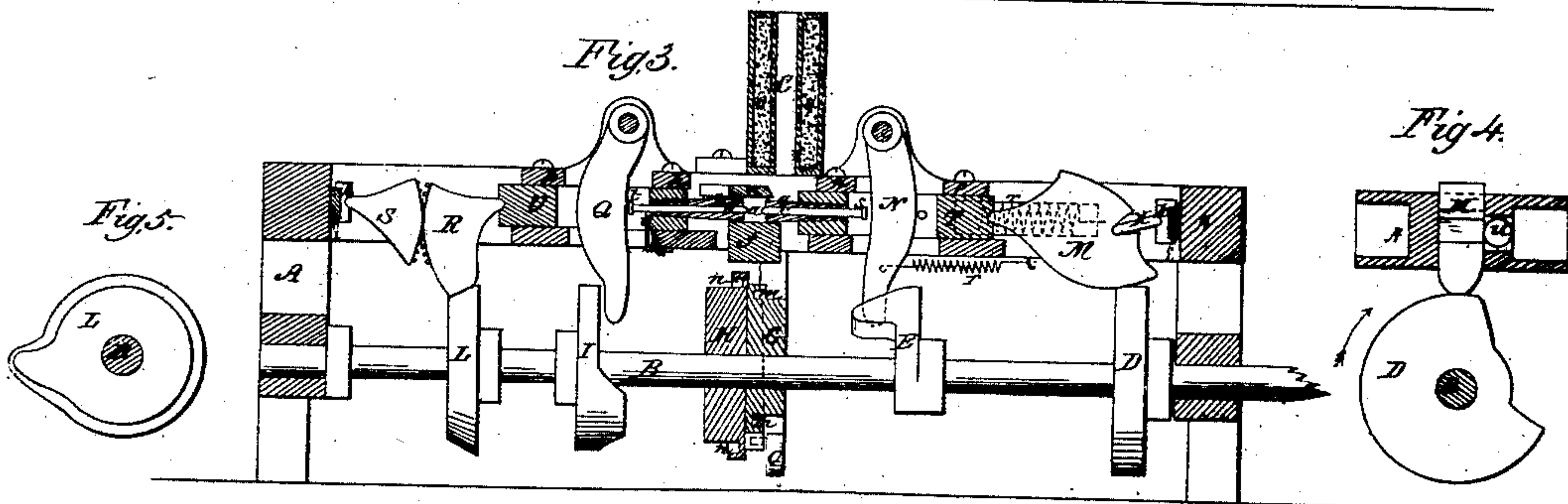
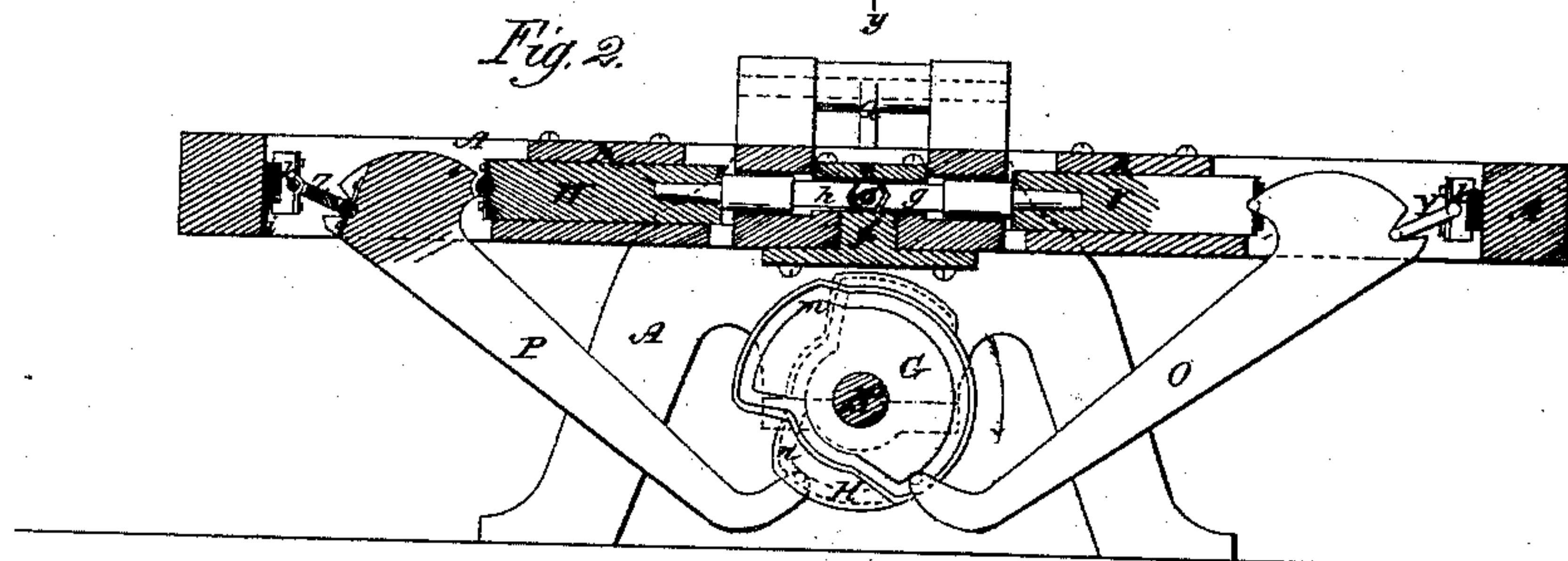
