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No. 661,535.

Patented Nov. 13, 1900.

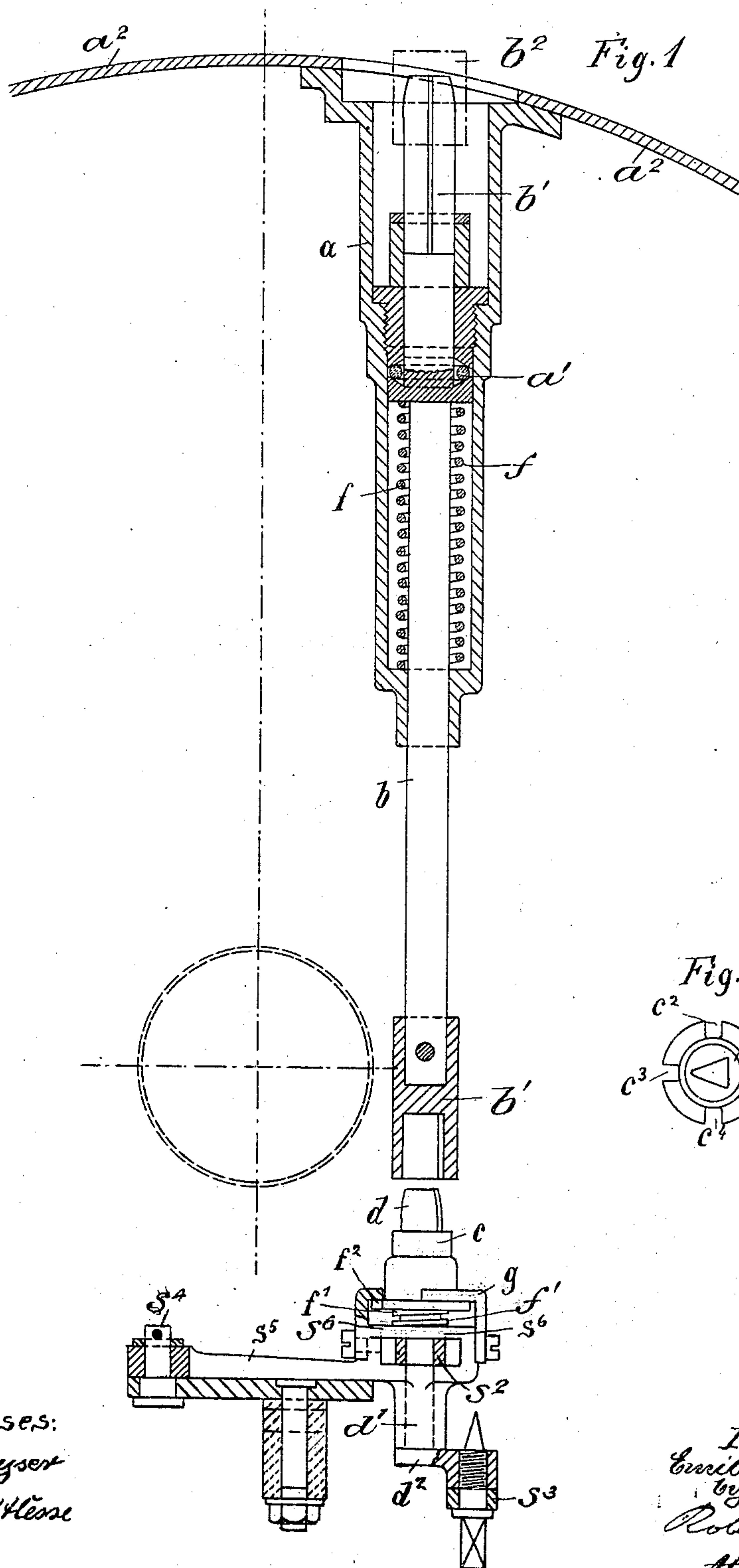
E. KASELOWSKY.

TORPEDO.

(Application filed Aug. 14, 1899.)

(No Model.)

10 Sheets—Sheet 1.



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No. 661,535.

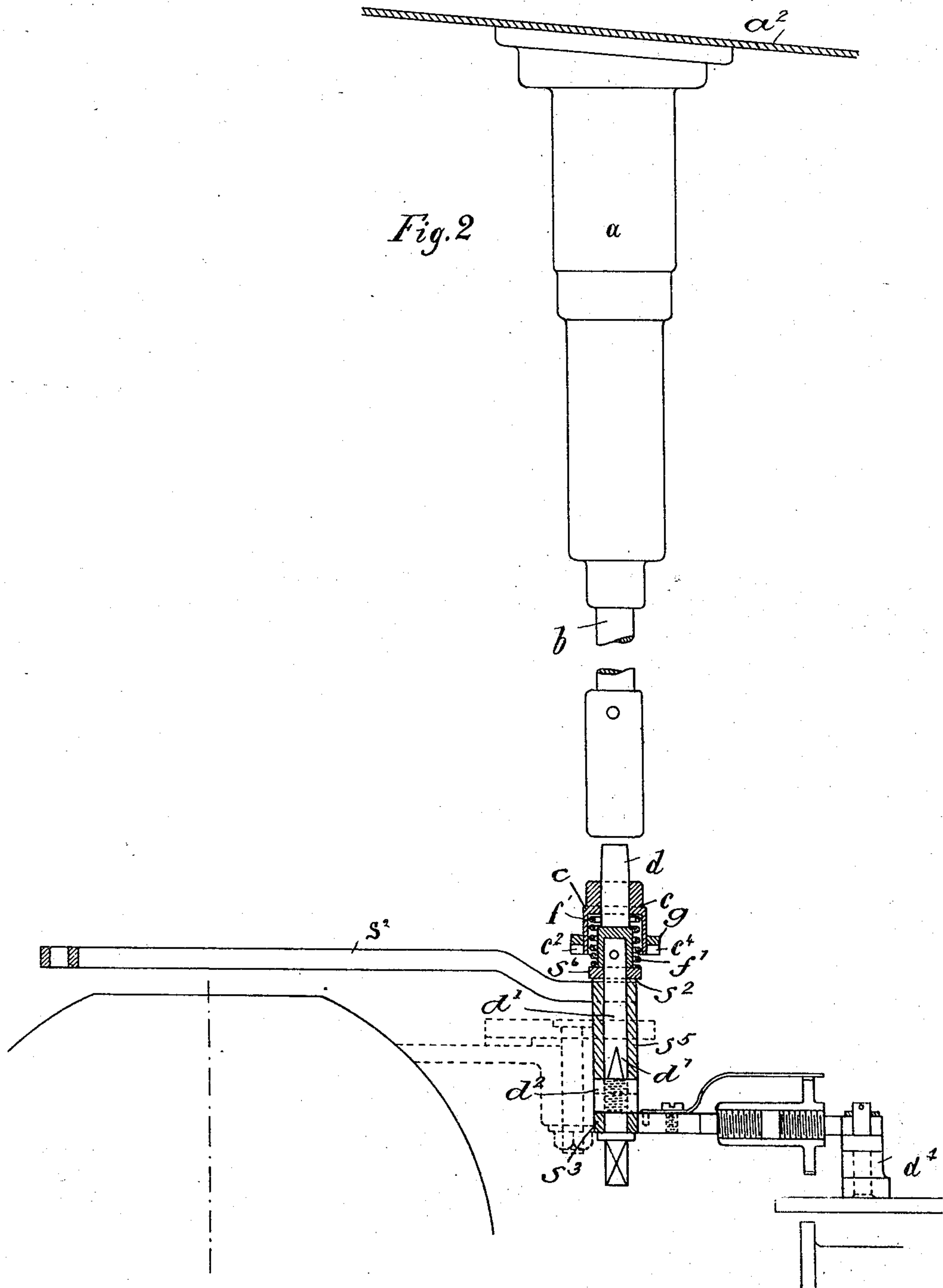
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10 Sheets—Sheet 2.



