No. 737,627. PATENTED SEPT. 1, 1903.

G. S. HERRICK & F. S. ROGERS.

DEVICE FOR REGULATING THE MOTION OF ROTARY SHAFTS.

APPLICATION FILED SEPT. 25, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

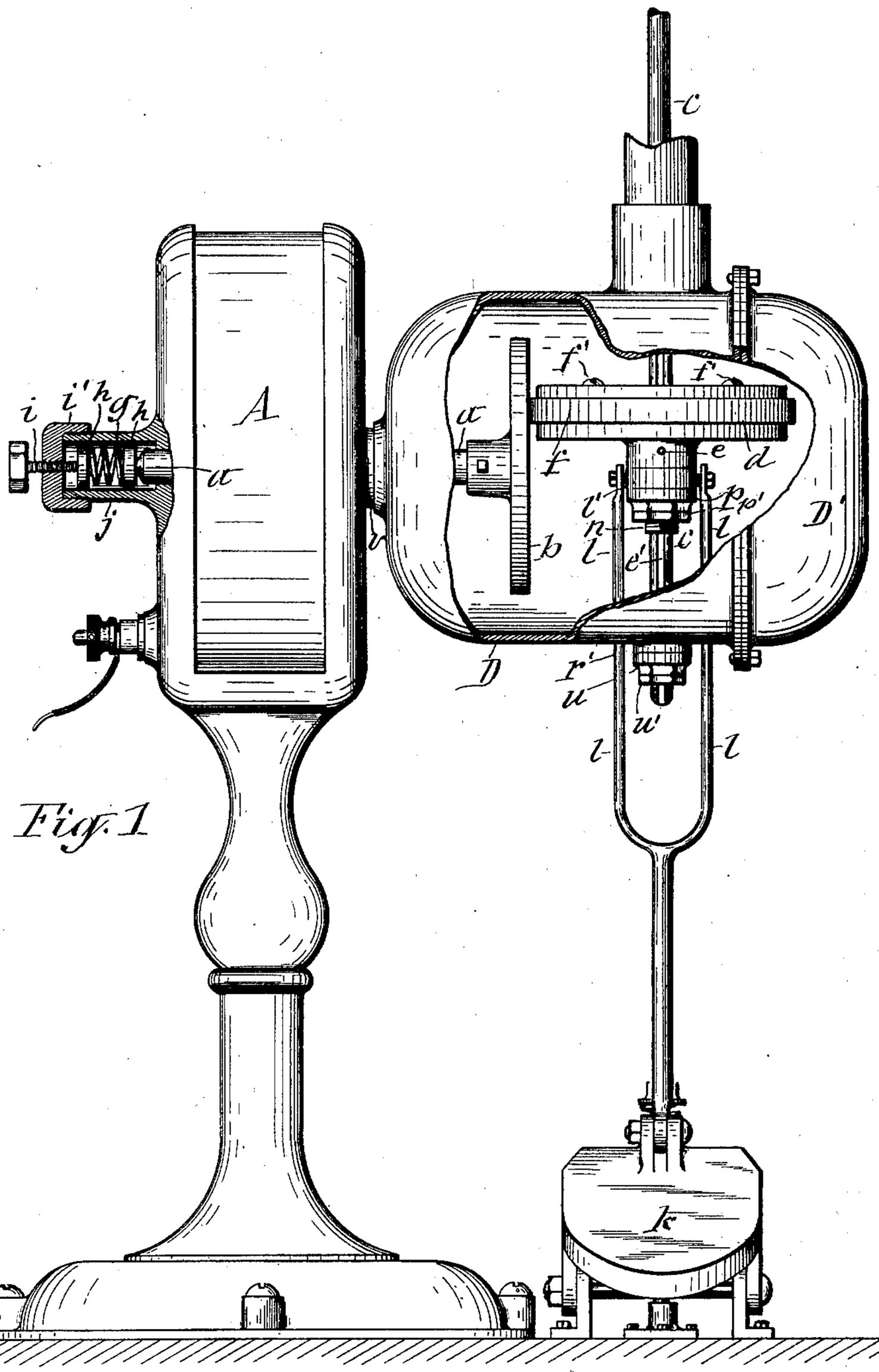

Fig. 1

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NO MODEL. 3 SHEETS—SHEET 2.

