

R. B. GOODYEAR.

Shuttle-Box Mechanisms for Looms.

No. 139,384.

Patented May 27, 1873.

FIG.3.

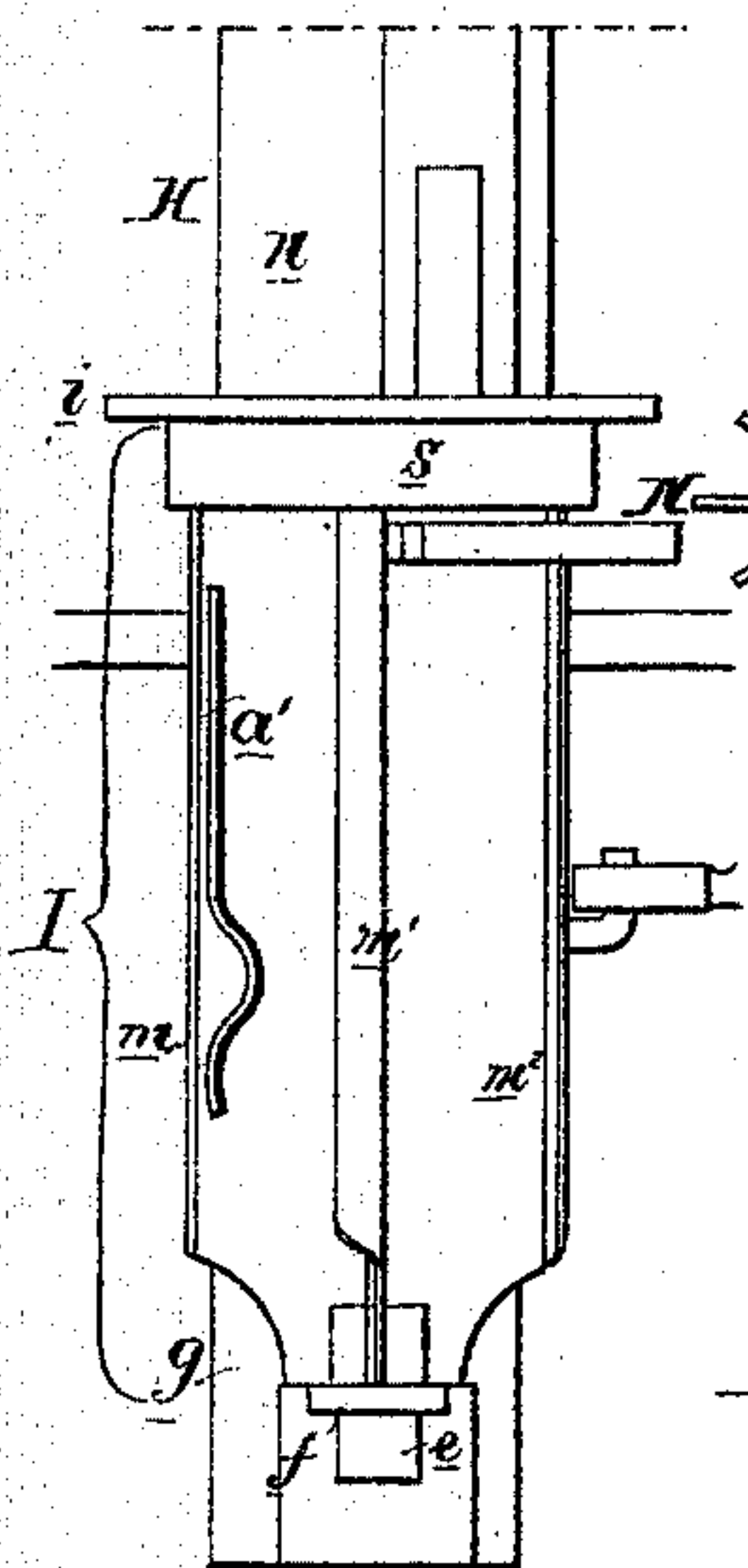


FIG.1.