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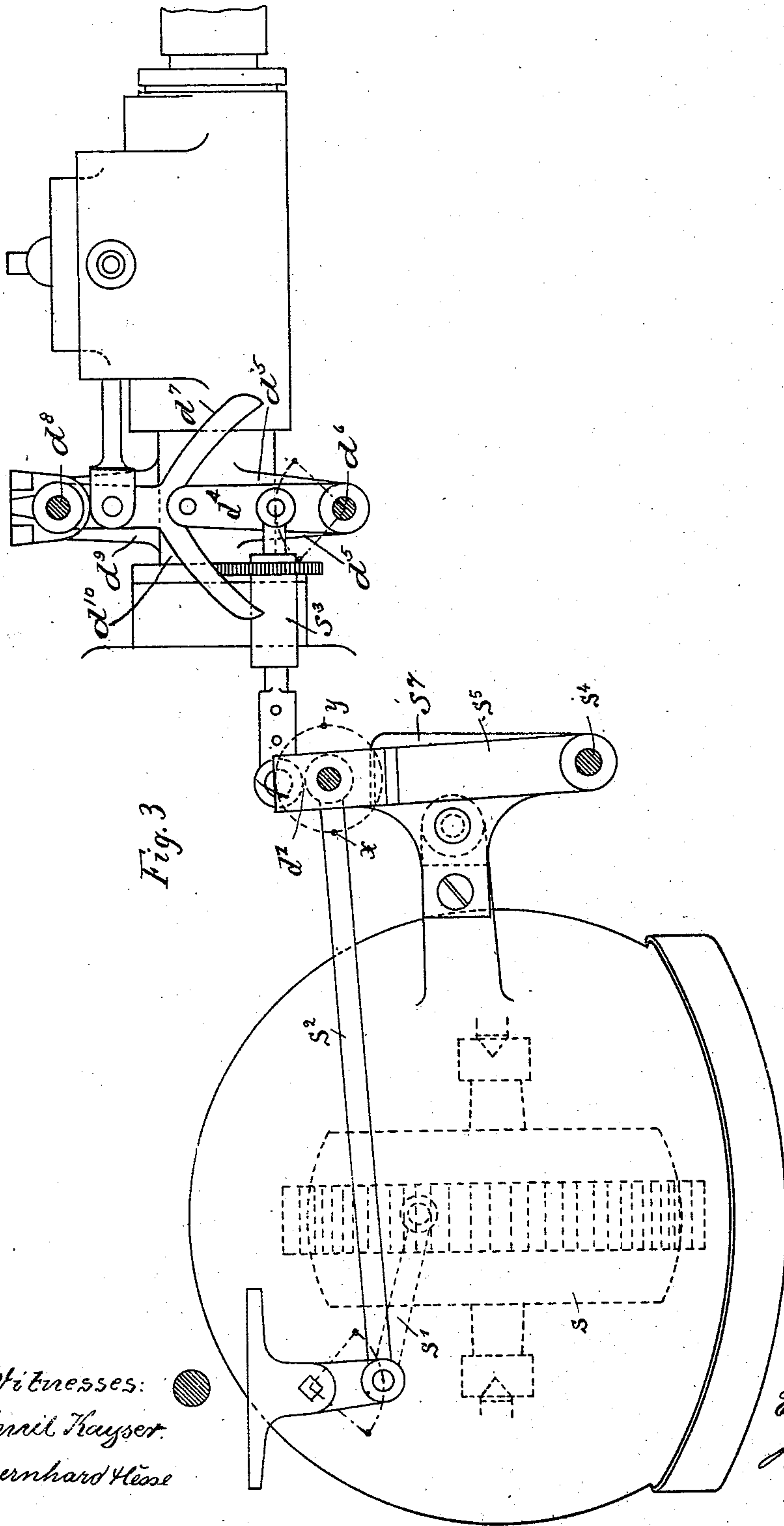
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10 Sheets—Sheet 3.



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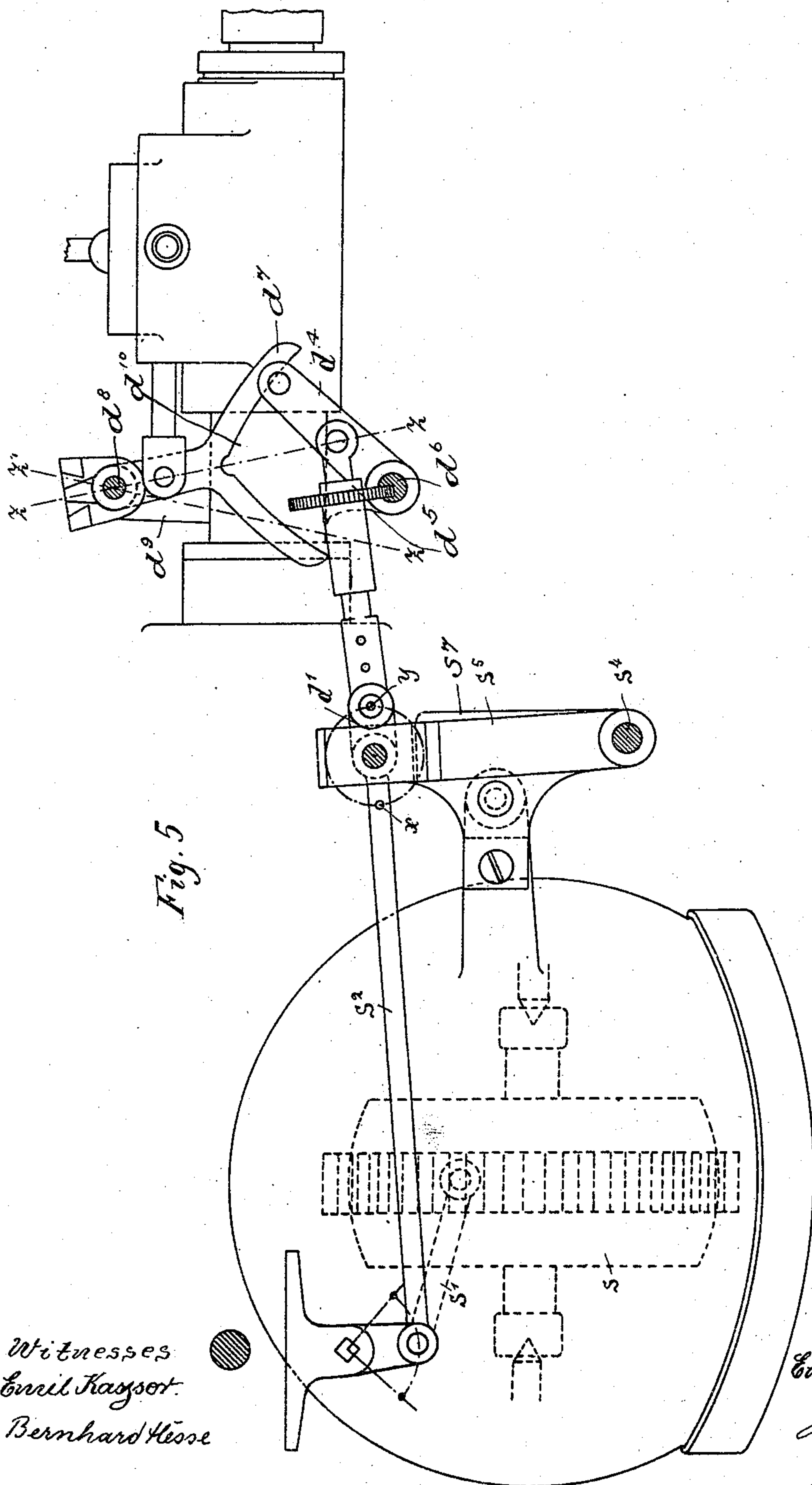
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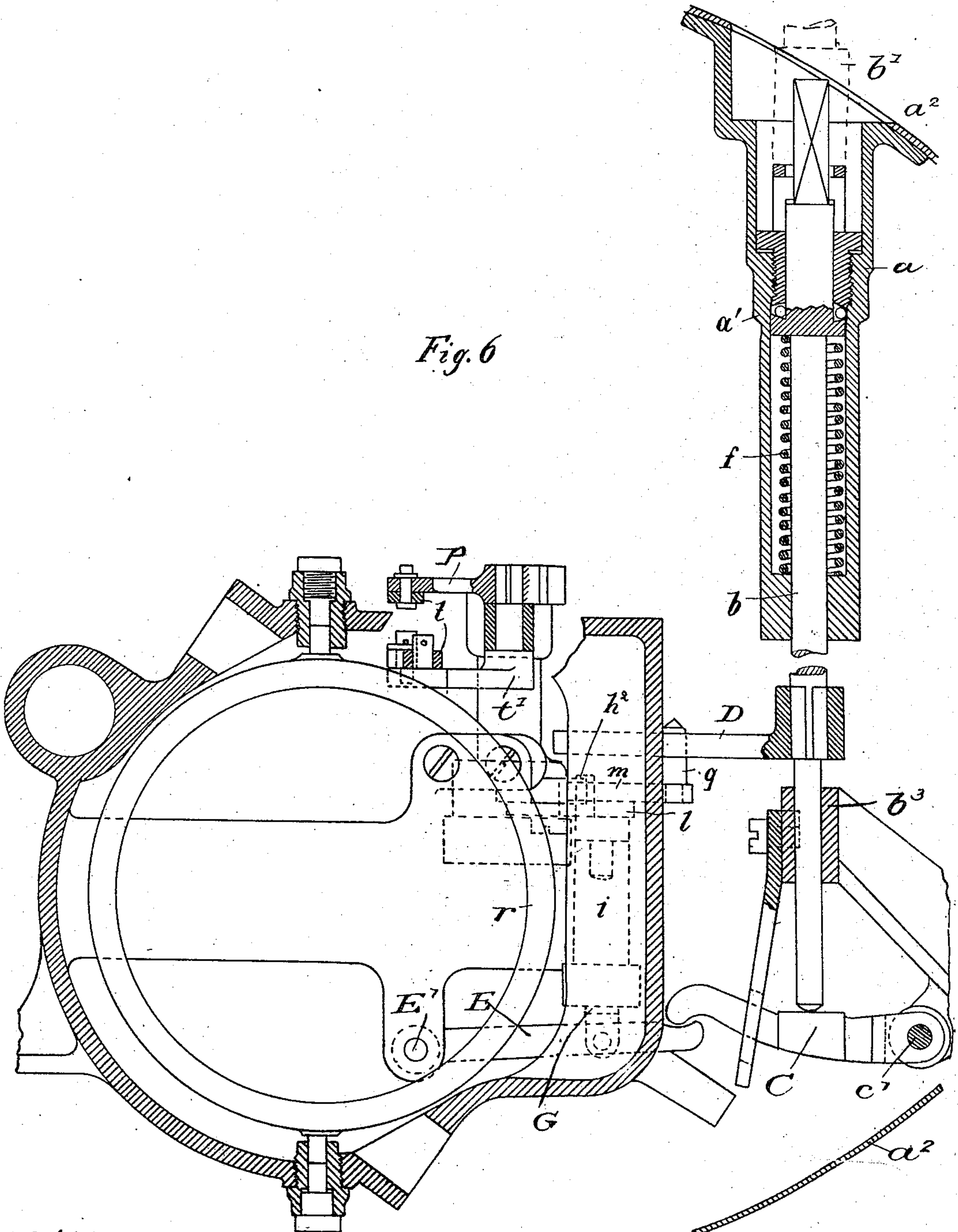
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Fig. 6



