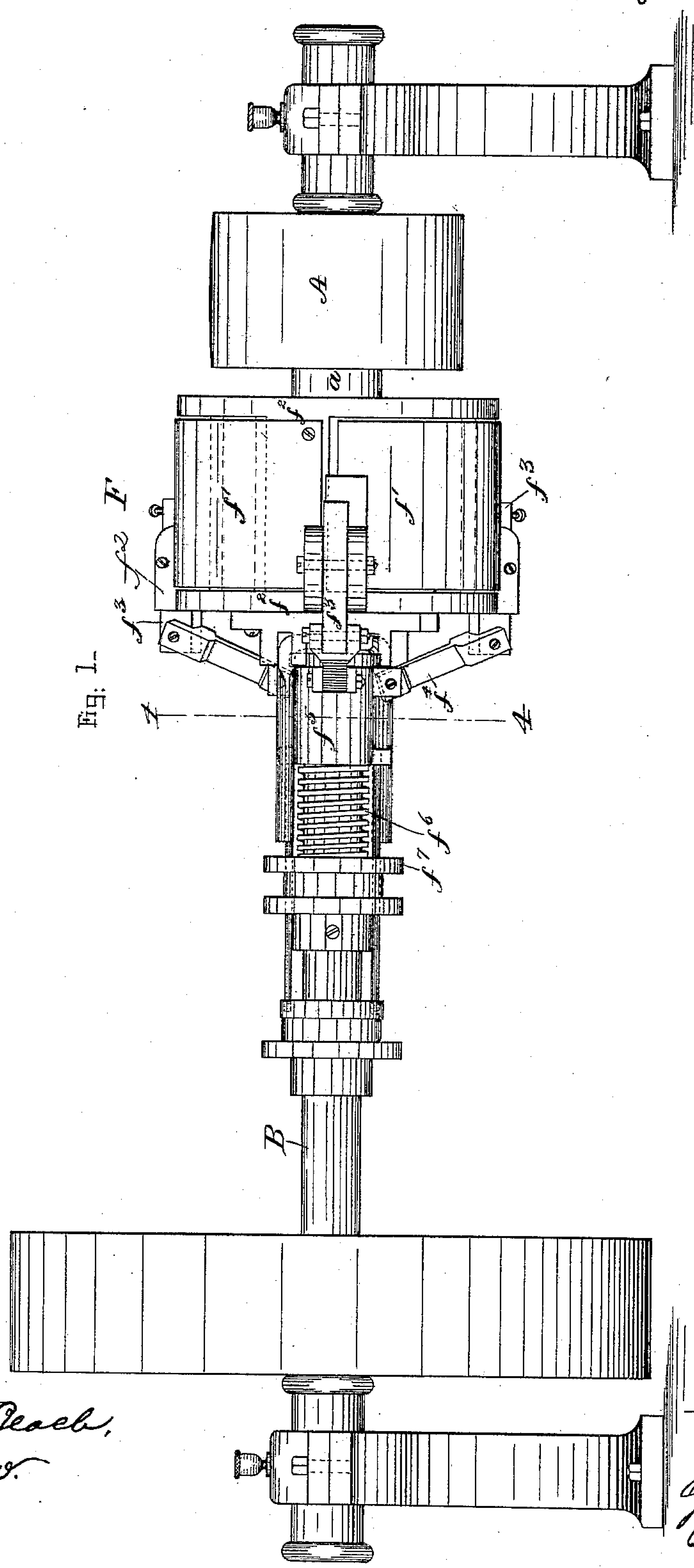
(No Model.)

4 Sheets—Sheet 1.

T. M. FOOTE.

SPEED REGULATOR.

No. 383,452. Patented May 29, 1888.



Witnesses.
Edward S. Beach,
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Inventor.
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[signature]
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N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.)

4 Sheets—Sheet 2.

T. M. FOOTE.

SPEED REGULATOR.

No. 383,452. Patented May 29, 1888.