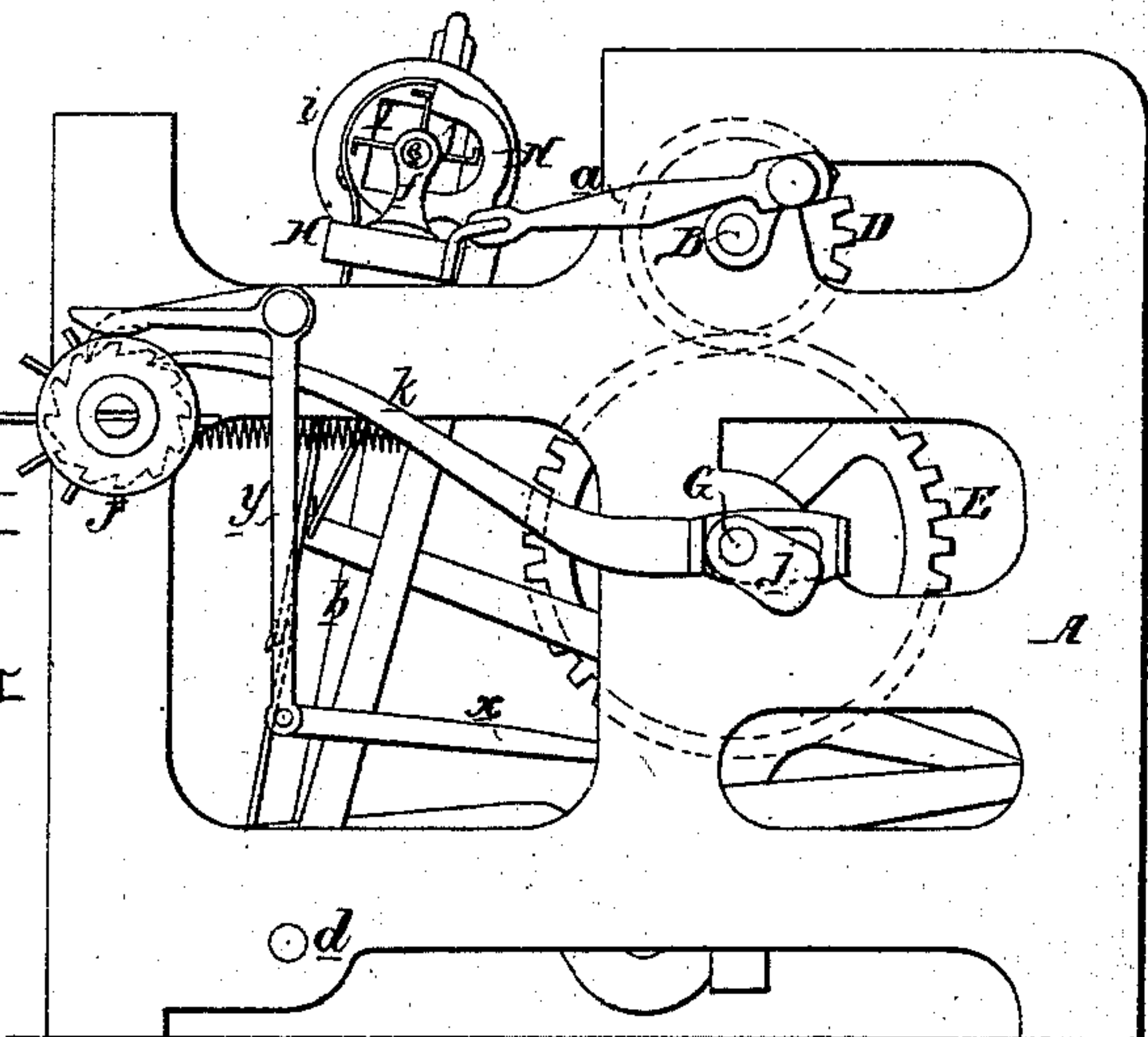


FIG.4.