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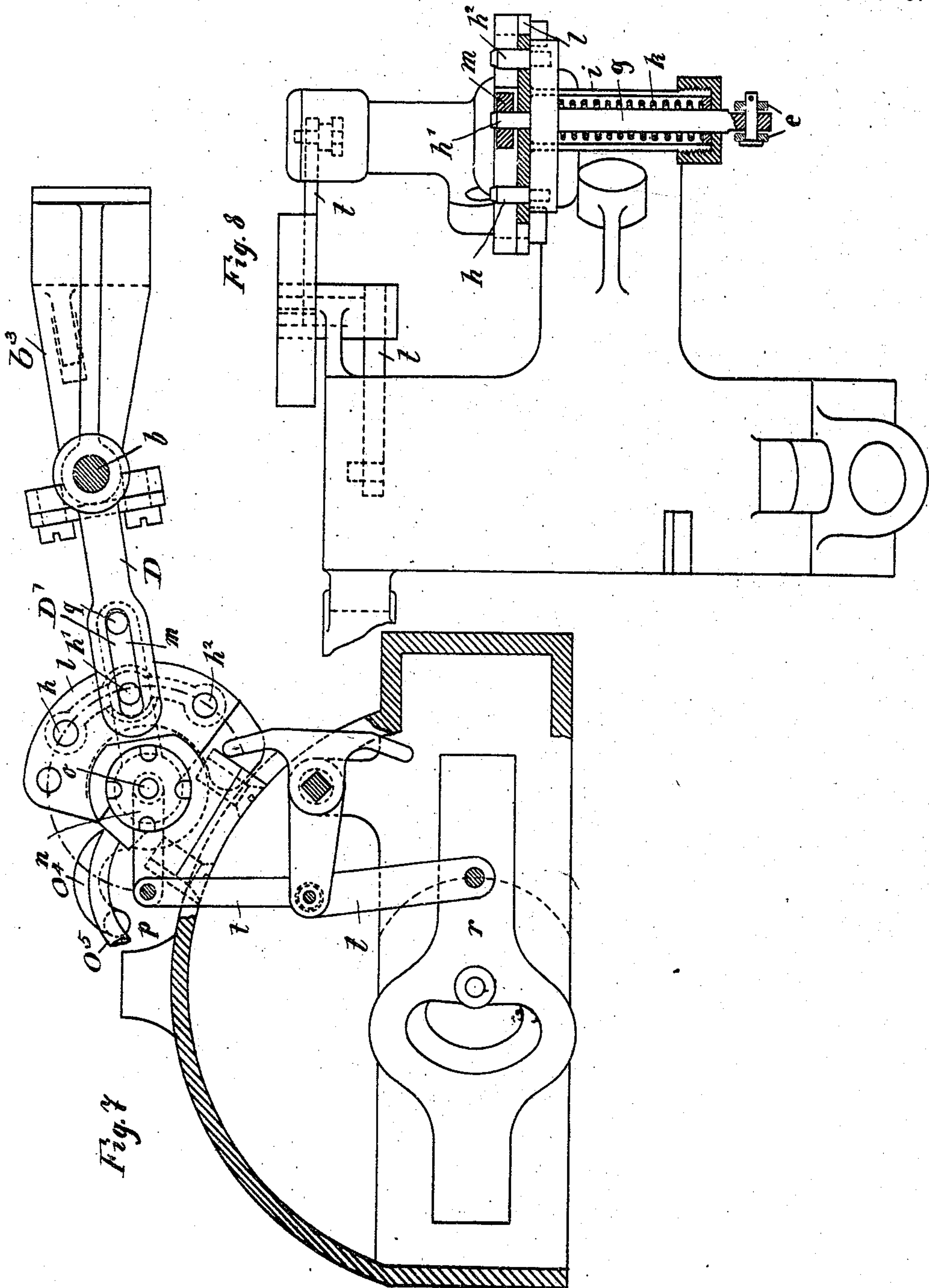
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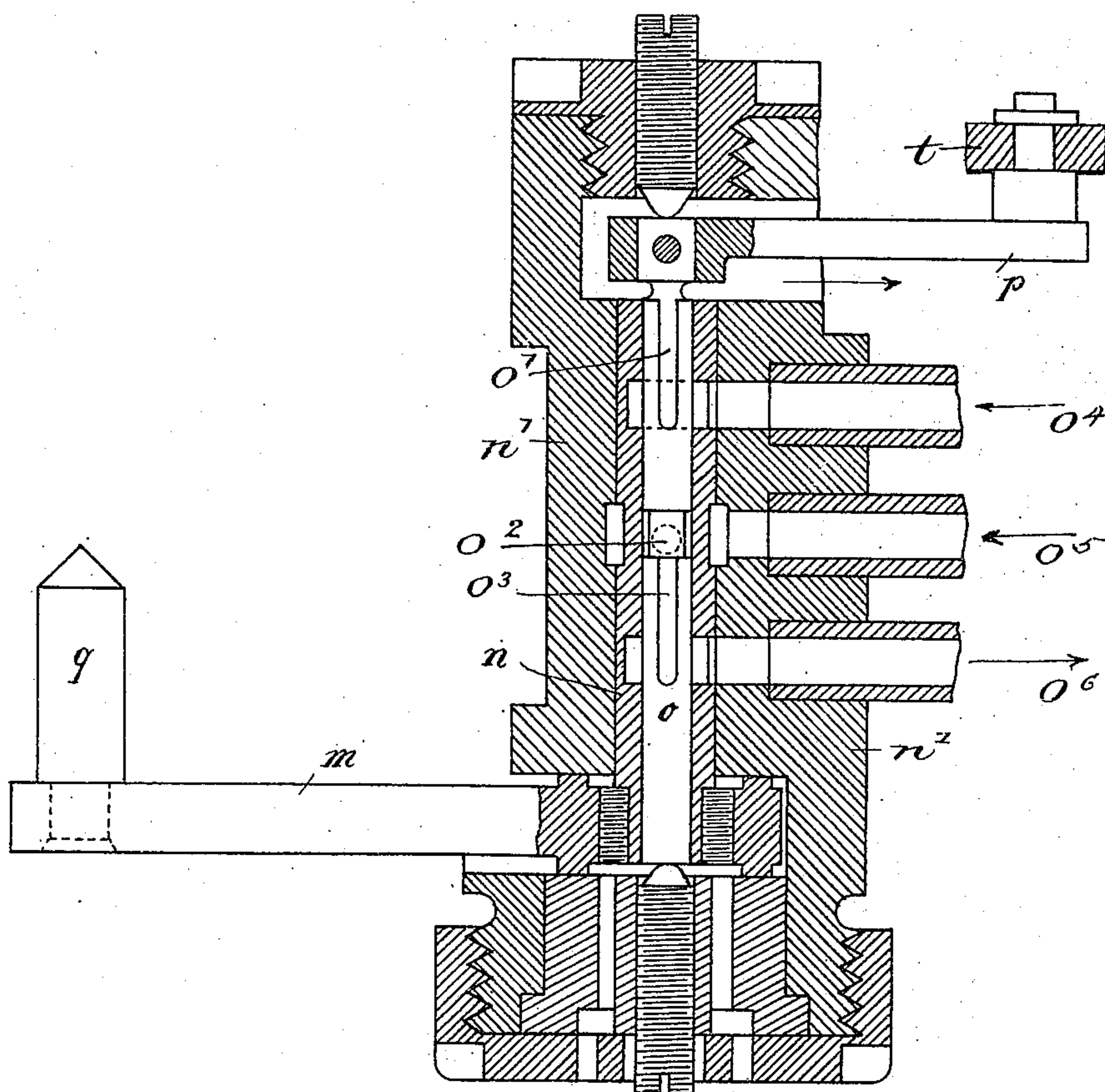
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Fig. 9