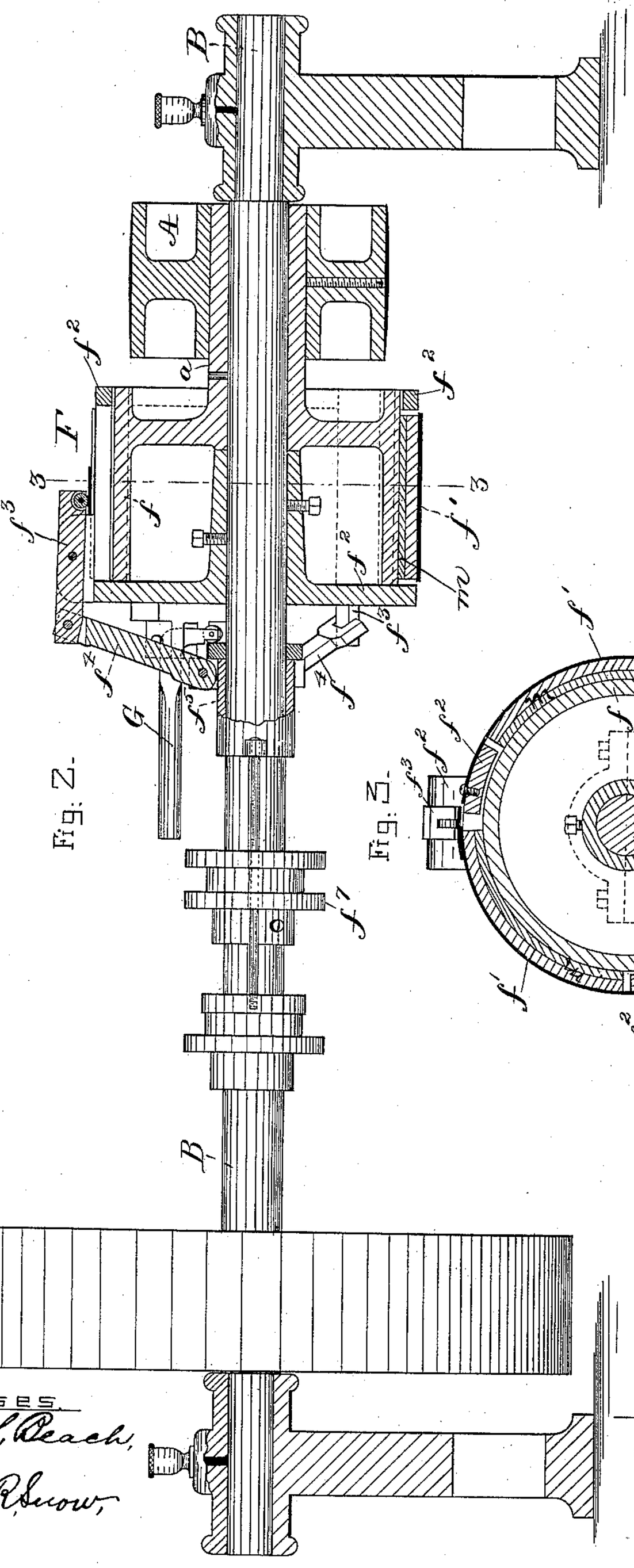

Fig. 2.