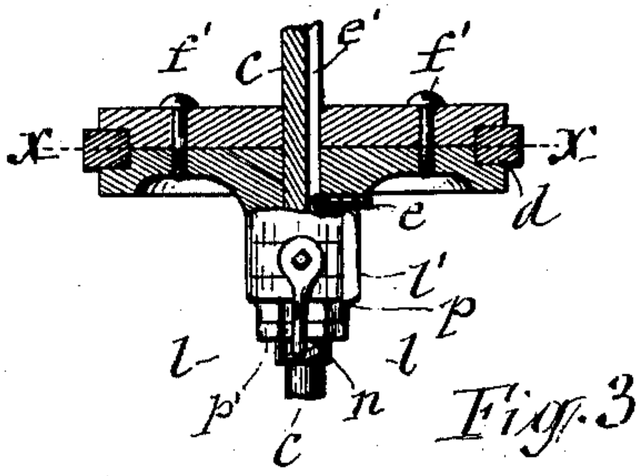

Fig. 3

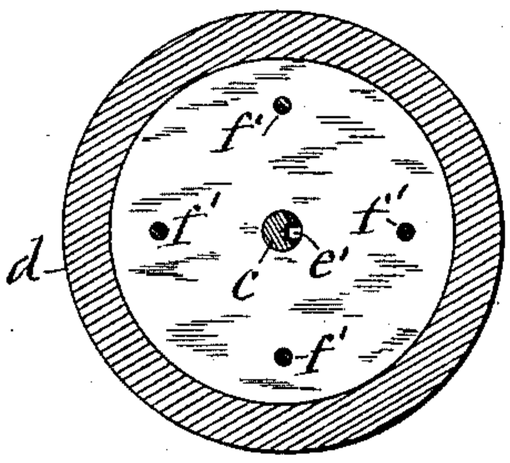

Fig. 4

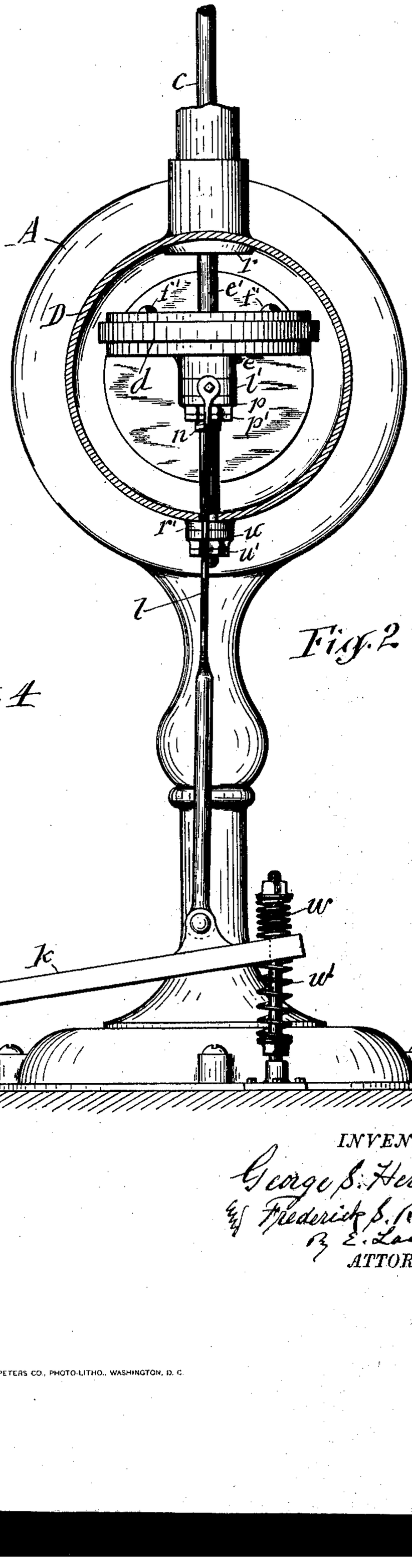

Fig. 2

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NO MODEL. 3 SHEETS—SHEET 3.