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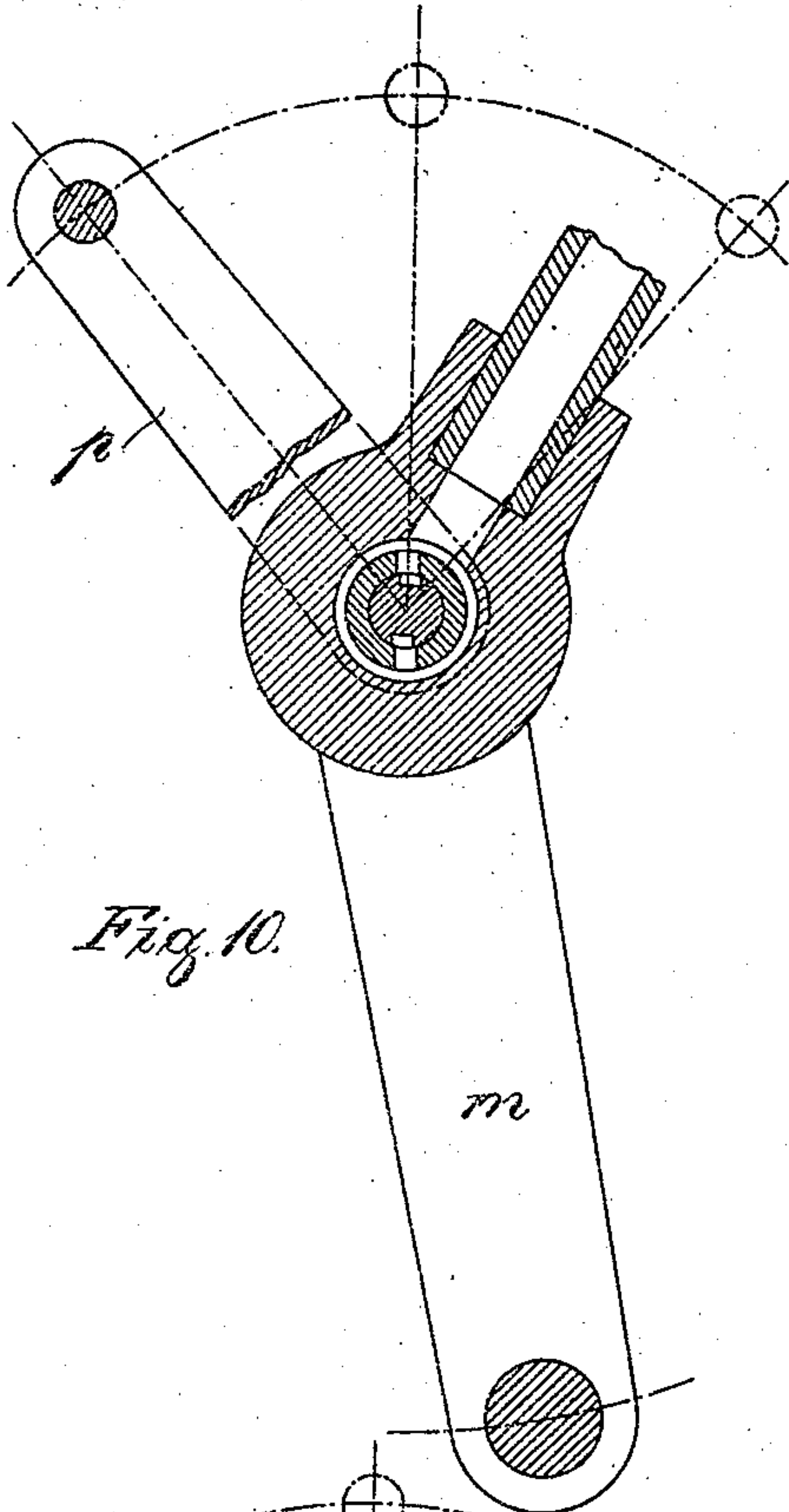


Fig. 10.