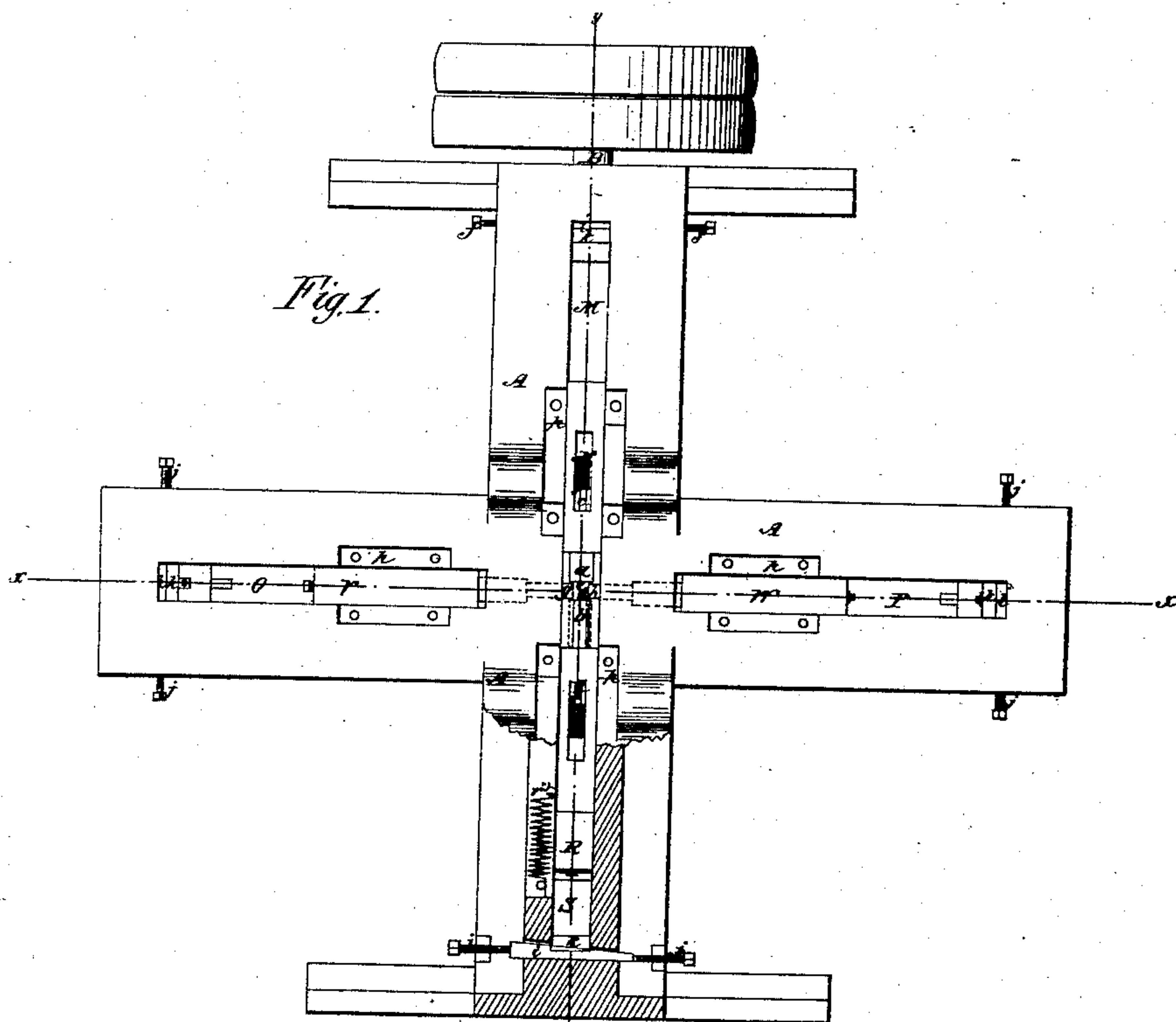