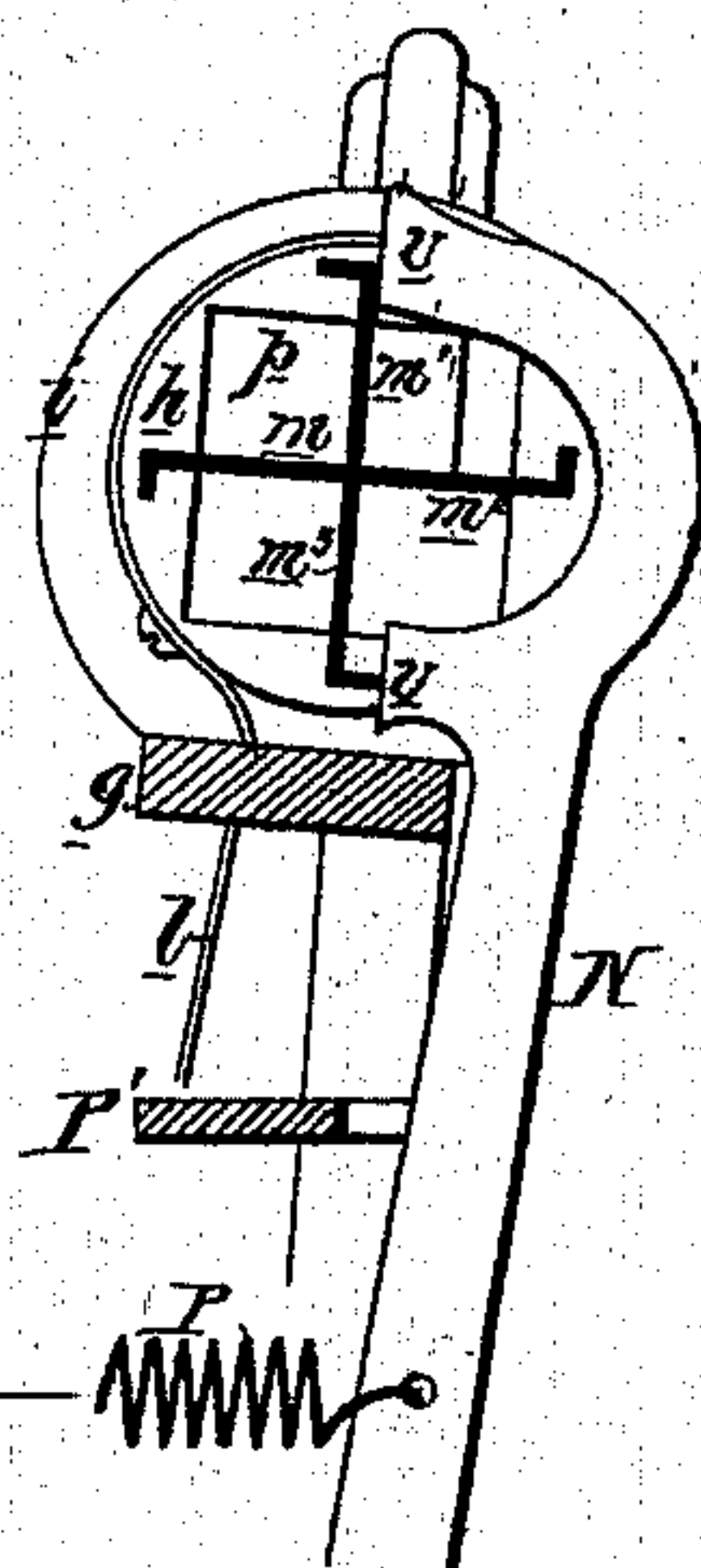
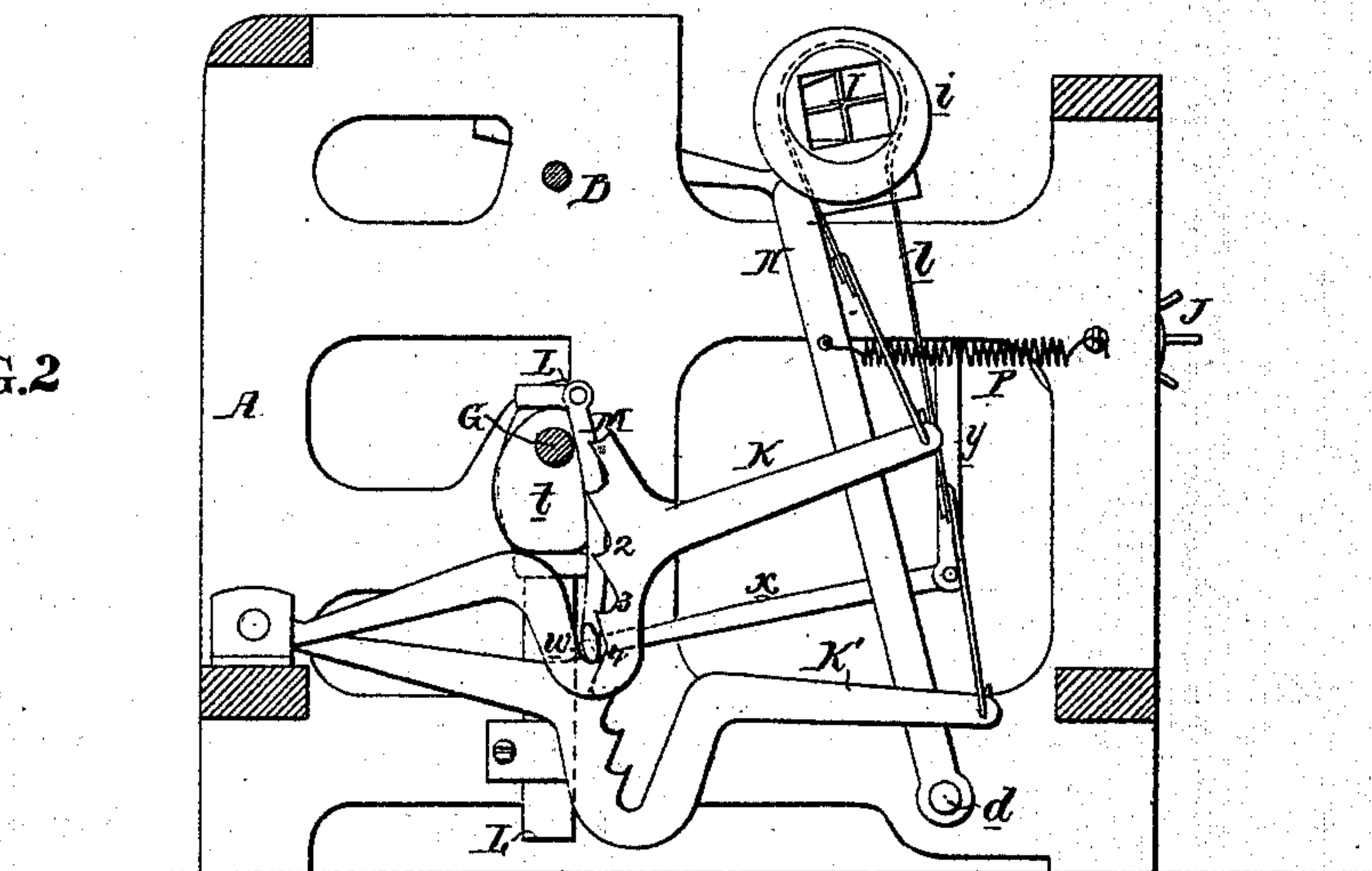