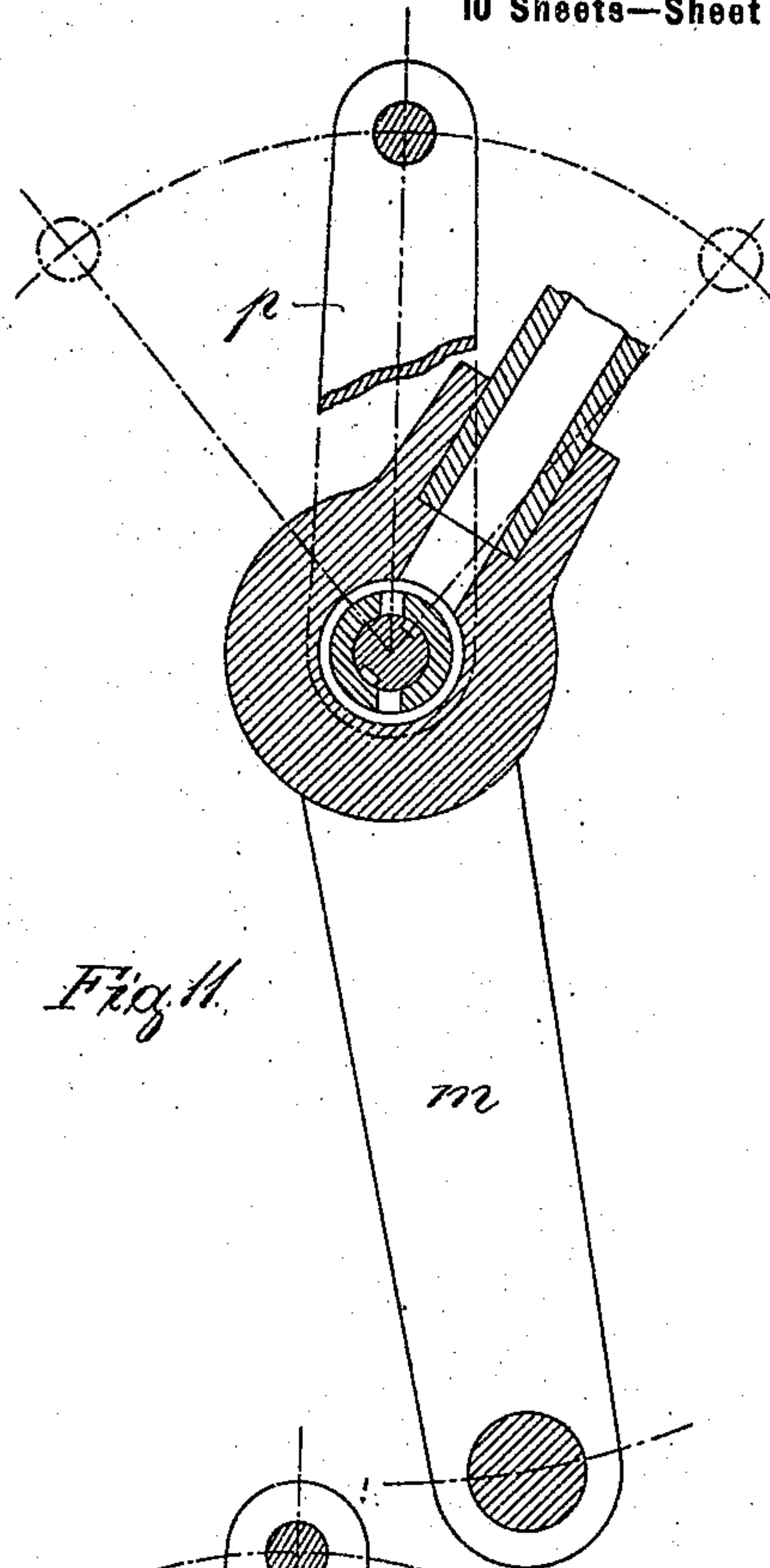


Fig. 11.

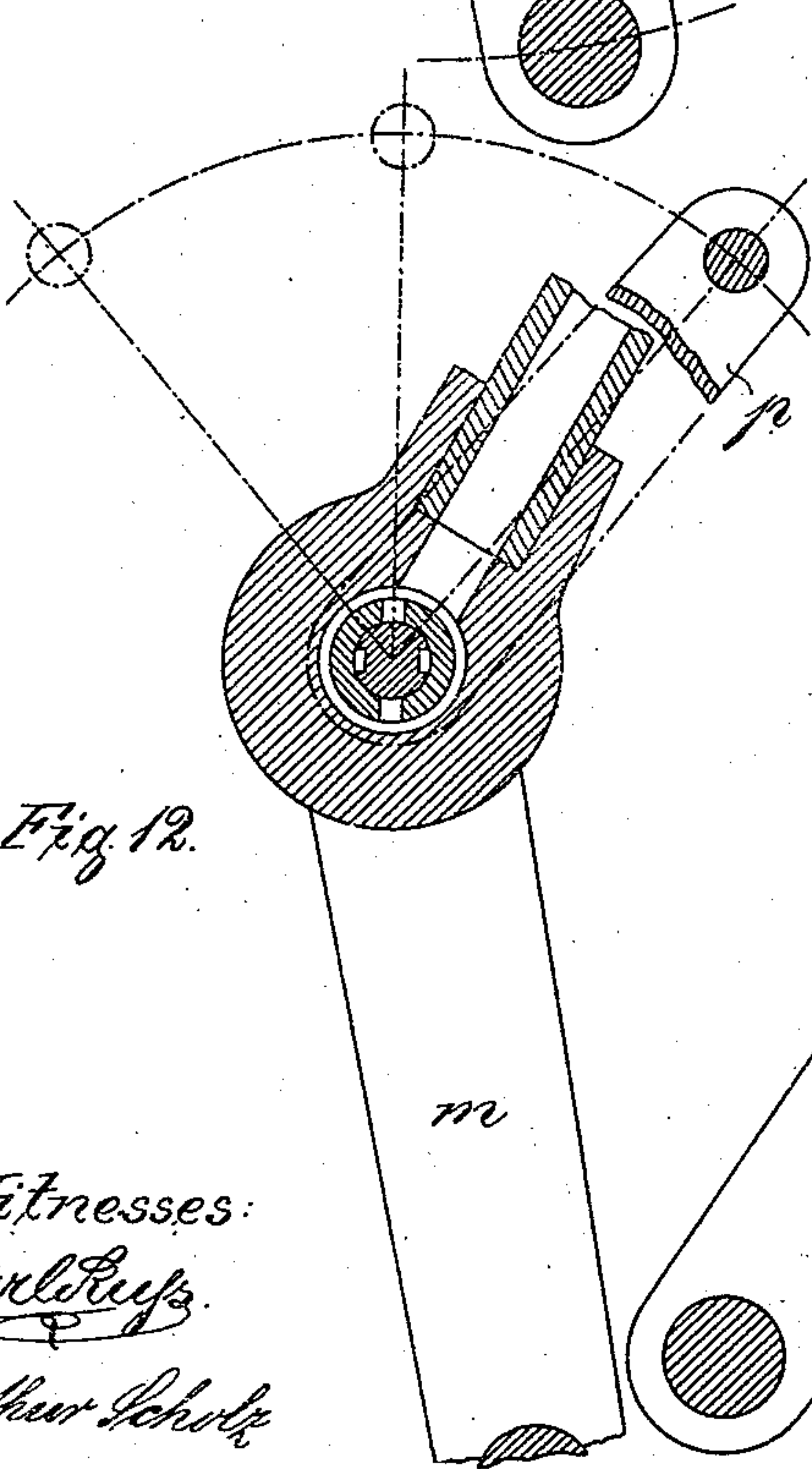


Fig. 12.

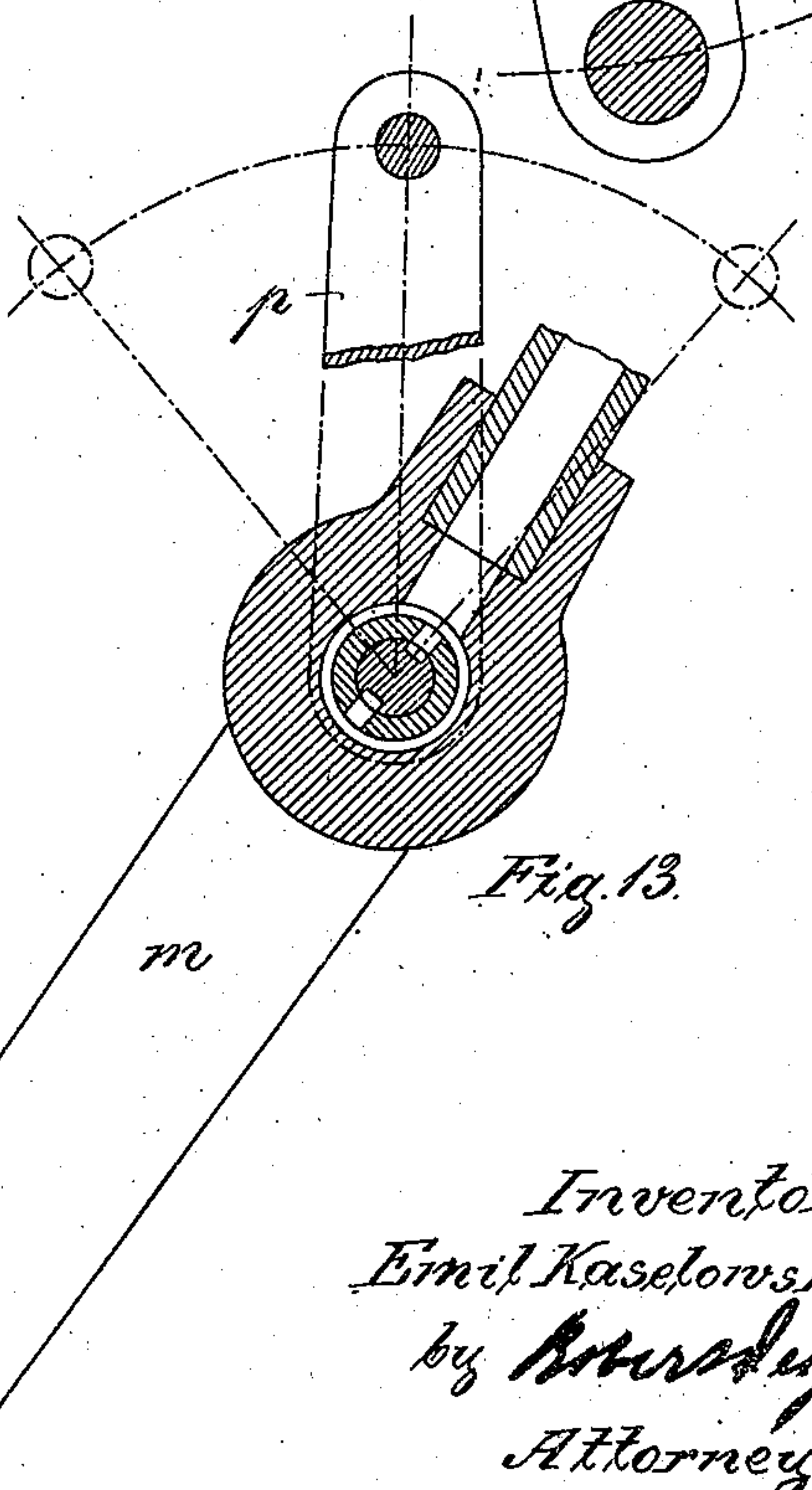


Fig. 13.