J. C. Day.
Nut Machine.

N^o 18,892

Patented Dec. 22, 1857.



UNITED STATES PATENT OFFICE.

J. C. DAY, OF JERSEY CITY, NEW JERSEY.

NUT-MACHINE.

Specification of Letters Patent No. 18,892, dated December 22, 1857.

To all whom it may concern:

Be it known that I, J. C. DAY, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and Improved Machine for Making Nut-Blanks for Screws at One Operation; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, Figure 1, being a plan of the machine, some portions being removed, to show parts beneath; Fig. 2, a vertical section thereof, in the plane indicated by the line x, x , Fig. 1; Fig. 3, a vertical section, in the plane indicated by the line y, y , Fig. 1; Figs. 4, and 5, views of parts detached.

Like letters designate corresponding parts in all the figures.

The parts are all mounted in a strong frame A, which may be made of cast-iron, and with hollow sides, as indicated in Fig. 4, in order to obtain the greatest degree of lightness compatible with the proper strength; and also incidentally to afford room for the compact location of some of the parts of the machine. In a suitable position beneath the body of the frame, is situated the driving shaft B, on which the cams D, E, G, H, I, L, are placed, for producing the various motions required.

The nuts are formed in the middle of the frame; and the heated bar from which they are cut is fed vertically to the dies through a hollow standard C, (Fig. 3,) the longitudinal aperture therein being of the right size to keep the bar in a proper position for cutting the nuts therefrom, and pushing them into the die-box.

The die-box and dies are peculiarly constructed and arranged, so as to make the nuts of any even number of sides, out of pieces cut from a rectangular bar, without waste of material; and the punches are also so shaped, and so act, as to make the holes in the nuts without waste of material. The manner in which these results are effected is substantially as follows: Nuts of an even number of faces and regular in form, have their opposite faces parallel. Upon this property of form, is based my improved arrangement of dies. Two opposite faces of the nut are shaped by stationary sides e, f , of the die-box, which may be adjustable so as to make nuts of different sizes. Between

these stationary sides two movable dies g, h , slide, each being shaped so as to make half of the remaining faces which compose the periphery of each nut. Thus, if the nut is to be hexagonal, as indicated in Fig. 2, each die has two faces. If the nut is to be octagonal, each die should have three faces; and in a corresponding manner for nuts of other numbers of faces. These dies may be removable and replaceable, for making nuts of various sizes and different numbers of sides. A movement is given to both simultaneously, so as to separate at the proper time for the insertion of the pieces of which the nuts are to be formed; and then close so as to bring the nuts into the desired shape. In order to produce this movement, the dies are inserted in sliding sockets V, W, to which the desired reciprocating motion is imparted by means of toggle-levers O, P, toggle-links Y, Z, and cams G, H, which actuate the levers. The manner in which these produce the desired effect is clearly represented in Fig. 2. The toggle-links are hinged to stationary bearings k, k , which are adjusted so as to bring the dies to the exact points desired, at the end of their inward strokes, by means of wedges i, i , and adjusting screws j, j , arranged as indicated in Fig. 1. The levers O, P, are jointed to the sliding sockets V, W. When the cams G, H, respectively raise the long arms of said levers O, P, the dies g, h , are separated in the die-box; and when they depress the levers, the dies are pressed toward each other, against the nuts, and swage them into shape. The power of these toggle-levers rapidly increases as the dies are forced farther inward, in the manner of a toggle-joint; and thus exert the greatest force when most required. In order that the cams may raise the levers O, P, they may be respectively provided with grooves m, n , in their faces, for the reception of pins projecting from the ends of said levers.

The die a , which forms one of the end faces of the nuts, just fits between the stationary sides e, f , and is of somewhat greater width than the nuts, so that it may serve also for cutting the pieces from the bar, as the same is fed, by the weight thereof, into the machine. It accomplishes this purpose by a shearing cut in connection with the front edge of the upper stationary side e , of the die-box, while the lower stationary

side *f*, projects somewhat farther than the side *e*, in order to furnish a gage, or stop, on which the bar rests before being cut. The movement of the die is sufficient to
 5 allow the bars to descend in front of it; and then to cut the bars off, and force the pieces entirely into the die-box, its own movement ceasing just when it comes in contact with the front sides of the dies *g*, *h*.
 10 It is mounted in a sliding socket *T*, which is actuated by a toggle-lever *M*, toggle-link *X*, and cam *D*, in the same manner as that described for actuating the dies *g*, *h*.

