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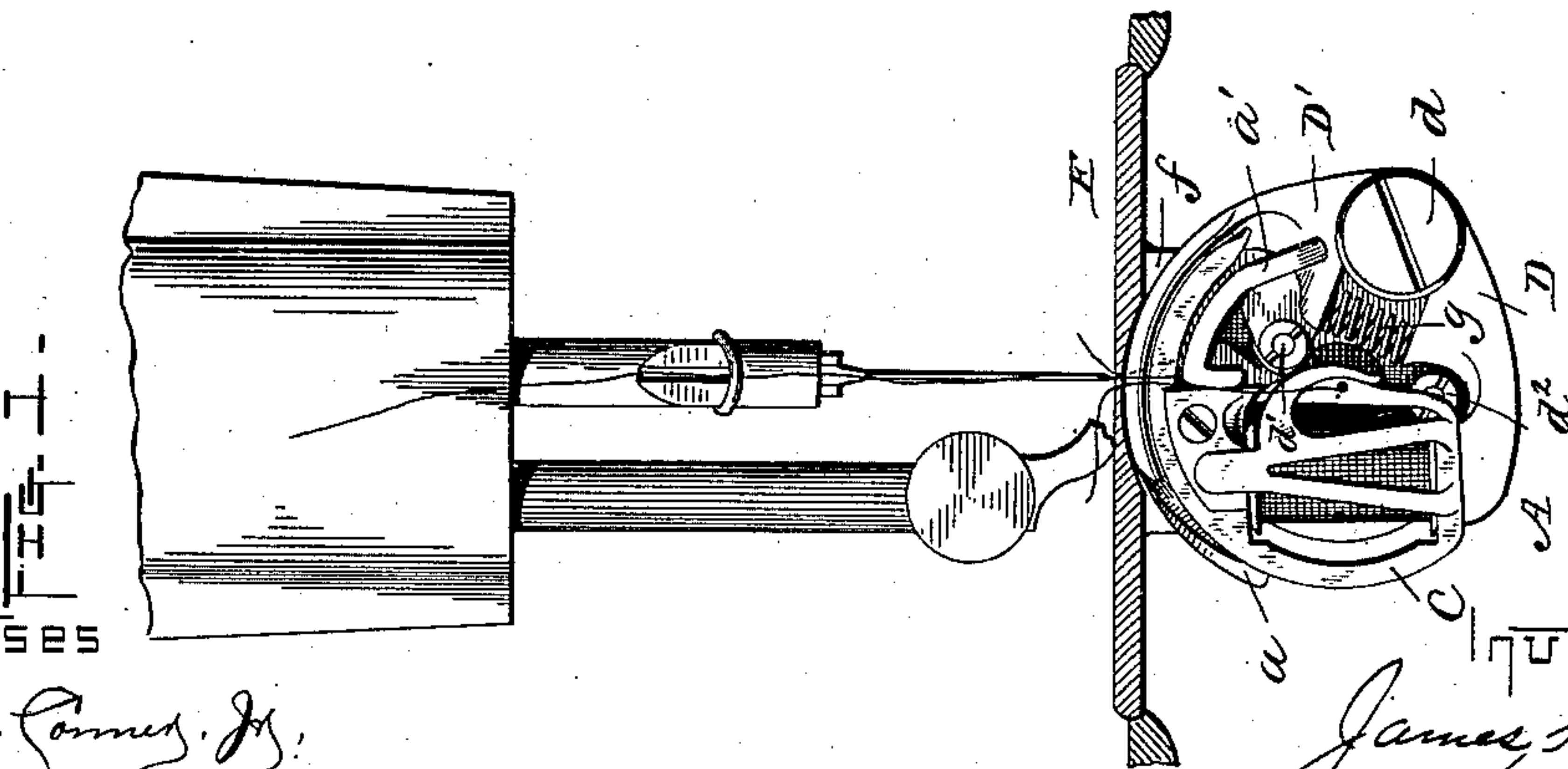