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Fig. 14.

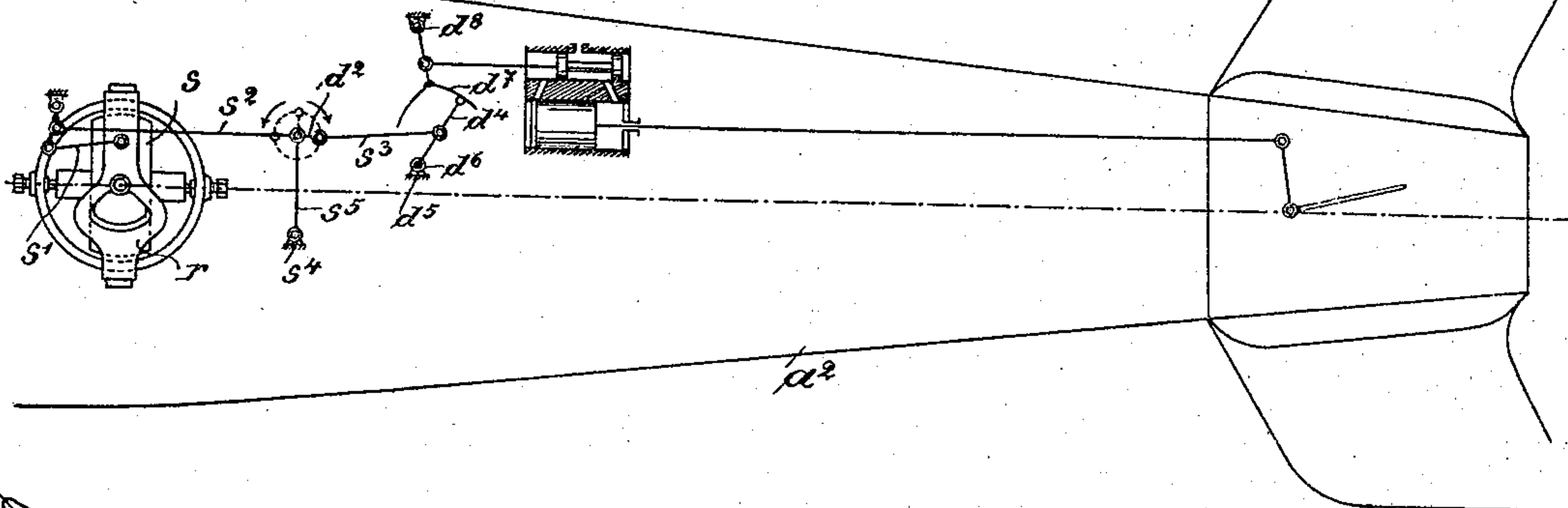
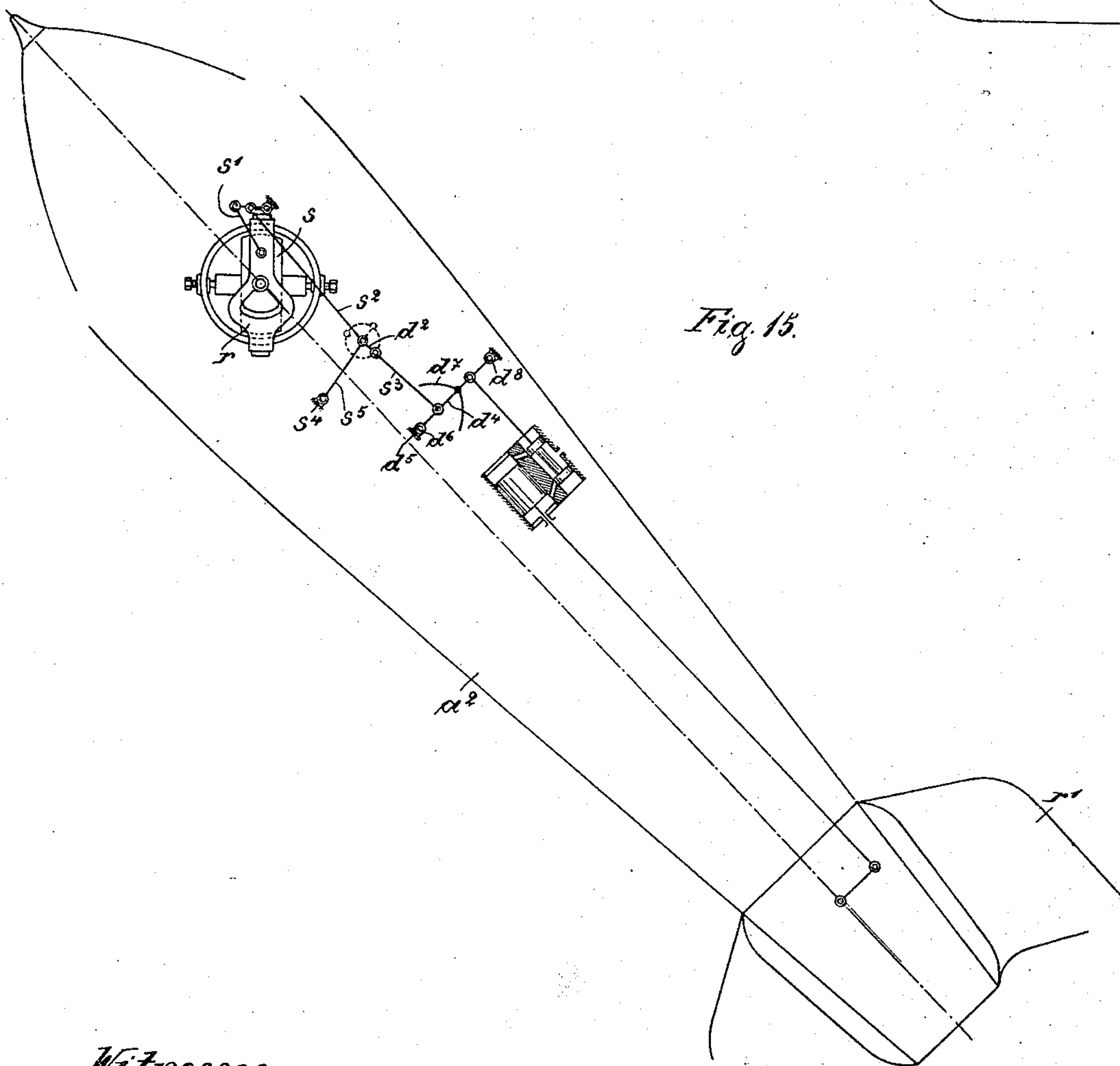


Fig. 15.