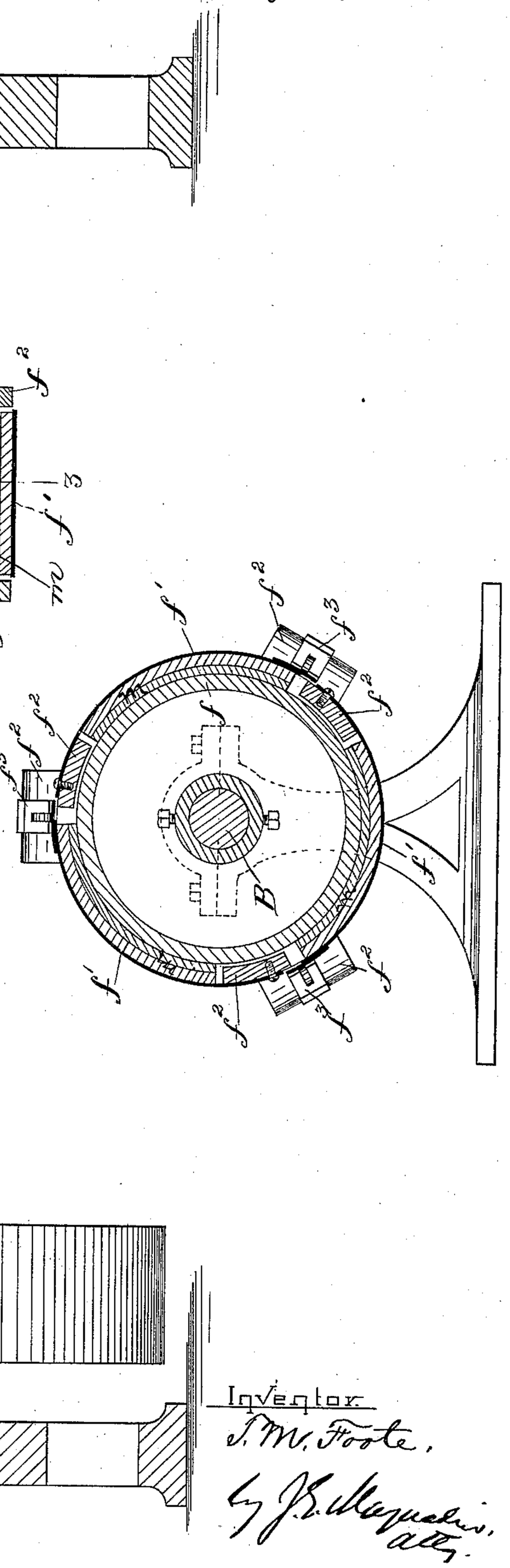

Fig. 3.

Witnesses.
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(No Model.)

4 Sheets—Sheet 3.

T. M. FOOTE.

SPEED REGULATOR.

No. 383,452. Patented May 29, 1888.

Fig. 4.