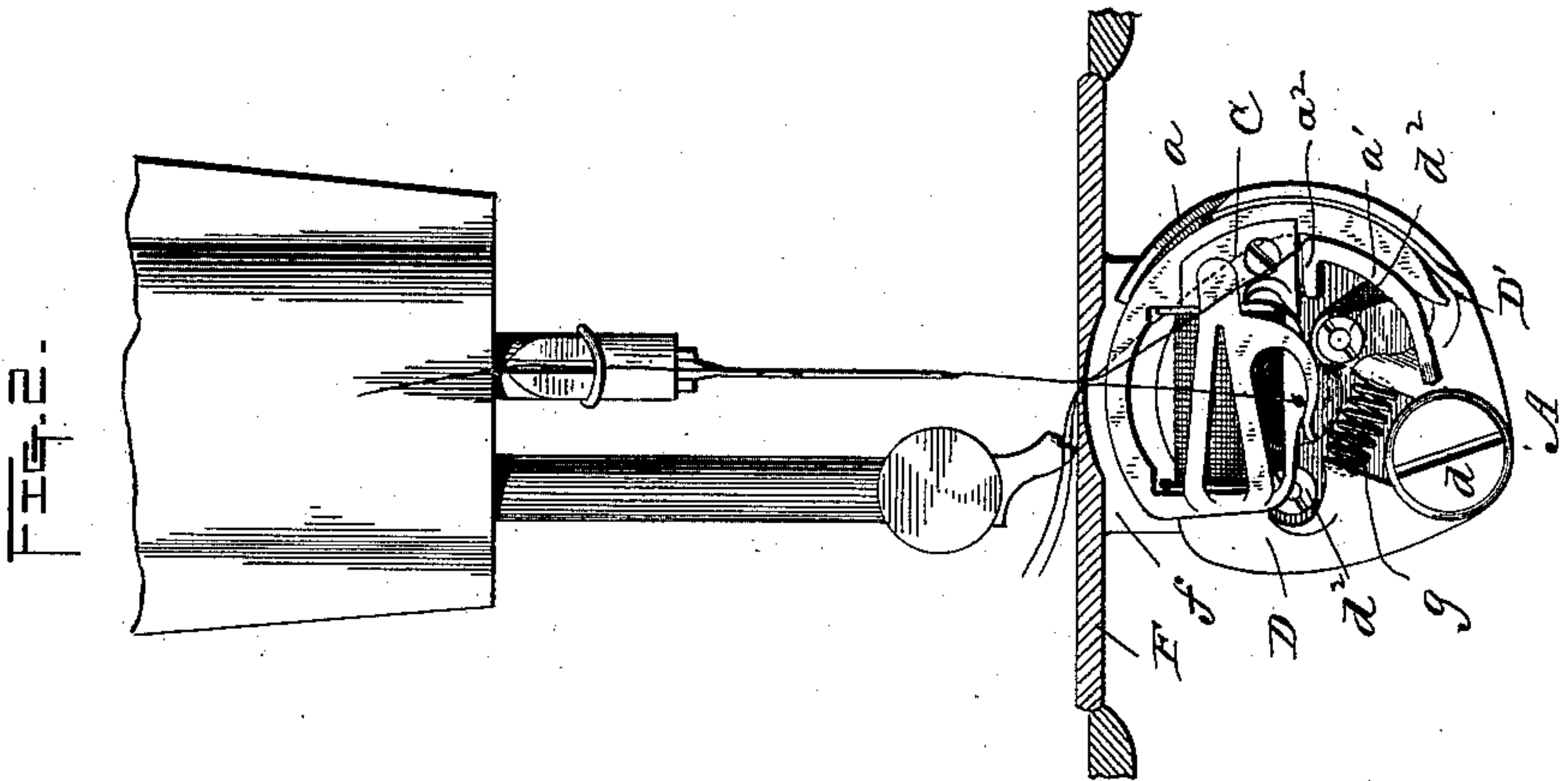
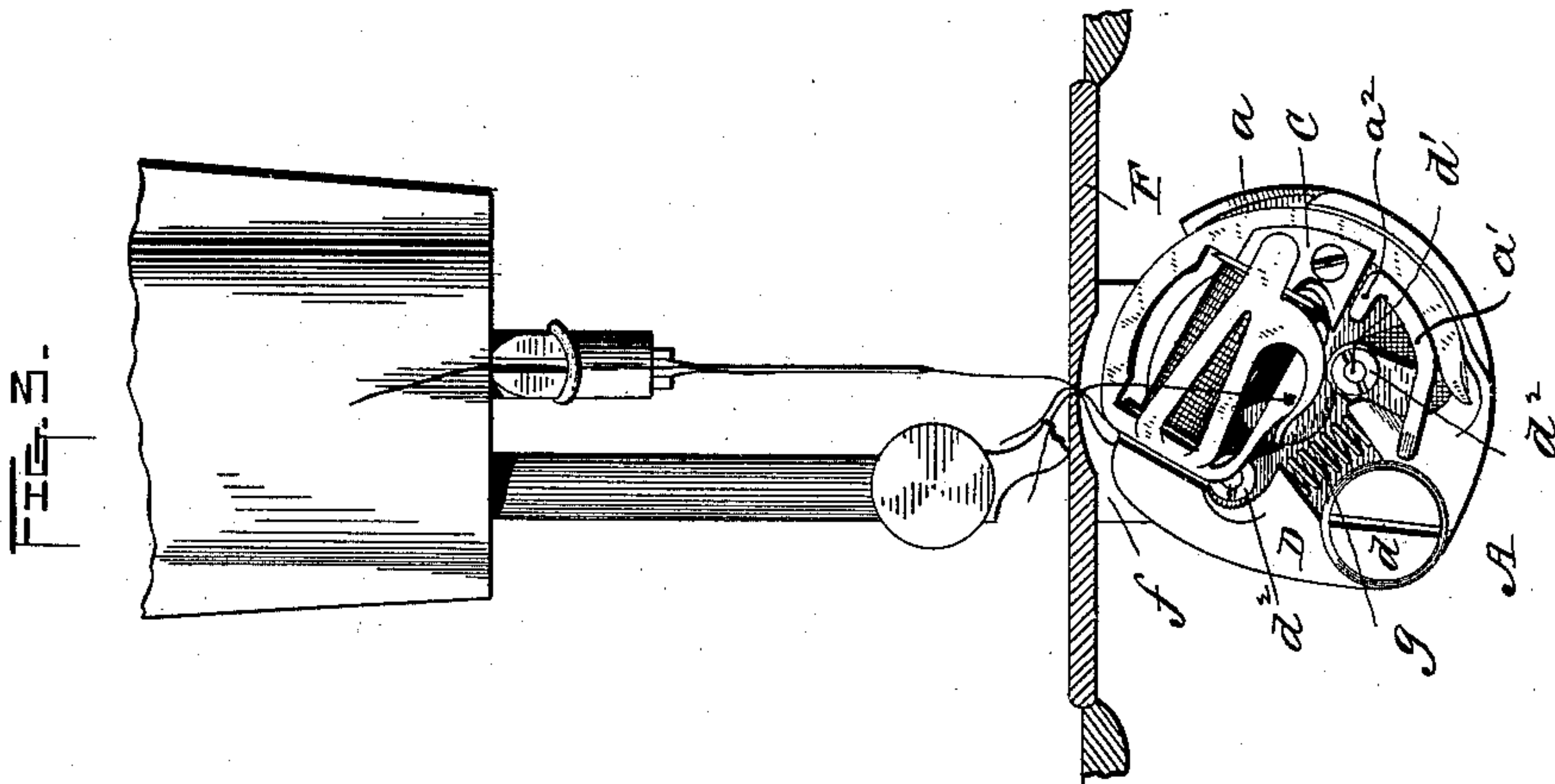
2 Sheets—Sheet 1.