The die *b*, which slides in the fixed back
 15 of the die-box, is of the same form and size in transverse section, as the nuts to be formed. Its movement is from a position where its face is flush with the back of the die-box, forward through the die-box, suffi-
 20 ciently far to drive the finished nuts therefrom, till they fall out by their own weight. In the beginning of its motion forward, it gives the final pressure to the nuts as herein-
 25 after described. Its movement is produced by means of two antagonist, antifriction, eccentric sectors *R*, *S*, one being hinged to a fixed bearing *k*, and the other to the slid-
 30 ing socket *U*, of the die. Against the lower edge of the sector *R*, a cam *L*, on the driving shaft, presses and gives the requisite motions, as shown in Fig. 3. These sectors
 35 are preferable to the toggle-joint or to other modes of actuating this particular die, because the greatest power is required at the beginning, while in the afterpart of the
 40 stroke, very little power is needed; and the forms of the sectors may be made so as to produce these relative forces at the proper times. The fixed bearings, against which the
 45 sector *S*, and the toggle-link *X*, respectively bear, are adjusted in the same manner as those of the toggle-links *Y*, *Z*, above described. And all the bearings *p*, *p*, *p*, *p*,
 of the sliding sockets *T*, *U*, *V*, *W*, are ad-
 50 justable. The dies are drawn back, if necessary, or desired, after the action of their respective cams, by means of springs *r*, *r*, *r*,
 or their equivalents.

To form the holes through the nuts, two
 50 punches *c*, *d*, are employed, moving respectively in the dies *a*, and *b*. Their inner ends are rounded, tapered, or pointed, so that they will force all the metal from be-
 55 fore them, sidewise into the body of the nuts, and thus avoid the waste of any metal. To do this in the best and most efficient manner, one punch *c*, is first driven through the nut till its extremity nearly or quite
 60 reaches the back surface thereof; and then the other punch is driven forward through the nut, while the former punch retreats before it. The punches have heads *s*, *t*, on
 65 their outer ends, to prevent their being driven too far through the dies; and there is a stop *v*, attached to the frame, against

which the head *t*, of the punch *d*, strikes, in order that said punch may never be driven beyond the front edge of the cutting side *c* of the die-box. The roundness or
 70 taper of the inner ends of the punches need not exceed a hemisphere, as indicated in Fig. 3. The punches are actuated respec-
 75 tively by means of suspended levers *N*, *Q*, against which cams *E*, *I*, on the driving shaft, act. The levers are suspended in slots through the frame, and the die-sockets *T*, *U*,
 80 substantially as shown in Fig. 3; and they return, after the action of their cams, by their own weight. Each punch requires no other means of driving it back than the
 85 action of the opposite punch, or of the nut blank, pressing against it.

The succession and effects of the move-
 85 ments produced in the manner above described, are as follows: The cutting die *a*, being withdrawn to its farthest extent, and
 90 the bar having descended in front of it, it is driven inward, first cutting the piece for a nut from the bar, and then forcing it into the die-box, its cam continuing to hold it in
 95 contact with, or close to, the front sides of the dies *g*, *h*. Immediately after this movement, the said dies *g*, *h*, are driven inward till they come in contact with the nut piece, and these are held by their respective cams,
 100 till, first, the punch *c*, is driven through, or nearly through, the pieces, and, afterward, the punch *d*, is driven in the other direction, through the same, and thereby finishes the hole in the center. Then, the said dies
 105 *g*, *h*, are driven still farther inward, while the punch *d*, remains in the piece, until the periphery of the nut is completely formed by the swaging action thereof. The back die *b*, then comes forward, and, first, pro-
 110 duces the final pressure against the nut, while the other dies are still held in place by their cams, and the punch *d*, is in the nut. The other dies now recede, and allow the die *b*, to continue forward till it drives
 115 the nut from the die-box; when it begins to recede, and all the parts being again in the same positions as at first, the same movements are repeated, thus making a nut at each revolution of the driving shaft *B*.

What I claim as my invention and desire to secure by Letters Patent is—

1. The arrangement and use of the cutting die *a*, the compressing dies *g*, *h*, the punches *c*, *d*, and the finishing and discharging die *b*,
 120 when constructed in the manner and operated in the order herein set forth.

2. I also claim the arrangement of the projecting under side or bottom, *f*, of the die-box, in combination with the feeding
 125 standard *C*, shear-edged die-top *e*, and dies *a*, *b*, in such a manner that the nut bar is fed into the machine, the nuts cut therefrom, and finally discharged from the machine, without the employment of any other means
 130

except the ordinary or otherwise necessary motions of the two dies *a*, *b*, substantially as described.

5 3. I also claim the arrangement of the bearings *k*, *k*, with sliding wedges *i*, *i*, which are adjusted by screws *j*, *j*, or their equivalents, for the purpose of accurately adjusting the movements of the toggle levers and links as described.

4. I also claim the arrangement and combination of the sectors R, S, and cam L, substantially in the manner and for the purpose specified. 10

J. C. DAY.

Witnesses:

JOHN B. DRAYTON,
DAVID BEDFORD.