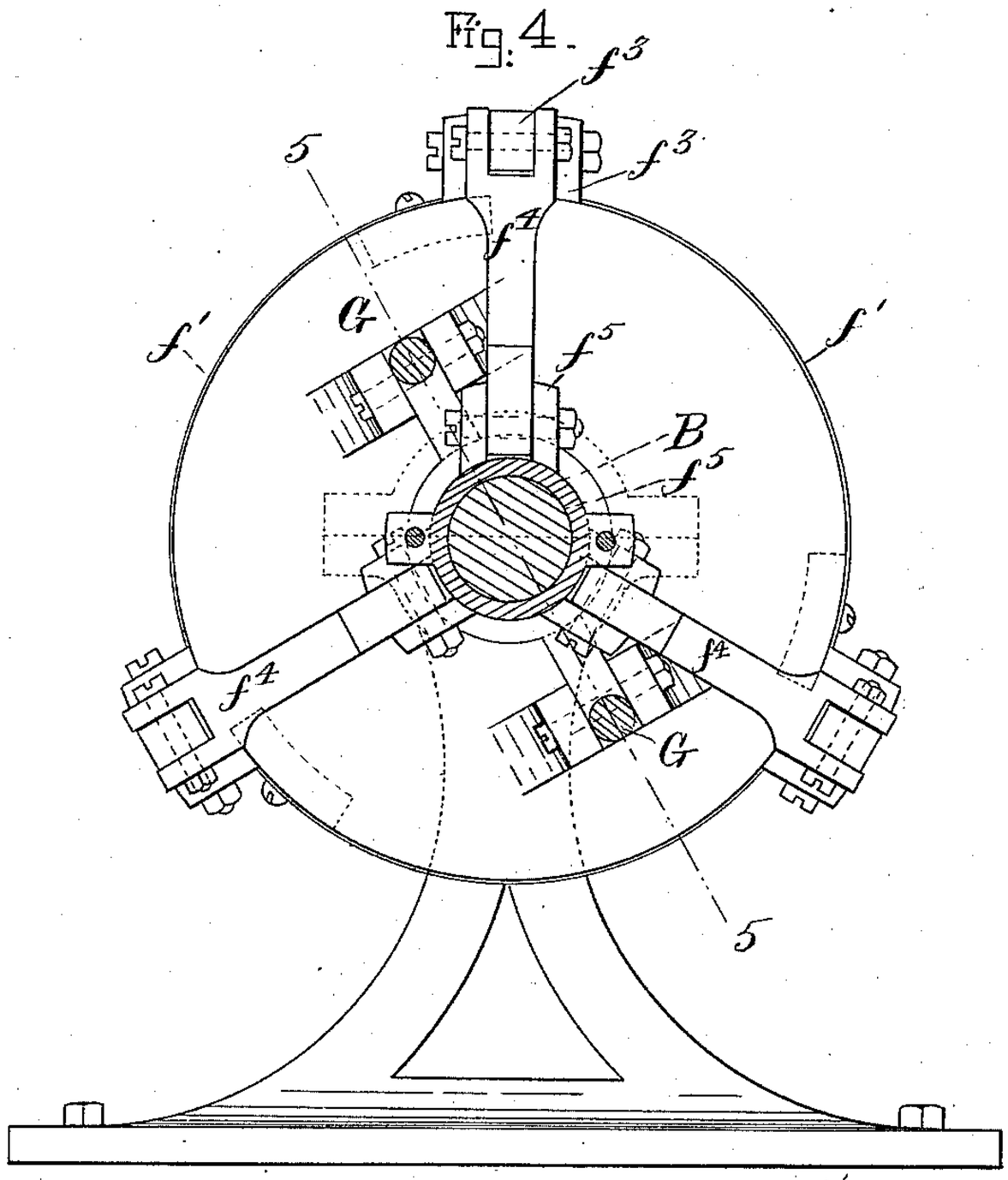
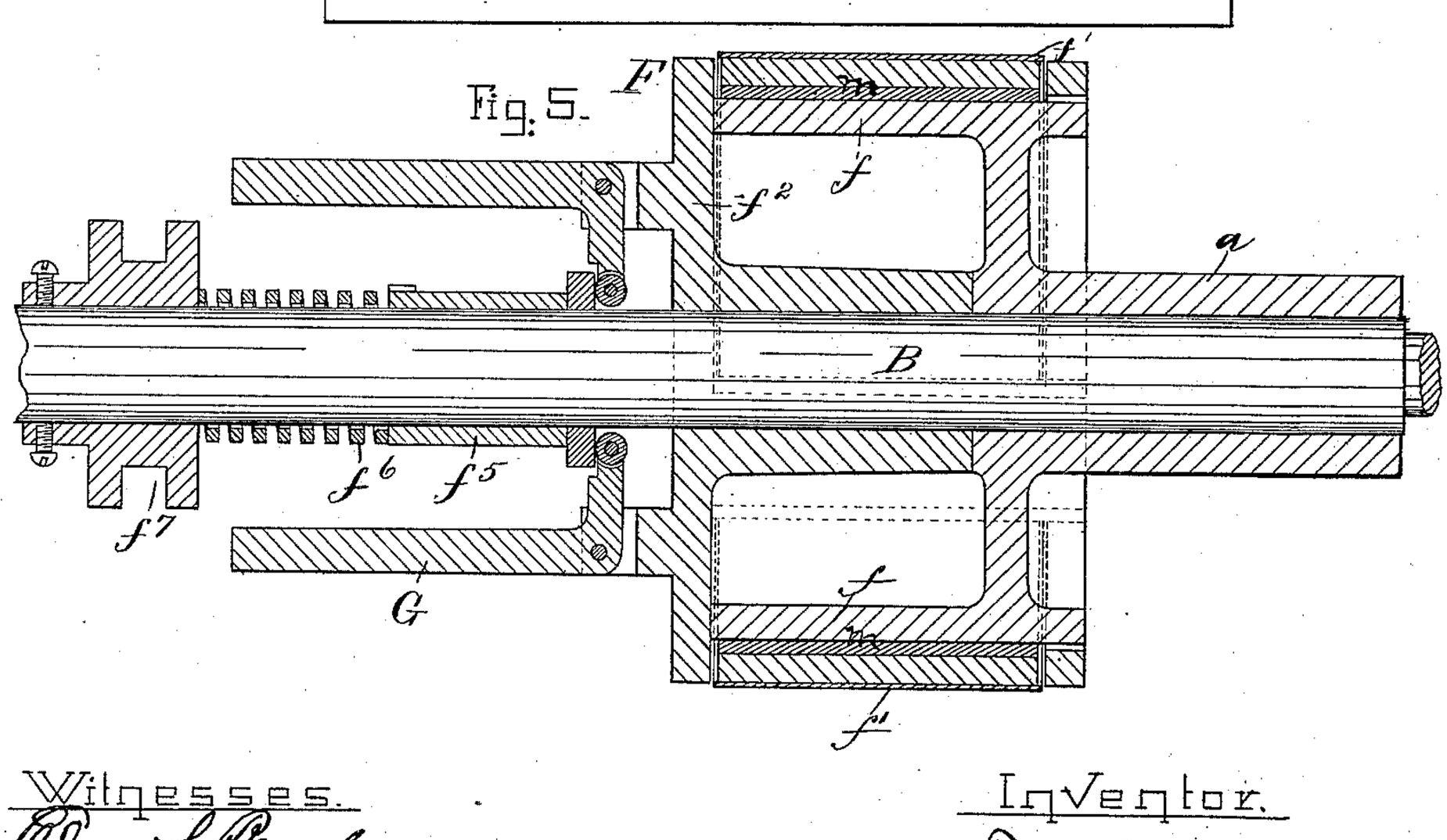