J. BOLTON.

OSCILLATING SHUTTLE DRIVER FOR SEWING MACHINES.

No. 376,284.

Patented Jan. 10, 1888.



Witnesses

L. G. Conner, Jr.  
J. C. Huntington

INVENTOR OF  
James Bolton,  
by Henry Calver,  
Att'y.

(No Model.)

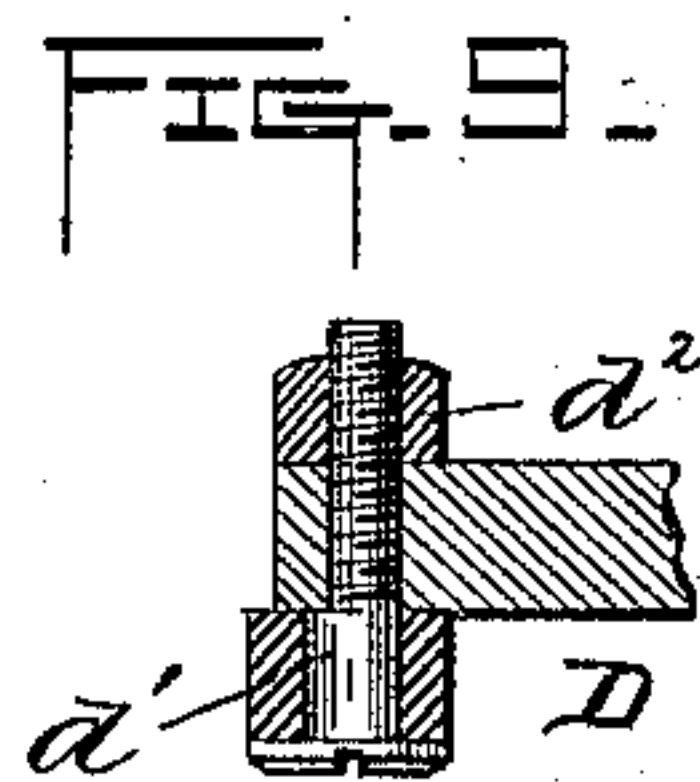