FIG.2



WITNESSES.

Harry Smith
Thomas McPherson

Robert B. Goodyear
by his Atty.
Sturges and Son

UNITED STATES PATENT OFFICE.

ROBERT B. GOODYEAR, OF WILMINGTON, DELAWARE, ASSIGNOR OF ONE-HALF HIS RIGHT TO BARTON H. JENKS, OF PHILADELPHIA, PA.

IMPROVEMENT IN SHUTTLE-BOX MECHANISMS FOR LOOMS.

Specification forming part of Letters Patent No. 139,384, dated May 27, 1873; application filed December 2, 1872.

To all whom it may concern:

Be it known that I, ROBERT B. GOODYEAR, of Wilmington, New Castle county, Delaware, have invented Improvements in Rotary Box-Looms, of which the following is a specification:

My invention relates to improvements in looms, in which rotating shuttle-boxes are operated from pattern-wheels or chains through the medium of levers connected to straps passing round pulleys on the box-shafts; the objects of my improvements being to reduce the extent of the rotation of the boxes when making some of the changes, and to adjust and retain the boxes after adjustment. The first object I attain by increasing the number of steps or gradations on the pattern-wheel or chain so that they will be one in excess of the number of compartments of the shuttle-box, the steps on the levers being equal in number to those of the pattern-wheel. The second object I attain by means of an arm, N, so situated at the rear of the shuttle-box (see enlarged view, Fig. 4,) that it will adjust the box after it has been turned to the exact position required, and retain it after adjustment.

A, Figs. 1 and 2, represents one of the side frames of a loom; B, the driving or crank-shaft, a cog-wheel, D, on which gears into a larger wheel, B, on a shaft, G. The cranks of the shaft B are connected in the usual manner by rods *a* to the lay H, the legs *b* of which are connected to pins *d* on the frames. I is the rotating shuttle-box, one end of which has a journal, *e*, adapted to a bearing, *f*, secured to a continuation, *g*, of the lay H, the opposite end of the shuttle-box consisting of a disk, *h*, arranged to turn in a ring, *i*, also secured to the lay, all as best observed in the enlarged views, Figs. 3 and 4. The shuttle-box has in the present instance four compartments formed by the plates *m*, *m'*, *m''*, and *m'''*, as best observed in the enlarged sectional view, Fig. 4, and any one of these plates can be brought to coincide with the bed *n* of the shuttle-race, with which the plate *m*, Fig. 4, coincides in the present instance, there being in the disk *h* a hole, *p*, for each compartment for the free passage to and from the same of the shuttle. It

