

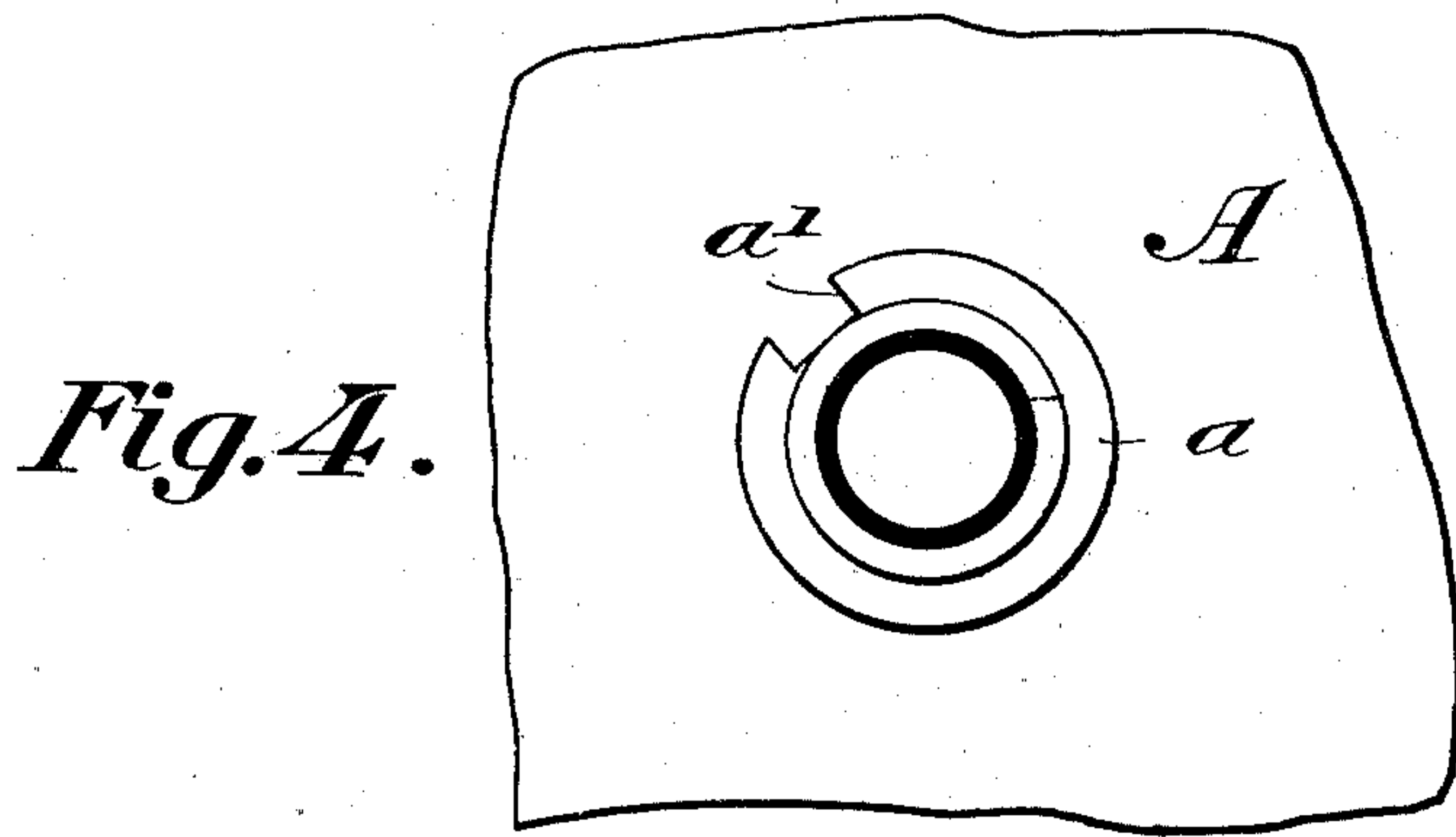
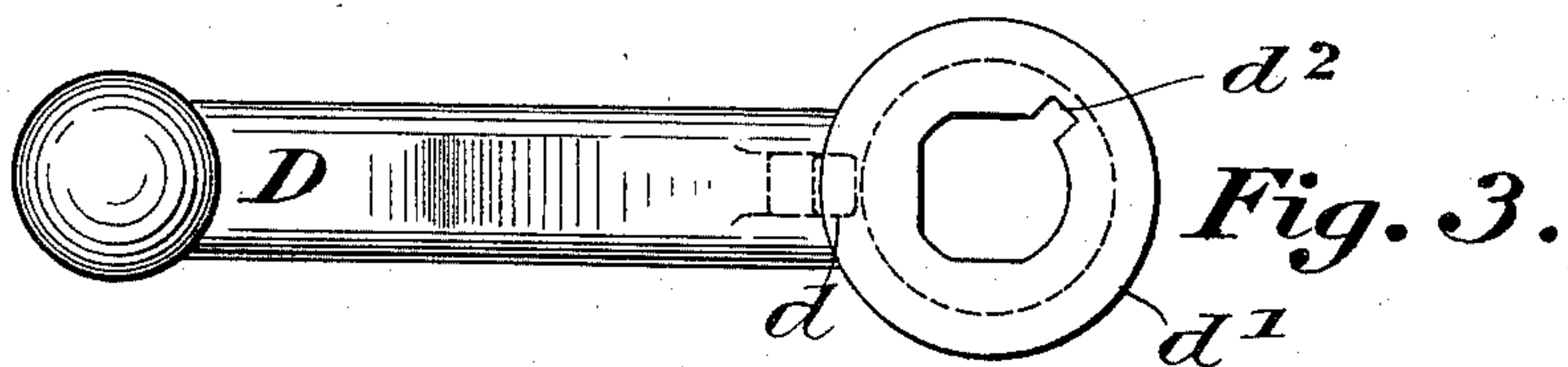