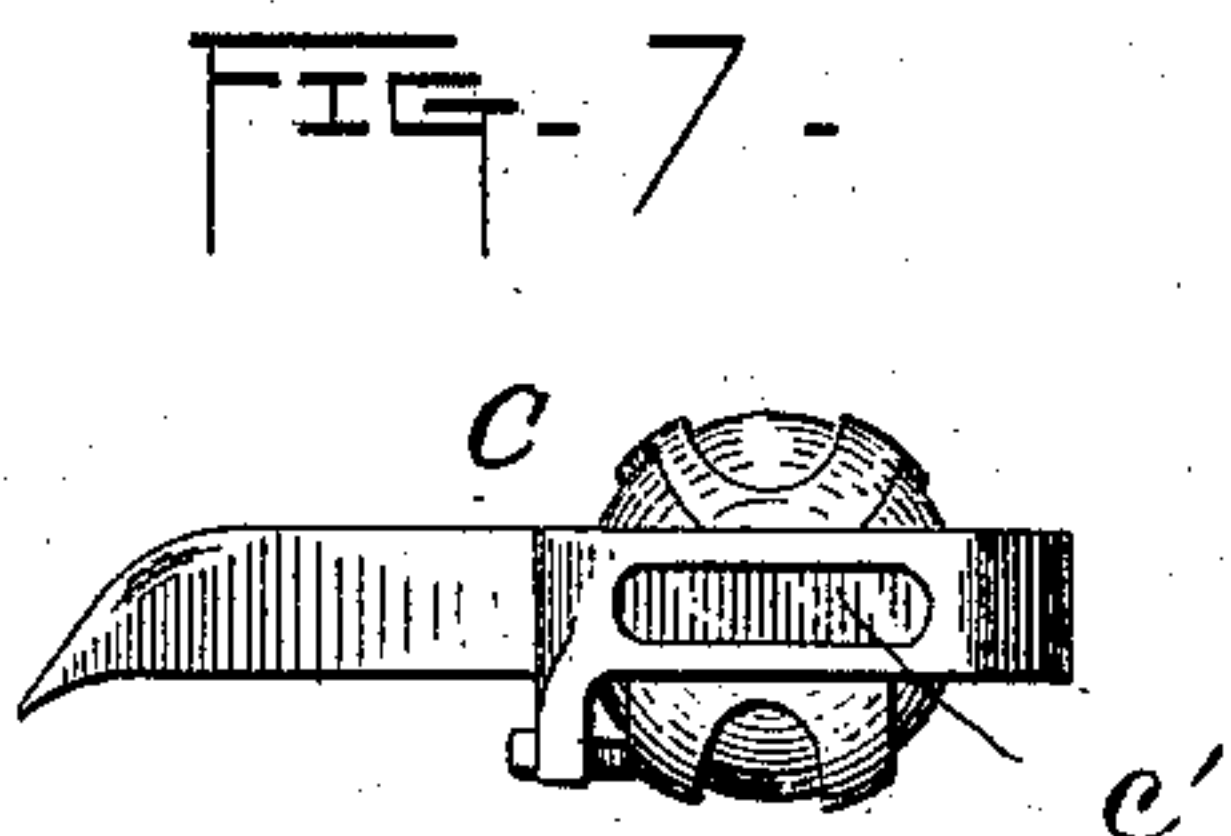
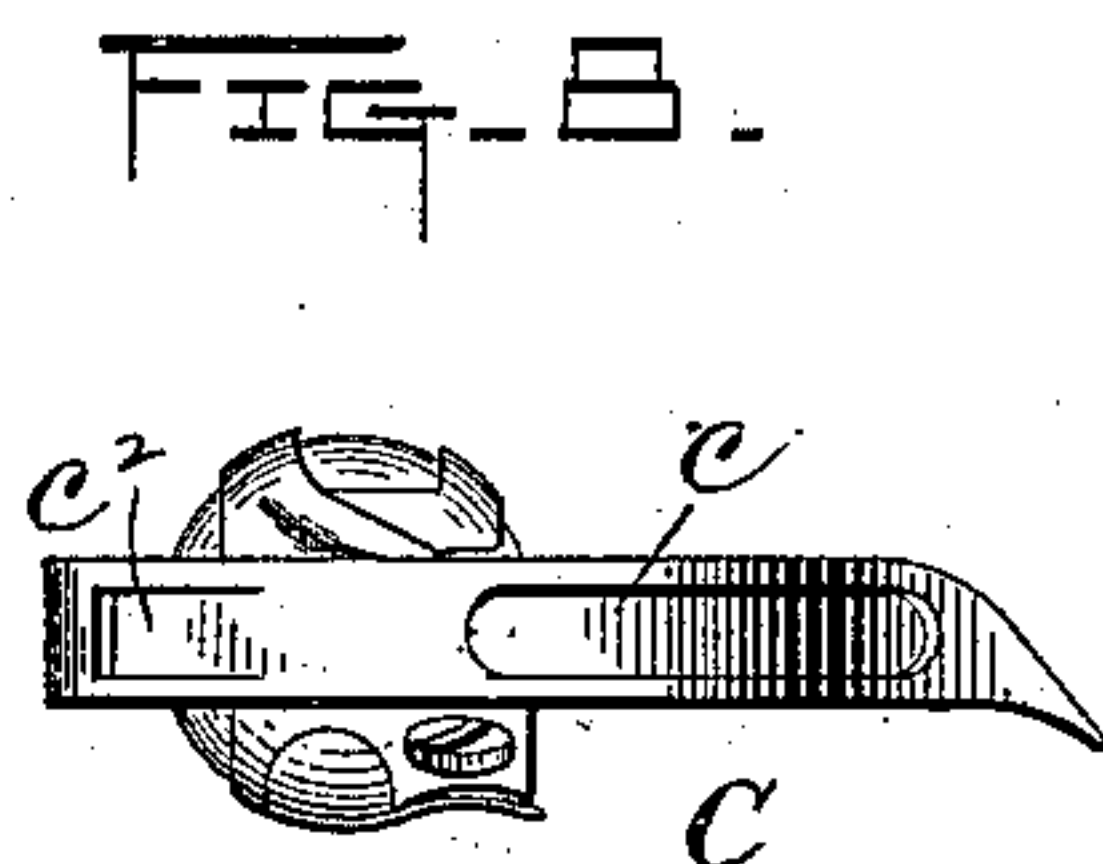