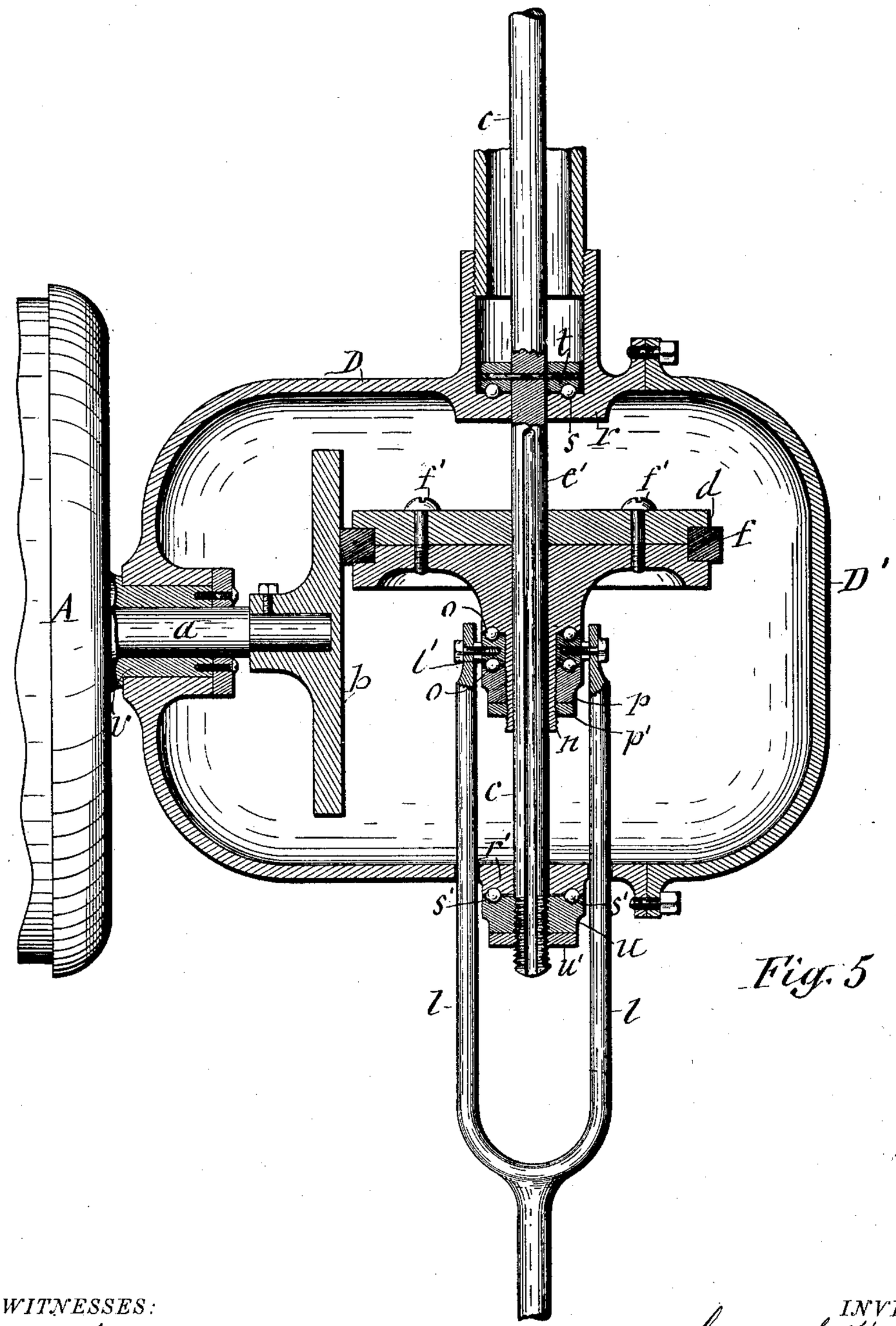

Fig. 5

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UNITED STATES PATENT OFFICE.

GEORGE S. HERRICK AND FREDERICK S. ROGERS, OF SYRACUSE, NEW YORK, ASSIGNORS OF ONE-THIRD TO JAMES D. SMITH, OF SYRACUSE, NEW YORK.

DEVICE FOR REGULATING THE MOTION OF ROTARY SHAFTS.

SPECIFICATION forming part of Letters Patent No. 737,627, dated September 1, 1903.

Application filed September 25, 1902. Serial No. 124,739. (No model.)

To all whom it may concern:

Be it known that we, GEORGE S. HERRICK and FREDERICK S. ROGERS, citizens of the United States, and residents of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Devices for Regulating the Motion of Rotary Shafts, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

The object of this invention is to provide simple and efficient means for accurately adjusting the motion of a driven shaft according to the nature of the work to be performed by the instrument or tool deriving motion from said shaft; and to that end the invention consists in the novel construction and combination of the component parts of the mechanisms employed for transmitting motion from a motor to the driven shaft, as hereinafter described, and pointed out in the claims.

In the annexed drawings, Figure 1 is a side elevation of mechanisms embodying our invention. Fig. 2 is a front view of the same. Fig. 3 is a vertical transverse section through the center of the transmitting-disk. Fig. 4 is a horizontal transverse section on line X X in Fig. 3; and Fig. 5 is an enlarged vertical transverse section through the center of the mechanism which transmits motion to the shaft operating the instrument or tool, deriving its power from a suitable motor.

Similar letters of reference indicate corresponding parts.

A represents a frame or case inclosing a rotary motor of any suitable type, to be actuated either by electricity or hydraulic or any other suitable and well-known power. *a* represents the shaft of said motor. To the protruding front end of this shaft is fastened the driving-disk *b*, which has its front or driving face in a uniform plane at right angles to the motor-shaft *a*.

c denotes the driven shaft, which is to transmit motion to the instrument or tool suitably connected with said shaft. This shaft is disposed at right angles to the motor-shaft *a* and diametric in relation to the driving-disk *b*. On the shaft *c* is loosely mounted the transmitting-disk *d*, which is movable lengthwise of said shaft and prevented from rotating thereon preferably by a spline or pin *e*, attached to the disk *d* and engaging a longitudinal groove *e'* in the shaft *c*, as more clearly shown in Fig. 3 of the drawings. This transmitting-disk *d* is provided with a frictional peripheral face *f*, which we preferably form of a band of leather or rubber clamped between two annular plates by means of screws *f' f'*, tying said plates together. The frictional face *f* protrudes from the edge of the disk *d* and is of a diameter to bear on the face of the driving-disk *b*.