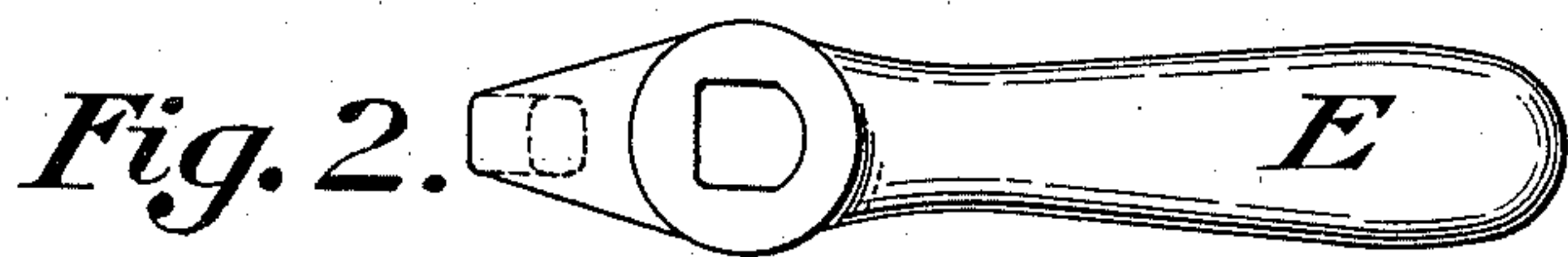
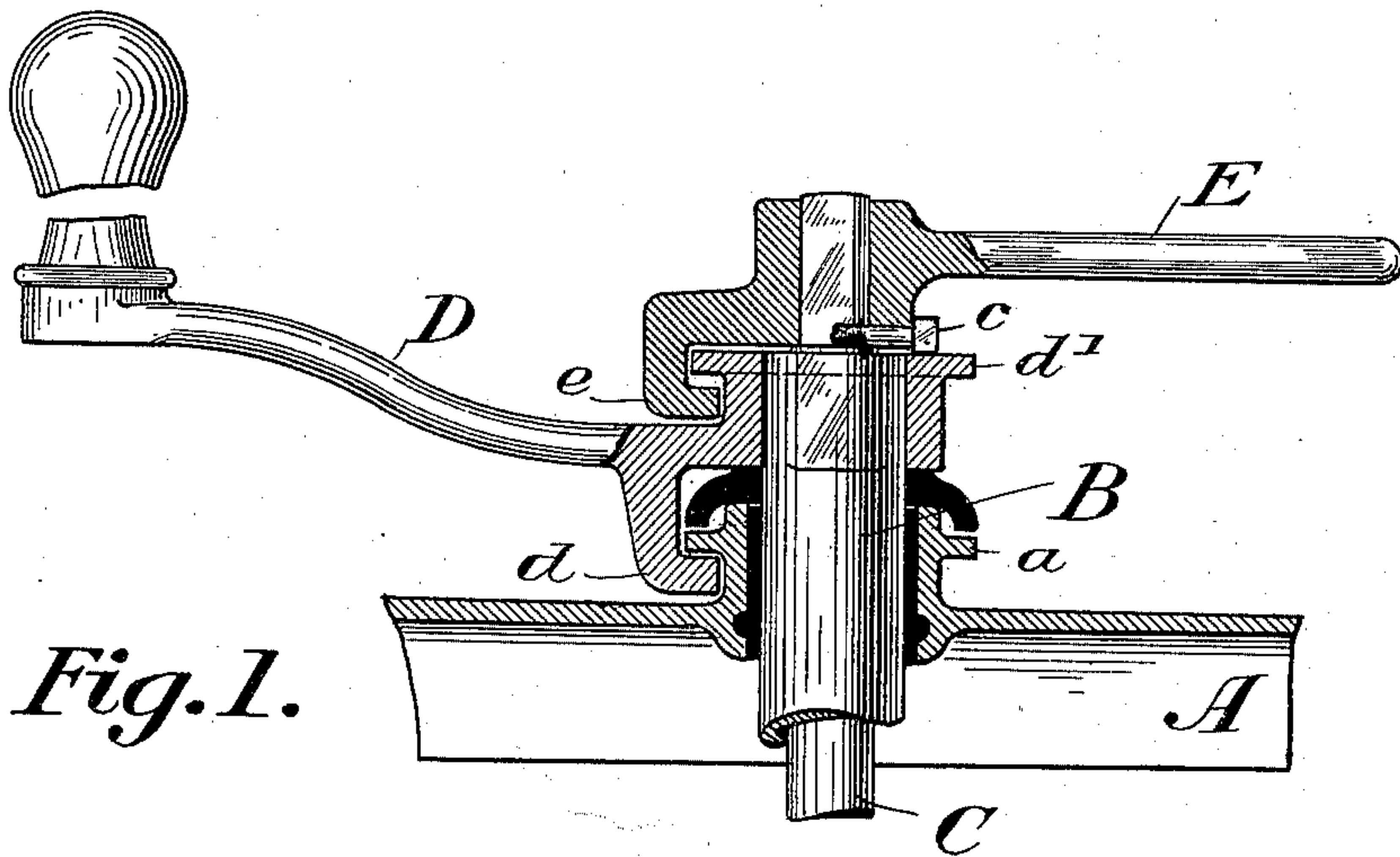
No. 609,092.