Fig. 5.



Witnesses.
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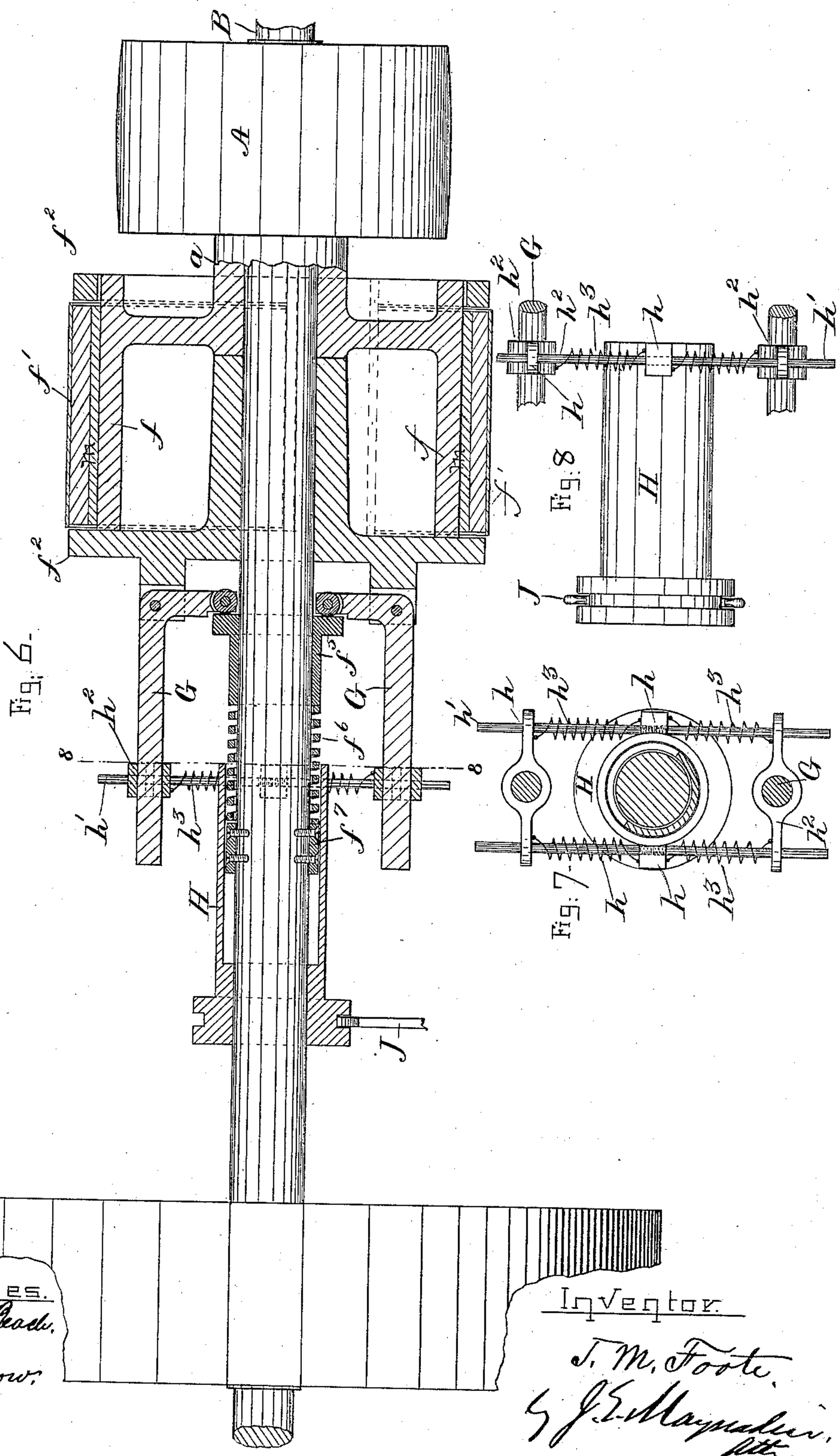
(No Model.)