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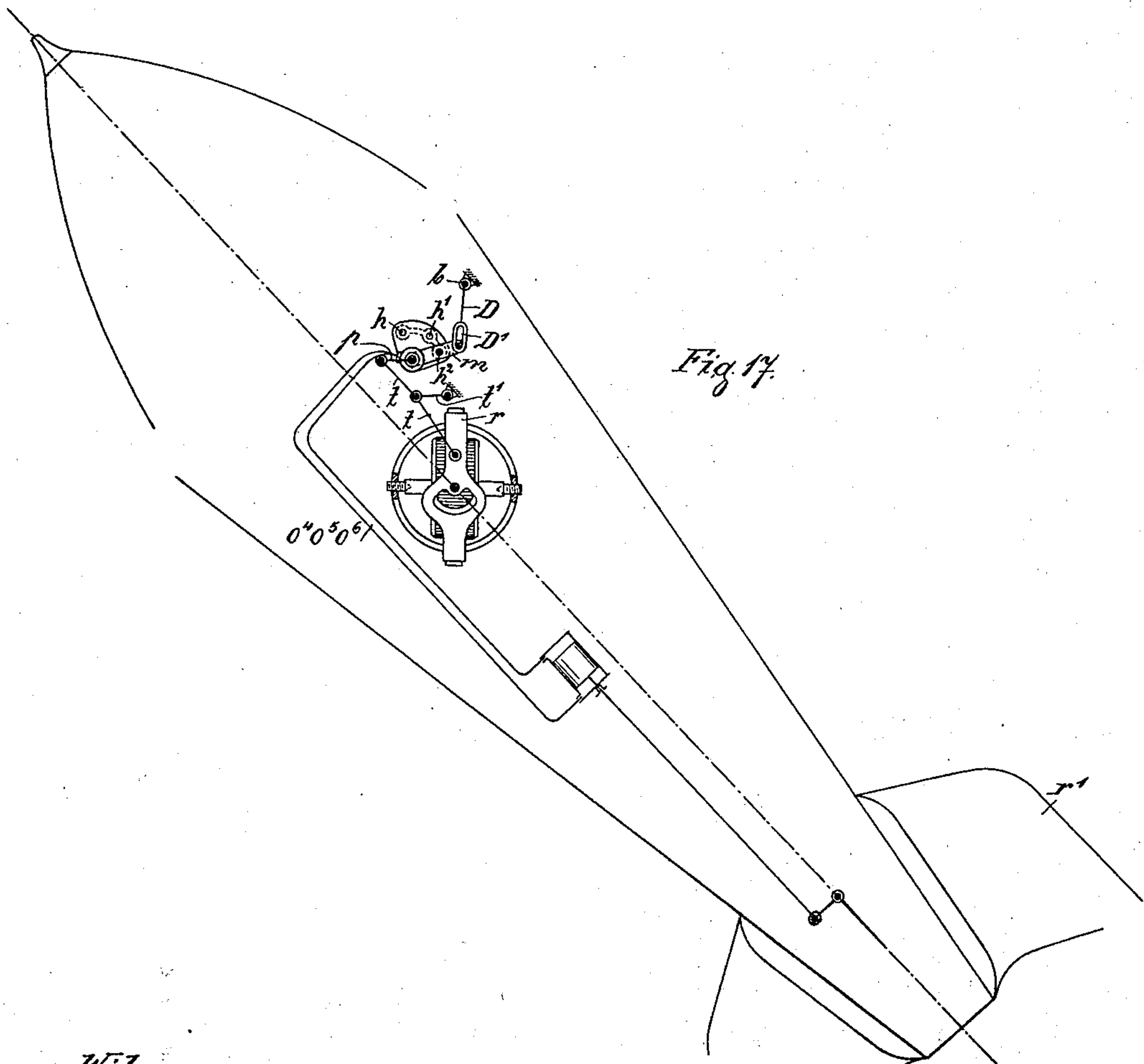
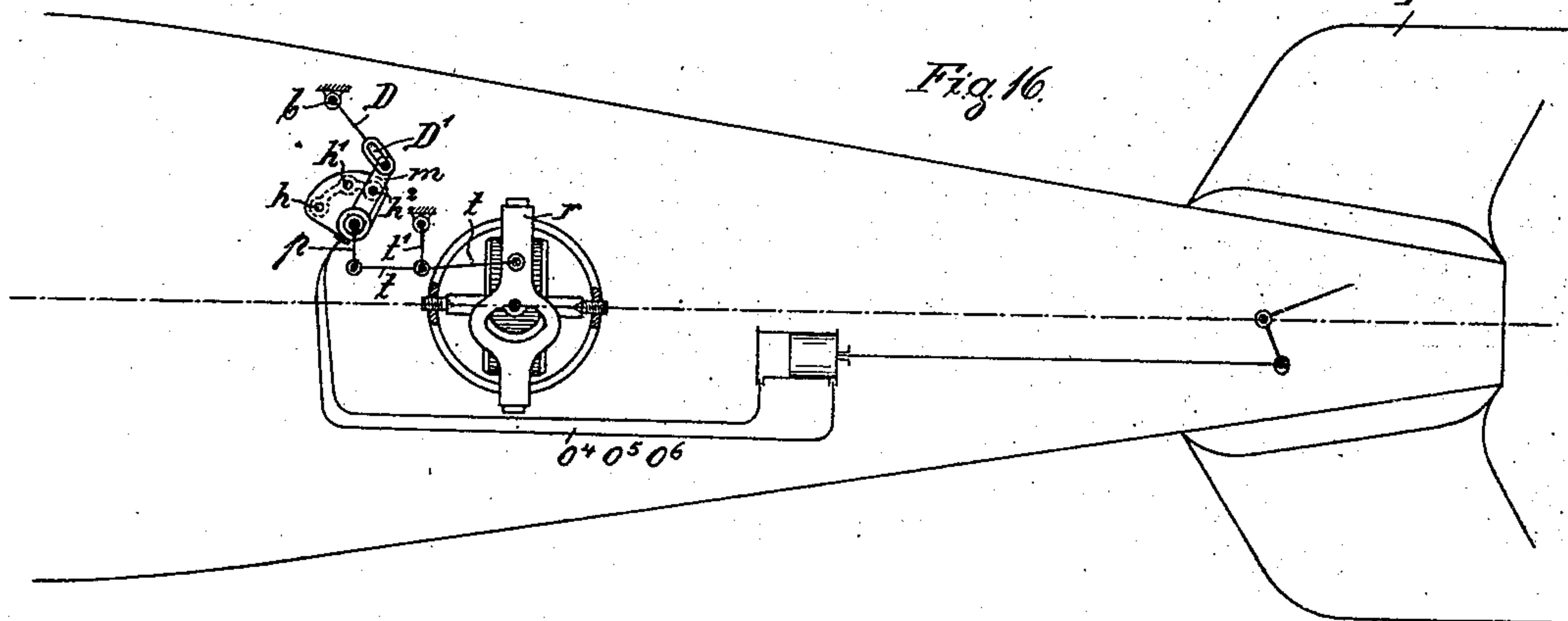
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UNITED STATES PATENT OFFICE.

EMIL KASELOWSKY, OF BERLIN, GERMANY.

TORPEDO.

SPECIFICATION forming part of Letters Patent No. 661,535, dated November 13, 1900.

Application filed August 14, 1899. Serial No. 727,180. (No model.)

To all whom it may concern:

Be it known that I, EMIL KASELOWSKY, a subject of the King of Prussia, German Emperor, and a resident of Berlin, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Torpedoes, of which the following is an exact specification.

In torpedoes steered and kept in straight course by gyroscopes it can be managed that the torpedo after having been launched shall not maintain the original direction in which it is launched—that is, the direction of the launching-tube—but that it shall adopt a new course, forming an angle to the original one. This diversion takes place when the steering-gear of the Servo motor on one side of its central position is connected to the central position of the gyroscope fly-wheel, so that when the torpedo is launched and has entered the water the steering mechanism of the Servo motor immediately causes its diversion. The torpedo keeps up the new direction, while the steering mechanism of the Servo motor gets adjusted again in its central position owing to the gyroscope fly-wheel. The direction thus obtained is the required course in which the torpedo has to run.

It is of great importance to regulate at convenience the deviation of the torpedo with respect to the original direction—that is, the direction of the launching-tube—either before the torpedo is placed into the launching-tube or when already within the same, owing to the changeability of the fighting position.

As above mentioned, the course taken by the torpedo when launched depends upon the central position of the motor steering-gear in relation to the central position of the fly-wheel.

My invention consists in providing means for varying the deviation of the torpedo at convenience, either by altering the length of the rods between the fly-wheel and the slide-valve of the Servo motor, thus altering the position of the slide-valve with regard to the ports in this Servo motor, or by leaving the length of the rods unchanged, but displacing directly the part containing the distributing-ports in relation to the valve-cock of the motor.