Patented Aug. 16, 1898.

J. D. FORRER.
ELECTRIC CONTROLLER.

(Application filed July 11, 1898.)

(No Model.)



WITNESSES:
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ELECTRIC CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 609,092, dated August 16, 1898.

Application filed July 11, 1898. Serial No. 685,631. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH D. FORRER, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Electric Controllers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention has special reference to electric controllers in which there are two switches mounted upon concentric shafts, each shaft having an operating-lever secured to it. One of these switches may be the regular controlling-switch of the controller and the other may be a reversing-switch or a switch having the combined functions of reversing the motors or cutting out either motor.

In a controller of this type it is extremely desirable that the operator shall not remove both handles unless the said switch is at a position of open circuit. The reason that this restriction is important is that the operator is not always a very high-grade man and in any case should have every safeguard present to aid him in avoiding errors. If he cannot remove the handles for operating the switches, there will be no danger of his leaving the car with the switches in operative position.

With this end in view my invention consists in mounting the two operating-levers upon their respective shafts in such a manner that one of the levers is prevented by a portion of the controller-casing from being removed except at a predetermined position and in so arranging and constructing the parts that the said lever cannot be removed when the shaft of the second lever is in a predetermined position. By these means both levers cannot be removed except when both switches are at the "off" position. I have also provided means whereby levers can only be removed simultaneously, and then only when both sides are at the "off" position.

My invention further consists in the specific construction, arrangement, and combination of parts, which I will now proceed to describe.

Referring to the drawings, Figure 1 is a transverse section of a part of a controller,

showing my improvement added thereto. Figs. 2 and 3 are detached plan views of the two operating-levers. Fig. 4 is a plan view of a portion of the top of the controller-casing.

A represents that portion of the controller-casing which is necessary to a proper understanding of my device.