4 Sheets—Sheet 4.

T. M. FOOTE.

SPEED REGULATOR.

No. 383,452. Patented May 29, 1888.



Witnesses.
Edward S. Beach.
John R. Snow.

Inventor.
T. M. Foote.
by J. E. Maynadier.
Atty.

UNITED STATES PATENT OFFICE.

THEODORE M. FOOTE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO WILLIAM LUMB, TRUSTEE, OF SAME PLACE.

SPEED-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 383,452, dated May 29, 1888.

Application filed April 25, 1887. Serial No. 236,111. (No model.)

To all whom it may concern:

Be it known that I, THEODORE M. FOOTE, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Speed-Regulator, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of one form of my regulator. Fig. 2 is an elevation, partly in section. Fig. 3 is a section on line 3 3 of Fig. 2, looking to the left. Fig. 4 is a section on line 4 4 of Fig. 1, looking to the right. Fig. 5 is a section on line 5 5 of Fig. 4. Fig. 6 is a longitudinal section with my supplementary regulator in place, and Figs. 7 and 8 are details.

My invention is, mainly, a contrivance made up of a novel friction-coupling connecting the driver with the shaft to be driven, and a governor which controls one member of the friction-coupling and increases or decreases the amount of friction in accordance with the varying speed of the driver, the purpose being to regulate the speed of dynamos or other machines which are to move at a constant speed.

Other features of my invention are set forth and claimed hereinafter.

In the drawings the driver is marked A, and is a driving-pulley which rotates at a speed in excess of that desired for shaft B, which represents the driving-shaft of a dynamo or of any other machine whose speed is to be regulated. Driver A is fast to sleeve *a*, and this sleeve carries a wheel, *f*, which forms one member of the friction device F. The other member of the friction device F is made up of brake-shoes *f'*, which are so connected to shaft B that they must rotate together, and also so connected with governors G that the friction between the brake-shoes *f'* and wheel *f* is diminished whenever the speed of shaft B tends to exceed the amount desired, whereby the speed of shaft B is regulated. In that form of my invention shown in the drawings there are three brake-shoes *f'*, of sheet metal, having some springiness, and these brake-shoes are carried by a carrier, f^2, which partially incases wheel *f*, the carrier f^2 being fast on shaft B. Each of these brake-shoes *f'* is preferably faced with a compound fabric, *m*, compounded fabric *m* consisting in this case of two laminations, as shown in Figs. 2, 3, 5, and 6, the inner surface of which is at all times in frictional contact with the outer surface of wheel *f*, and each brake-shoe *f'* is controlled by a lever, f^3, fulcrumed in the carrier f^2. The levers f^3 are connected with links f^4 from slide f^5, which is forced in one direction by a spring, f^6, and in the opposite direction by the governors G. Slide f^5 is best made in the form of a sleeve, as shown in the drawings. The tension of spring f^6 is regulated by means of sleeve f^7, which is adjusted in either direction on shaft B, and is secured by any suitable means. Slide f^5 is moved against its spring f^6 by means of the governors G, which are fulcrumed to carrier f^2, so that the governors rotate with the shaft B.