My invention will be the better understood with reference to the accompanying draw-

ings, in which similar letters denote similar parts throughout the different views, and in which—

Figures 1 and 2 represent sections through the torpedo, showing clearly the mechanism. Fig. 3 illustrates a schematic view of the gyroscope in combination with the Servo motor and the mechanisms connecting the same. Fig. 4 is a detail view. Fig. 5 is a view similar to Fig. 3, the steering-gear being out of normal position. Figs. 6 to 9 show the second mode of arrangement for displacing the distributing-ports in relation to the valve-cock of the motor. Figs. 10, 11, 12, and 13 show details of the second arrangement. Figs. 14 and 15 illustrate a torpedo with a schematic view of the first arrangement in connection with the rubber, and Figs. 16 and 17 show the same with a schematic view of the second arrangement in connection with the rubber.

In both modes of arrangement the adjustment is effected by a rod b , guided in a stuffing-box a , fixed to the casing a^2 of the torpedo. Suitable packings a' are provided in the box to attain a water-tight joint. The rod b is surrounded by a spring f and is pressed constantly upward. The upper end of the rod b is provided with a square head b' , adapted to be turned by a key b^2 being applied to the head from the outside, Fig. 1. The fly-wheel s of the gyroscope before set in motion is kept in position by suitable means. Consequently the rods s' s^2 , the rod s' being pivotally attached to the suspending-ring r of the fly-wheel and the rod s^2 to the rod s' , are also fixed. The rod s^2 is connected to a lever s^5 , adapted to oscillate around a pivot s^4 , the latter being arranged in the lateral projecting piece s^7 .

d is a prismatic head capable of being turned and pinned with a bolt d' . On the bottom extremity of the rod b is adapted a box b^2 to fit the head d . The head d is located upon the lever-arm s^5 and is connected by means of an angle-lever d^2 to a lever s^3 . The latter is rigidly connected to the arm d^4 , adapted to oscillate around the pivot d^6 , arranged in the projecting piece d^5 . By means of the arm d^4 and the double-armed lever d^7 , adapted to oscillate around the pivot d^8 , arranged in the projecting piece d^9 of the motor-case d^{10} and rigidly connected to the rod of

the slide-valve of the motor, the distribution of the air is effected into the motor.

When the head d is turned, after the rod b has been pressed down to the right, so that the arm d^2 adapts the position y , Fig. 5, the rod d^4 , influencing the steering of the Servo motor, takes the position illustrated in Fig. 5. When the head d is turned to the left and the arm d^2 takes the position marked x , the rod d^4 takes the opposite and the slide-valve the position contrary to that illustrated in Fig. 5. Over the head d a box c is fitted, Figs. 1 and 2, which, being influenced by the spring f' , presses against an annular clamp g , rigidly connected to the arm s^5 , whereby the upward movement of the box is determined. The latter is provided on its bottom with a projecting edge c' , in which three recesses c^2 c^3 c^4 are cut. The clamp g is provided with a tooth f^2 , engaging into one of the recesses—for instance, c^3 of the edge c' . When the box c is pressed down by means of the box b^2 of the rod b so far until it knocks against the part s^5 of the arm s^5 , it is liberated from the tooth f^2 and can be turned. When the box rises again, owing to the spring f' , the tooth f^2 of the clamp g can engage into another recess, as c^2 or c^4 . By beveling more or less the head of the tooth f^2 inaccuracies may be completely prevented.

Evidently the described arrangement may be conveniently altered—for instance, by providing more recesses in the edge c' —whereby the adjustment will be rendered more variable. By turning the box c either in one or the other direction and coupling it with the arm s^5 the rods connecting the fly-wheel with the slide-valve of the Servo motor get elongated or shortened by the lever d^2 , as shown in Fig. 5. By this means the slide-valve of the Servo motor gets displaced and alters the distribution of air into the motor, so that the piston of the latter, being rigidly connected to the rudder r' , as shown in Fig. 14, will also get displaced and effect the deviation of the torpedo, Fig. 15.

As for the second mode of arrangement, the mechanism for effecting the deviation is similar to that of the first mode. A box a is fixed to the casing a^2 of the torpedo. Within this box a rod b is guided, and a water-tight joint is effected within the box by packings a' . The bottom part of the rod b is guided in bearings b^3 , fixed to the casing a^2 of the torpedo. This part of the rod b rests upon a lever C , capable of being turned around a bolt C' . The front end of the lever C fits upon a lever E , adapted to oscillate around the bolt E' , the latter connected with the gyroscope-ring r . A spiral spring f constantly presses the rod b upward. The latter is provided with a lever D , adapted to be turned with the rod b by means of a key b' , Fig. 6.

n is the steering-box of the Servo motor, Figs. 7 to 9. A lever m , provided with a head q , is rigidly connected to the steering-box, Figs. 7 to 9. This head q engages into a re-

cess D' of the lever D , Fig. 7. A rod G , constantly pressed upward by a spring k within the box i , is provided on its upper part with a disk l' , in which are fixed bolts h h' h^2 , the latter being guided in a disk l , Fig. 8. These bolts engage alternatively into the recess m' , arranged in the lever m , and determine its position. The valve-cock o of the motor is rigidly connected to the suspending-ring r of the gyroscope fly-wheel by means of the lever p and the rods t t , Fig. 7. This cock is provided with channels o' o^2 o^3 , which are brought in connection with tubes o^4 o^5 o^6 , fixed in the distributing-casing n' . By means of this valve-cock the distribution of air to the Servo motor is effected according to the position of the gyroscope. In normal position of the lever m and of the steering-box n , as illustrated in Fig. 7, the cock o effects the distribution of air to the Servo motor, so that the course of the torpedo is in the direction of the launching-tube. When now a certain deviation of the torpedo with respect to the direction of the launching-tube shall be effected, the rod b is pressed down by means of a key applied to the square head of the rod b . Thereby the lever C presses upon the lever E and draws the rod G , together with the bolts h h' h^2 , downward, so that the latter get out of engagement with the lever m and are only guided within the plate l , Figs. 6, 7, and 8. Now the rod b , and consequently the lever D , is turned into the position required. The lever D , owing to the head q , displaces the lever m , and thus also the steering-box n , Figs. 7, 9, 10, 11, 12, and 13, so far until the lever m has left its position above the head h' and stands over h or h^2 . If in this moment the pressure upon the rod b is taken off, the spring f pushes the same upward. The spring k raises the rod G and brings the bolt h or h^2 into engagement with the lever m , whereafter the latter, as well as the steering-box n , will be kept in the new position. By altering thus the position of the steering-box n in relation to the distributing-cock o the central position of the whole steering mechanism gets altered and the torpedo adapts the required direction. Since the fly-wheel in consequence of its gravity will always remain in its original position the suspending-rings of the gyroscope-wheel adapt a position according to the new direction of the torpedo, and by means of the levers t t and p alter the position of the valve-cock o until again a central position of the steering mechanism, and consequently of the rudder, will be obtained, Figs. 16 and 17.

By having more bolts h h' h^2 any desired deviation may be attained.

Having thus fully described the nature of this invention, what I desire to secure by Letters Patent of the United States is—

1. In torpedoes, the combination of the Servo motor in operative connection with steering devices, and with the fly-wheel by gearing mechanism variable in length, with means adapted to be controlled from the outside for

altering the length of the gearing mechanisms between the Servo motor and fly-wheel, these means extending to the outside casing of the torpedo, for the purpose and substantially as set forth.

2. In torpedoes, the combination of a Servo motor with a gyroscope, rods fixed to the suspending-ring of the rotating body, connecting the fly-wheel of the gyroscope to the steering-gear of the Servo motor, a square head turned from the outside for shortening or lengthening the connecting-rods, thereby altering the position of the steering-gear in relation to the gyroscope, means to turn the said head from the outside, either in one direction or in the other direction, for the purpose as set forth.

3. In torpedoes, the combination with the rod *b*, guided within a stuffing-box *a* fixed in the casing of the torpedo, said rod being adapted to be turned from the outside, a heli-

cal spring *f* surrounding said rod and pressing the same outward, a lever *d* fixed to the lower extremity of the rod *b*, a steering-box *n*, a lever *m* provided with a pin *q*, rigidly connected to the steering-box, the pin engaging with the lever *d* of the rod *b*, a rod *g* arranged within a box *i* and pressed outward by means of a spring *k*, pins *h h' h²* fixed to the rod *g* and fixing the position of the lever *m*, and of the steering-box, a valve-cock *o* connected to the suspending-ring of the gyroscope-wheel by means of the lever *p* and the rod *t*, for the purpose and substantially as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

EMIL KASELOWSKY.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.