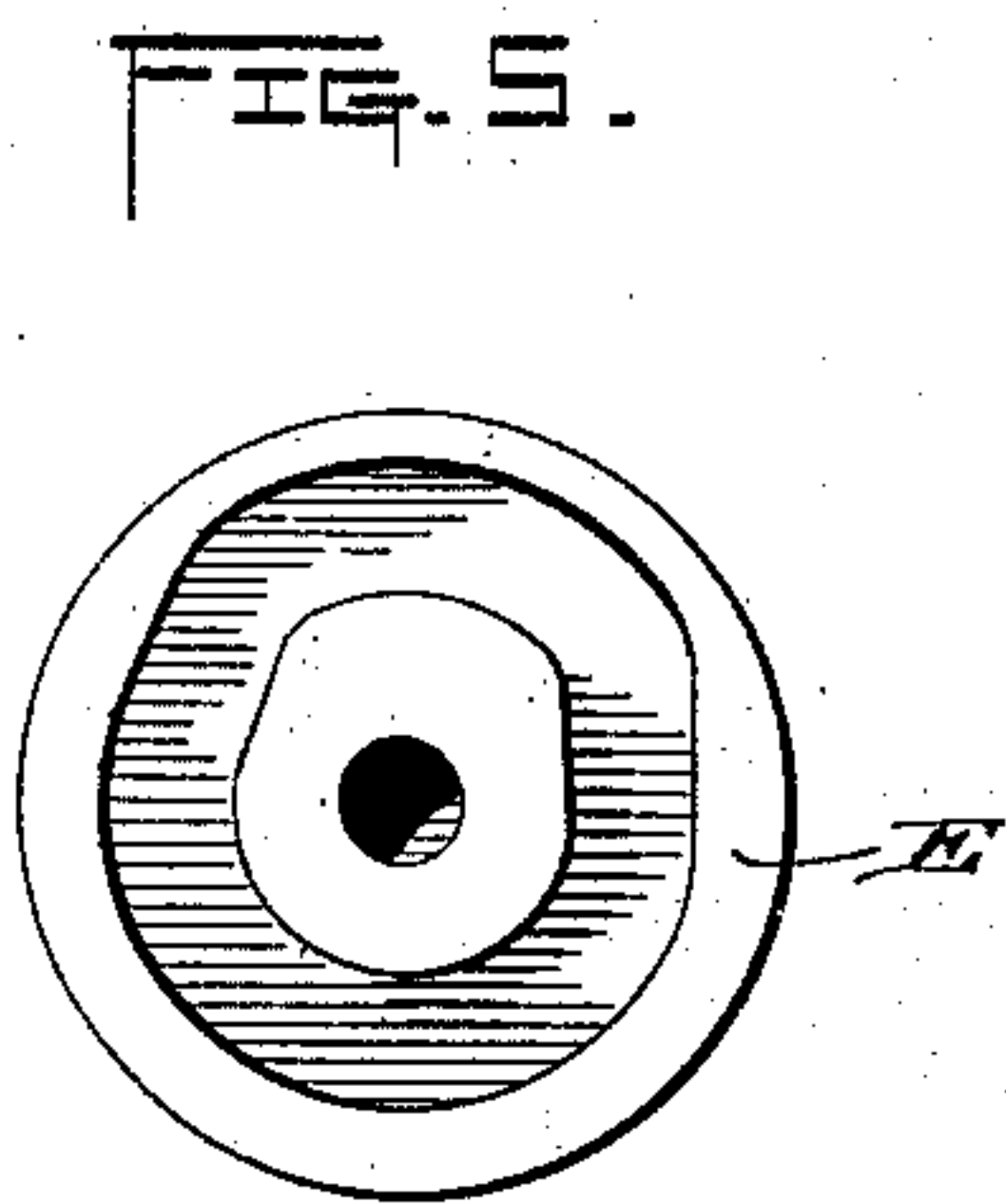
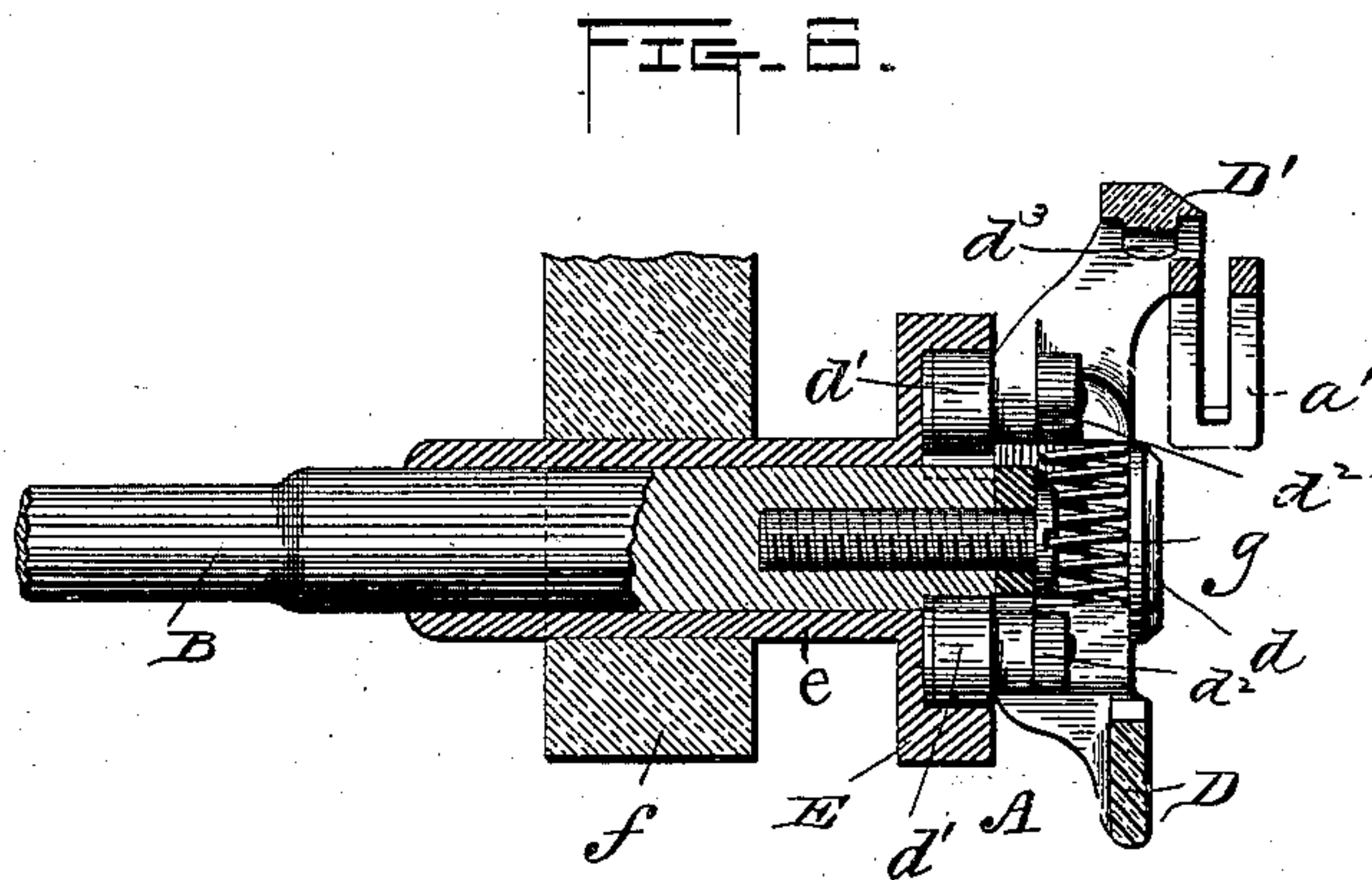
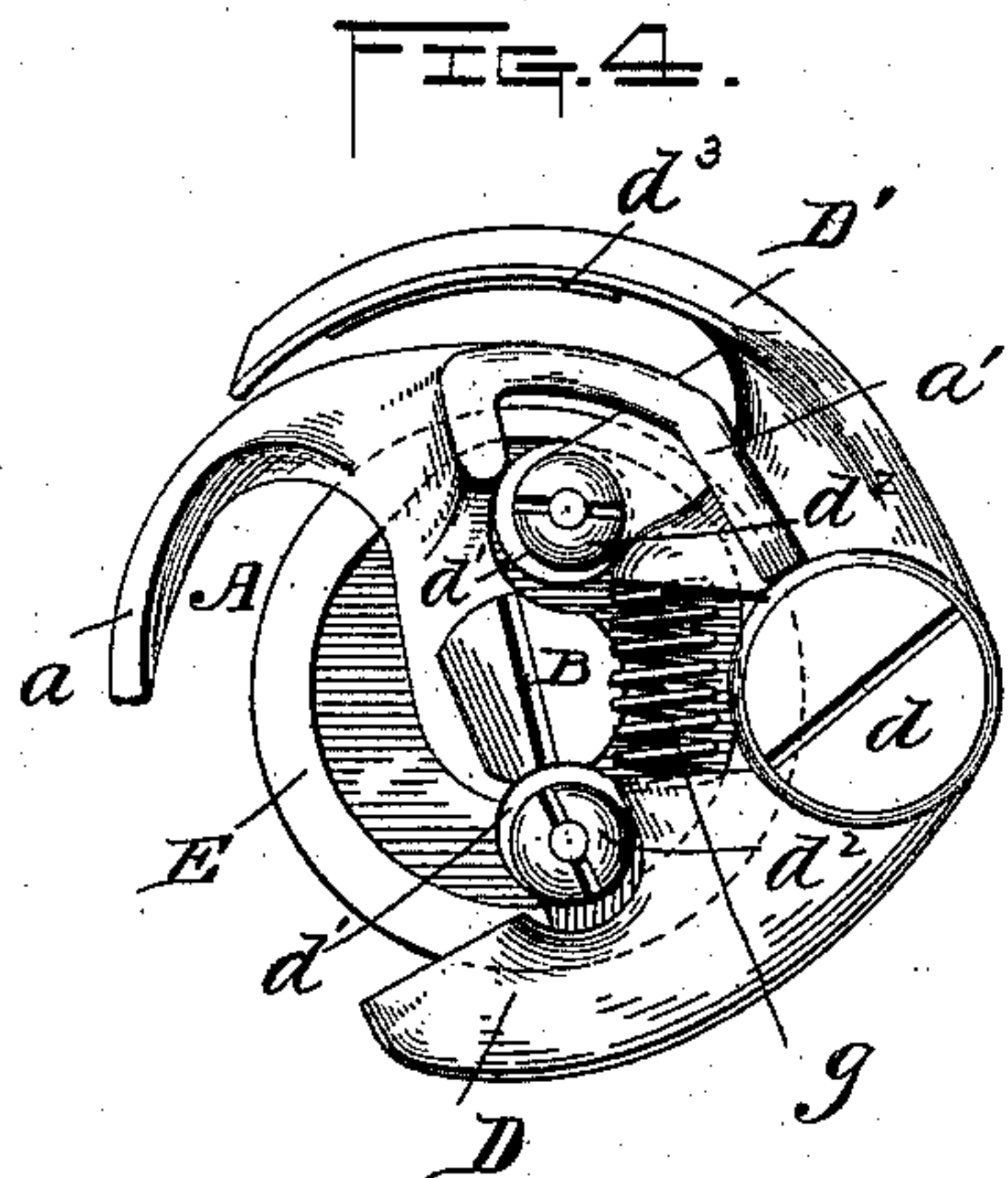
2 Sheets—Sheet 2.