Inasmuch as the frictional face *f* is subject to compression and wear, and thus liable to loose its frictional hold on the driving-disk, we render this latter disk adjustable toward the transmitting-disk by applying to the rear end of the motor-shaft *a* an expansion-ring *g*, seated between disks *h h*, one of which bears on the end of the aforesaid shaft, and on the other of said disks bears a screw *i*, which passes through a correspondingly-threaded eye in a cap *i'*, detachably secured to a tubular hub *j*, projecting from the case A and inclosing the aforesaid spring and disks adjacent thereto, as shown in Fig. 1 of the drawings. By means of the screw *i* the tension of the spring *g* can be adjusted.

The frictional contact of the transmitting-disk *d* with the face of the driving-disk *b* imparts rotary motion to the shaft *c*, and this motion is regulated to a higher or lower speed, as may be desired, by the operator shifting the transmitting-disk *d* longitudinally on the shaft *c* to a greater or less distance from the center of the driving-disk *b*. By shifting the disk *d* to the center of the disk *b* the motion of the shaft *c* is arrested, and by shifting said disk still farther and beyond the center of the driving-disk the motion of the transmitting-disk *d* and shaft *c* is reversed. For controlling the position of the disk *d* in relation to the driving-disk *b* we preferably employ either a suitable lever or a treadle *k*, as illustrated in the annexed drawings. This treadle we connect to the disk *d* by means of a rod *l*, which is connected at one end to the treadle and has its opposite end bifurcated and con-

nected to a collar l', which embraces a sleeve-shaped extension n of the hub projecting from the bottom of the disk d. The rod l is thus sustained normally in line with the driven shaft c, which constitutes the sole means for guiding the rod and obviates the additional friction and expense of maintenance incident to the use of extra guide-rods and carrier-arm for transmitting motion from the longitudinally-movable rod to the transmitting-disk. The collar l' is provided with antifriction top and bottom bearings consisting of two sets of balls o o, one set of which is arranged in coinciding annular grooves respectively in the top of the collar and in a shoulder on the hub of the disk d. The other set of balls are disposed in annular grooves respectively in the bottom of the collar and in the top of a nut p, applied to the screw-threaded lower end portion of the sleeve n, as shown in Fig. 5 of the drawings. A jam-nut p' on the sleeve beneath the nut p serves to retain the latter in its required position.

To prevent the driven shaft c from moving longitudinally, we provide the stationary support of said shaft with hubs r r', respectively above and below the transmitting-disk d and receiving through them the shaft c. The top of the upper hub r is provided with an annular groove in which are arranged antifriction-balls s, upon which rides a collar t, fastened to the shaft c and serving to prevent downward movement of the shaft. The bottom of the lower hub r' is provided with an annular groove, and beneath this is a nut u, the top of which is provided with a corresponding groove containing balls s' s', forming an antifriction-bearing for the nut u, which restrains the upward movement of the shaft. u' denotes a jam-nut applied to the shaft under the nut u.

To protect the described regulating mechanism from dust and other injury, we house the same in a case D, extending from the motor-case A and provided with the hubs r r', hereinbefore described. The said case constitutes a stationary support for the driven shaft.

To permit ready access to the aforesaid mechanism when required for repairs or other purposes, we form the front or free end of the case D of a cap D', which is detachably secured in any suitable manner to the body of the case D.

w w' represent two expansive springs arranged to press on the top and bottom of the treadle k and automatically move it to a position to carry the transmitting-disk d to the center of the driving-disk b, and thus maintain the driven shaft c normally at rest.

What we claim as our invention is—

1. The combination with the driven shaft and the transmitting-disk mounted longitudinally movable on said shaft, of a manually-controlled speed-regulating rod formed with a bifurcation and connected thereat to the transmitting-disk and guided by the driven shaft normally in line with said shaft as set forth.

2. The combination with the driving-disk and motor-case, of the driven shaft disposed at right angles to the axis of said disk, a transmitting-disk mounted longitudinally movable on the driven shaft, a housing extending from the motor-case and provided with ball-bearing hubs, collars attached to the driven shaft and engaging the ball-bearings to prevent longitudinal movement of the driven shaft, and means for shifting the transmitting-disk longitudinally on the driven shaft as set forth.

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