B and C represent two operating-shafts, the former of which I will call the "control-shaft," while the latter I will call a "reversing-shaft."

D and E are the two operating levers or handles, which I shall call, respectively, the "control-handle" and the "reversing-handle." The control-handle D is mounted upon the shaft B in any suitable manner and has a downwardly-projecting hook or lug d , which in operation is beneath the annular projection a , the latter, as clearly shown, being formed of a portion of the controller-casing. a' is a recess formed in the annular projection a , this recess being of sufficient size to permit of the passage through it of the lug d when the handle D is at a position at which the recess and lug will register.

An annular projection d' similar to the projection a of the controller-casing is formed on the upper part of the hub of control-handle D. This projection d' , however, has no recess in it, but is continuous throughout its periphery.

The reverse-handle E is formed with a downwardly-projecting hook or lug e , which in service fits under the annular projection d' in the same way as the lug d fits under the projection a . c is a pin which is secured in the reversing-shaft C, and d^2 is a slot in the control-handle d through which this pin c may pass when the said pin and slot register with each other.

The recess a' is located so as to register with the hook d when the handle D is at the "off" or open-circuit position. The slot d^2 is arranged to register with the head of pin c when both the control-handle D and the reverse-handle E are at the "off" position. It will thus be seen that the reverse-handle E can never be removed from the reverse-shaft C unless the control-handle D is also removed from the control-shaft B, because of the fact that the hook e fits under the projection d' .

Furthermore, it will be observed that the handle cannot be removed until it is at the "off" position, because of the engagement between projection *a* and hook *d*, and even when the handle B is at the "off" position it cannot be removed unless reverse-handle E is also at the "off" position, for unless it is the head of the pin *c* is engaging the top of the control-handle.

I do not desire to be limited to the particular details which I have shown and described, as my invention is broader than these details, and they might be considerably varied without departing outside the scope of the appended claims. I would particularly point out that while I have described my improved mechanism in conjunction with operating-levers for a control-switch and a reversing-switch it may readily be used for other kinds of concentrically-arranged switches. I also desire to point out that I have provided a highly useful interlocking mechanism even though the projection *d'* and lug *e* be omitted, for in this case, while the reverse-handle could be removed at any position, the control-handle cannot be removed except when both switches are at the "off" position.

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

1. The combination of a pair of concentric shafts, operating-levers for each shaft, means for preventing the removal of one of said levers except when it is at a predetermined position, and independent means for preventing the said lever from being removed except when the other shaft is at a predetermined position.

2. The combination of a pair of concentric shafts, an operating-lever for each shaft, a fixed annular projection having a recessed portion, a lug on one lever engaging said projection and adapted to register at one position with said recessed portion, a slot in the same lever, and a stop on the other shaft adapted to register with said slot at one relative position of the said shaft and the said lever.

3. A pair of concentric shafts, operating-levers for the same, means for preventing the

levers from being dissimultaneously removed from their shafts, and means for preventing them from being simultaneously removed except when at a predetermined position.

4. A pair of concentric shafts, operating-levers for the same, mechanism permitting independent rotation of said levers but preventing independent vertical movement of the same, and a lock for preventing simultaneous vertical movement except at a predetermined position.

5. The combination of an annular projection having a recessed portion, the operating-lever having a lug engaging said projection and adapted at one position to register with said recessed portion, and a second lever having a lug engaging a projection on the first-mentioned lever.

6. The combination of an annular projection having a recessed portion, a pair of shafts concentric with said annular projection, an operating-lever for each shaft, a lug on one lever engaging said projection and adapted at one position to register with the recessed portion thereof, an annular projection on the same lever, and a lug on the other lever engaging said last-mentioned projection.

7. The combination of an annular projection having a recessed portion, a pair of shafts concentric with said projection, an operating-lever for each shaft, a lug on one lever engaging said annular projection and adapted at one position to register with the recessed portion thereof, a similar projection and a slot on the same lever, a lug on the other lever engaging said last-mentioned projection, and a pin on one shaft adapted to register with said slot when at a predetermined position.

8. The combination of the annular projection *a* having recess *a'*, shaft B, operating-lever D therefor having lug *d*, annular projection *d'* and slot *d''*, shaft C having pin *c*, and operating-lever E therefor having lug *e*, substantially as, and for the purpose, set forth.

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

J. D. FORRER.

Witnesses:

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ROBERT M. EVANS.