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Patented Jan. 10, 1888.



Witnesses

G. G. Corney &  
G. C. Hunting

Inventor

James Bolton  
by Henry C. Carter



# UNITED STATES PATENT OFFICE.

JAMES BOLTON, OF GLEN SPEY, NEW YORK.

## OSCILLATING SHUTTLE-DRIVER FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 376,284, dated January 10, 1888.

Application filed July 1, 1887. Serial No. 243,062. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES BOLTON, a citizen of the United States, residing at Glen Spey, in the county of Sullivan and State of New York, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention comprises certain improvements in sewing-machine shuttle drivers or carriers, whereby they are adapted to operate the shuttles in a positive and efficient manner without requiring races for the shuttles to run in. By dispensing with a shuttle-race in a sewing-machine much friction and wear are avoided; but the devices heretofore devised for this purpose have not been found to operate satisfactorily, and have therefore not been adopted practically.

The present invention is an improvement on that embraced by my application No. 208,939, filed July 24, 1886, which covers a shuttle carrier or driver provided with a clamping-plate having two arms alternately clamping the shuttle to the driver, the said arms moving in unison and being operated by a stationary cam. The said device, while very well serving the purpose for which it was intended, has been found in practice to have one fault, in that between the time when one clamping-arm was released from the shuttle and the other engaged therewith the shuttle would momentarily be loose in the carrier, and more or less rattling noise therefore resulted. This objection is obviated in the present instance by the use of two independently-movable clamping-levers operated from a stationary cam in such a manner that one lever will engage the shuttle before the other is released therefrom, and thus the shuttle will always be held tight by one or both levers. The shuttle-carrier is provided with two arms, which, in connection with the clamping-levers, form two independent clamps, in one, at least, of which the shuttle is always tightly held, and I prefer to use a spring to assist the centrifugal force incidental to the rapid movement of the driver or carrier in releasing the clamping-levers.

In the drawings, Figures 1, 2, and 3 are sectional front end views, with the parts in different positions, of a "Singer" oscillating-shuttle machine with my invention applied thereto. Fig. 4 is a detail view of the shuttle-carrier with the shuttle removed. Fig. 5 is a detail

face view of a modified form of stationary cam. Fig. 6 is a sectional detail showing the stationary cam and adjacent parts. Figs. 7 and 8 are detail views of the shuttle to show the recesses or pockets therein engaged by the clamping-levers. Fig. 9 is a detail sectional view to show one of the eccentric studs of the clamping-levers.

In the machine herein shown the shuttle-driver A is carried by a shaft, B, having an oscillating or reciprocating rotary movement, the said driver having two fixed arms, *a* and *a'*, the former being outside of the shuttle C and the latter inside of the shuttle or under the beak thereof.

D and D' are the shuttle-clamping levers shown in the present instance as having a common fulcrum on the screw-pin *d*. The said levers, in connection with the arms *a* and *a'*, form two clamps, of which the said arms may be said to be the fixed and the said levers the movable jaws, the lever D and arm *a* forming one clamp and the lever D' and arm *a'* the other. E is a stationary cam having a sleeve, *e*, by which it is secured in the hanger *f*, depending from the work-plate F, the said cam being engaged by the roller-studs *d'* on the clamping-levers to operate the latter. In the present instance the clamping levers are forced positively against the shuttle by the impingement of the roller-studs *d'* against the outer wall of the cam E, and are released from the shuttle by the spring *g*, the action of the latter being more or less assisted by the centrifugal force incidental to the rapid oscillation of the shuttle. I may, however, operate the clamping-levers positively in both directions by a grooved cam, as shown in Fig. 5; but I prefer to use the spring for releasing the clamping-levers, as it prevents the latter from rattling.