In that form of my speed-regulator above described both the spring f^6 and the governors G can be adjusted readily and nicely to give the desired speed, and this ease and nicety of adjustment is a matter of very great importance, as is well known to all skilled in the art.

The best form of device for regulating governors G now known to me is that shown in Figs. 6, 7, and 8, in which slide H (best made in the form of a sleeve and mounted on shaft B, as shown) has lugs *h*, in which are mounted rods *h'*, passing through slots in the cross-pieces h^2, that are carried by and are movable on the governors G. Springs h^3 connect cross-pieces h^2 to lugs *h* on slide H.

The operation is as follows: The driver A is driven with a speed in excess of that desired for shaft B. The sleeve f^7 is so set that the spring f^6 will cause slide f^5, by means of links f^4 and levers f^3, to force the brake-shoes *f'* against friction-wheel *f*, and thereby create sufficient friction to cause shaft B to rotate with driver A. When slide f^5 is moved sufficiently near carrier f^2 to force the shoes *f'* into greater frictional contact with wheel *f*, links f^4 will be brought into such relation to the levers f^3, pressing on friction-shoes *f'*, that the members of the friction device F will be held in the required frictional contact until centrifugal force acting upon the governors G moves sleeve f^5 away from carrier f^2, and thereby causing the free ends of levers f^3 to move away from brake-shoes *f'*, which then spring back very slightly, but not so far as to become

out of contact with friction-wheel *f*. As sleeve f^5 is thus moved away from the carrier f^2, it compresses the spring f^6. The centrifugal force of course does not act until shaft B has attained the desired speed, and when the governors G are properly weighted and adjusted to suit springs f^6 the speed of shaft B is accurately regulated. While not strictly essential, it is yet clear that both governors G and the springs f^6 should be adjustable for the best results.

When the governor-regulating device above described is used, the speed of shaft B is readily varied by moving slide H, say by a forked lever, J, so as to bring cross-pieces h^2 nearer to or farther from the fulcra of the governors, whereby the force of springs h^3 upon the governors is varied.

I am aware of Oesterlein's patent, No. 235,558, dated December 14, 1880, and Capron's patent, No. 275,446, dated April 10, 1883, and disclaim all that is shown in them.

What I claim is—

1. Driver A and friction-wheel *f*, in combination with carrier f^2, mounted on shaft B, and one or more brake-shoes, f', secured in contact with friction-wheel *f*, to the carrier f^2, substantially as and for the purpose set forth.

2. Driver A and friction-wheel *f*, in combination with carrier f^2, mounted on shaft B, one or more brake-shoes, f', secured in contact with friction-wheel *f*, to the carrier f^2, and means, substantially such as described—viz., one or more levers, f^3, and links f^4, and sliding sleeve f^5—for increasing the frictional contact between brake-shoes f' and friction-wheel *f*, substantially as and for the purpose set forth.

3. In a friction-coupling, the combination of friction-wheel *f* and one or more brake-shoes, f', in contact with friction-wheel *f*, with one or more levers, f^3, and links f^4, slide f^5, and spring f^6, substantially as and for the purpose set forth.

4. In a speed-regulator, the combination of a governor, G, with slide H, and springs h^3, connecting the governor and slide, substantially as and for the purpose set forth.

THEODORE M. FOOTE.

Witnesses:

R. L. WALKER,

J. E. MAYNADIER.