should be understood that each plate *m* of the shuttle-box is provided with a spring, *a'*, for retarding and retaining the shuttles, and that the box is provided with the usual appliances for retaining the shuttles in the compartments. A pattern-wheel, J, with pins on its periphery, hung to a pin on the side of one of the frames, determines which of the compartments of the shuttle-box shall coincide with the race, the pattern-wheel being actuated by a cam, *j*, on the shaft G through the medium of a pawl, K, and ratchet on the wheel in a manner which will be readily understood by reference to the side view, Fig. 1. A strap, *l*, passes over and is attached to a pulley, *s*, secured to or forming part of the shuttle-box, and one end of this strap is attached to the outer end of the lever K, and the other to the lever K', both levers being hinged to the rear of the loom. A vertical reciprocating motion is imparted, by a cam, *t*, on the shaft G, to a slide, L, adapted to guides on the frame of the loom, and to this slide is loosely connected the upper end of an arm, M, having at its lower end a projecting pin, *w*, for striking the levers K K', the lateral position of the arm M being under the control of the pattern-wheel, as it is connected by a rod, *x*, to one arm of a bell-crank lever, *y*, hung to the side of the frame, the other arm of this lever being directly above the periphery of the pattern-wheel, so that it may be raised and permitted to fall by the rotation of the wheel. There are on each of the levers K K' five shoulders or steps, O 1 2 3 4, against any one of which the projection *w* of the reciprocating arm M can strike, and the pins or steps of the pattern-wheel are equal in number to, and decide which of these shoulders shall be struck by the arm M of the reciprocating slide L, and consequently which of the four compartments of the shuttle-box shall coincide with the shuttle-race; for it will be seen that the depression of one lever must be simultaneous with the elevation of the other, and consequently that a partial rotation of the shuttle-box must take place on the depression of either lever, and that the extent of the movement of the box will depend on the point where either of the levers may be struck, as determined by the

pattern-wheel; in other words, while the rotary shuttle-box is operated by the direct power of the loom, the pattern-wheel determines which of the four compartments of the box shall coincide with the race, and during how many picks of the shuttle one compartment of the box shall so coincide.

It will be understood that a pattern-chain may be used in place of the pattern-wheel for operating the bell-crank lever *y*.

In ordinary looms of this class the number of steps in the levers and pattern-chain is equal to the number of compartments in the shuttle-box, so that when the fourth shuttle is in use one of the levers will be at the limit of its downward motion, and the box must be turned back three-fourths of a revolution in order to bring the first shuttle of the series next to coincide with the race. This is objectionable, as the speed of the loom between any of the "picks" cannot be greater than that at which it will run during the most extended movement; and where this movement is three-fourths of a revolution the general speed of the loom is greatly reduced.

By inserting an additional pin, or using an additional step, as above described, this difficulty is in many instances avoided, for it allows the levers a further motion after the fourth shuttle has been used, so as to bring the first, by a single step, opposite the shuttle-race. Extended movements being thus avoided, the speed of the loom may be greatly increased; an increase of capacity also resulting, without any material increase of cost, and without rendering the loom more complex.

The arm *N*, at the rear of the shuttle-box, is connected at its lower end to the pin *d*, on which one of the legs of the lay vibrates, and the upper end of this arm has two projections, *V*, which, during a portion of the movement of the lay, are caused by a spring, *P*, to bear against two of the plates of the shuttle-box, as best observed in the enlarged view, Fig. 4. When the lay has been moved to the limit of its forward movement the arm *N* has been left behind, having been arrested by a stop, *P'*;

hence the shuttle-box is at liberty to be turned by the devices described; but on moving the lay back two of the plates of the box will strike the projections *v v* of the arm, and the first duty of these projections will be to adjust the box to the desired exact position, to which it might not be moved in the first instance; and the second duty of the projection is to maintain the box, by a constant pressure, against two of the plates, in that exact position which insures the coincidence of one of its compartments with the shuttle-race for the free passage of the shuttle when the lay has reached or nearly reached the limit of its rearward movement.

It should be observed that I do not desire to claim the levers attached to the shuttle-box, and having stops or shoulders, any one of which may be struck by a device operated by a pattern-wheel, as an example of such mechanism may be found in the English patent of Andrews, No. 2,724, September 27, 1869, that part of my invention which relates to the operating of the shuttle-box being restricted to the special relation which the pins on the pattern-wheel have to the steps on the levers and to the number of compartments in the shuttle-box.

I claim—

1. A loom in which a rotating shuttle-box is operated by a pattern-wheel or chain through the medium of levers *K K'* and a chain, and in which there is one more step upon the chain and on each lever than there are compartments in the box, all substantially as and for the purpose described.

2. The combination of a rotating shuttle-box with the adjusting and retaining arm *N*, arranged and operating substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBT. B. GOODYEAR.

Witnesses:

WM. A. STEEL,
HUBERT HOWSON.