To take up the wear of the rollers, the studs *d'* are preferably made eccentric and held in adjusted position by small set-nuts *d''*, so that by loosening said nuts and partially rotating said studs before again tightening the nuts the rollers may be brought into the desired relation to the operative wall of the stationary cam.

The shuttle is provided at its beak and heel with shallow recesses or pockets *c* and *c'*, the former being engaged by a slight rib, *d''*, on the inner side of the free end of the clamping-lever D', and the latter by the free end of the lever D, so that the said levers can hold the



shuttle from lateral as well as from forward and backward movement in the carrier. The shuttle may also have a pocket or recess,  $c^2$ , rearward of the beak for the reception of the point of the arm  $a$ , to assist in holding the shuttle firmly. It will be observed that these recesses or pockets in the shuttle are provided with end as well as with side walls, so that the said shuttle will be held positively from forward and backward movements in the carrier as well as from lateral movements therein. This construction might, however, be reversed by forming the recesses or pockets in the clamping-levers and providing the shuttle with ribs to engage the same, this reversed construction being the obvious equivalent of the construction shown.

The operation of my invention is as follows: When the shuttle has taken a loop of needle-thread, as shown in Fig. 1, the clamping-lever  $D'$  is released from the shuttle, so that the loop of needle-thread can pass freely around the beak of the shuttle, the latter being now held tightly between the clamping-lever  $D$  and the arm  $a$  of the carrier, so that the beak of the shuttle is lifted slightly from the arm  $a'$  of the driver to make a free passage for the loop both below the beak as well as between the same and the lever  $D'$ . As the shuttle and driver move forward to the position shown in Fig. 2, the lever  $D'$  is clamped against the shuttle, opening a passage for the needle-thread between the rear part,  $a^2$ , of the arm  $a'$  and the shuttle, as shown in Fig. 2, and while in this position the shuttle is engaged by both clamping-levers, so that it is firm in the carrier, the lever  $D'$  engaging the shuttle before the lever  $D$  is disengaged therefrom. As the shuttle continues its forward movement to the position shown in Fig. 3, the clamping-lever  $D$  is released, so that there will be a loose passage for the loop between the shuttle and the arm  $a$  of the driver and a free passage between the shuttle and the said lever, as shown in said figure. The take-up now draws up the loop around the heel of the shuttle, and when the take-up has reached its highest position to tighten the stitch the return oscillation of the carrier will have again brought the parts into the position shown in Fig. 2, with the shuttle tightly held by both clamping-levers, so that when there is the greatest strain on the shuttle the latter is held by both clamps.

It will thus be apparent that by the construction shown and described I am enabled to operate a shuttle in a positive and efficient manner without a shuttle-race, and that, as the shuttle is always firmly clamped in the carrier by at least one of the clamping-levers, its operation will be almost, if not entirely, noiseless.

While I have shown my invention in connection with a well-known form of oscillating shuttle, I do not wish to be understood as limiting it thereto, as I may use my invention in connection with shuttles differently constructed and operated without departing from the essential features thereof.

I am aware of the patent of Miller and Diehl, No. 283,636, dated August 21, 1883, which shows a series of arms or levers moving with an oscillating shuttle-driver and operated successively by a stationary cam, to permit the loops of needle-thread to pass, so that the shuttle could be operated without a race to run in; but in the Miller and Diehl device the shuttle was always held loosely between the said levers and the driver, as shuttles are commonly held between the driver and the shuttle-race, and as the levers did not clamp the shuttle they did not effect the result which is accomplished by my invention.

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

1. In a sewing machine, the combination, with a shuttle, of a shuttle driver or carrier having two independently-operated clamps, by which the said shuttle is held and driven, and means for alternately opening and closing the said clamps to permit the loops of needle-thread to pass, whereby the shuttle is positively held and driven without requiring a race for it to run in, as set forth.

2. In a sewing-machine, the combination, with a shuttle, of a shuttle driver or carrier having two clamps, between which the said shuttle is held and by which it is driven, each of the said clamps consisting of a fixed and a movable part, the movable parts of the said clamps being adapted to operate independently of each other, and means for operating the said clamps, whereby the shuttle is positively held and driven without a race for it to run in, as set forth.

3. The combination, with a sewing-machine shuttle driver or carrier having two carrying arms or parts, one of which engages the shuttle on its outer side or periphery and the other of which engages the shuttle on its inner side, of two independently-movable clamping-levers to co-operate with the said carrying-arms to form two clamps, and a stationary cam to cause said clamping-levers to engage the shuttle.

4. The combination, with a sewing-machine shuttle driver or carrier having two arms or parts to engage a shuttle, of two independently-movable clamping-levers pivoted to the said driver or carrier, and thus moving therewith, a stationary cam to cause said levers to clamp the shuttle alternately, and a spring to release said levers from the shuttle.

5. The combination, with the shuttle provided with the recesses or pockets  $c$  and  $c'$ , having end and side walls, as described, of the shuttle carrier or driver, the independently-movable clamping levers adapted to engage the shuttle at the said recesses or pockets, and the stationary cam for operating the said levers.

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

Witnesses: JAMES BOLTON.  
HENRY CALVER,  
J. S. BARKER.