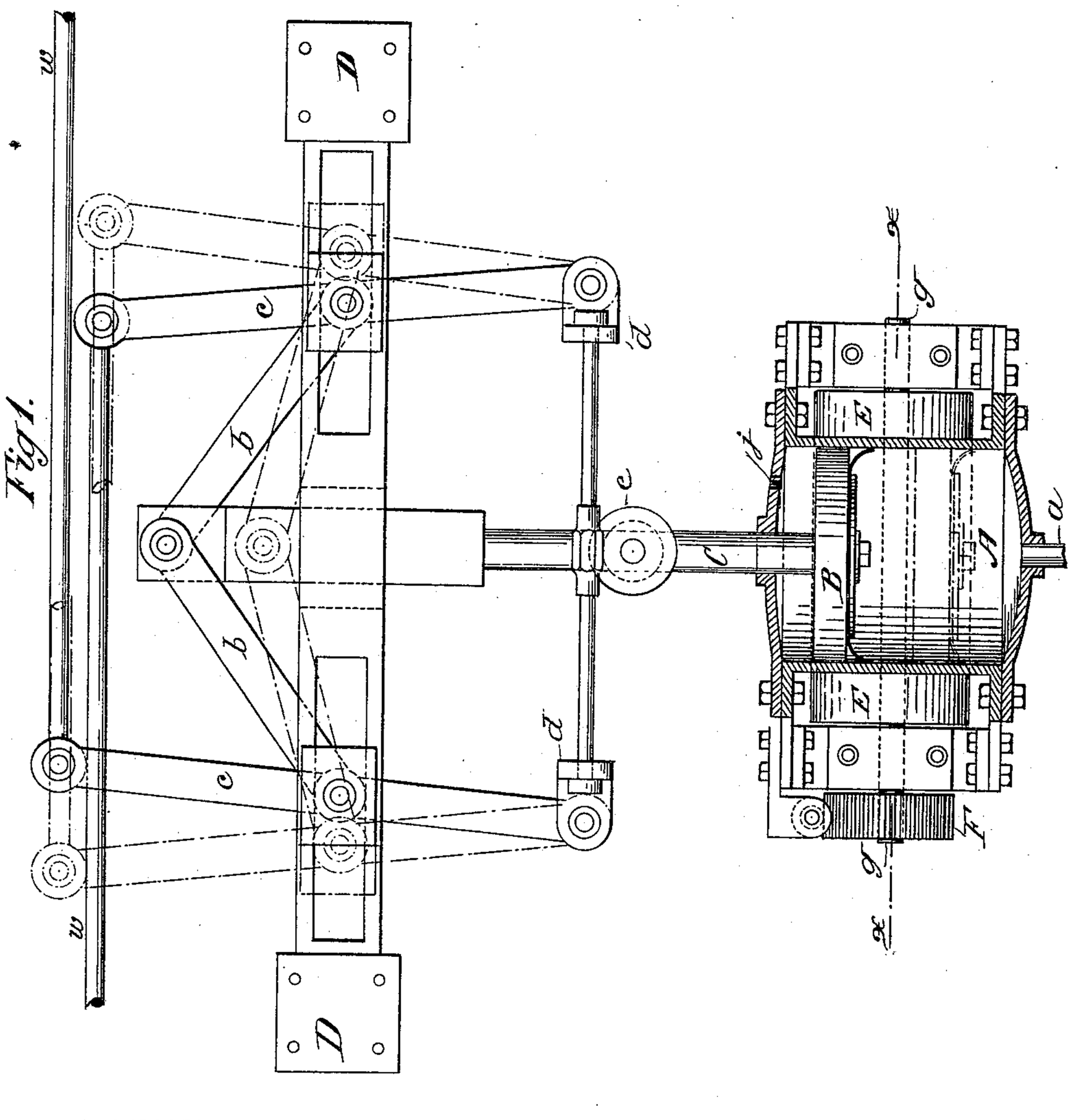
(No Model.)

4 Sheets—Sheet 1.

R. SOLANO.

POWER BRAKE.

No. 353,892. Patented Dec. 7, 1886.



WITNESSES:

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Wm. H. Hannia

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(No Model.)

4 Sheets—Sheet 2.

R. SOLANO.

POWER BRAKE.

No. 353,892. Patented Dec. 7, 1886.

Fig 2.

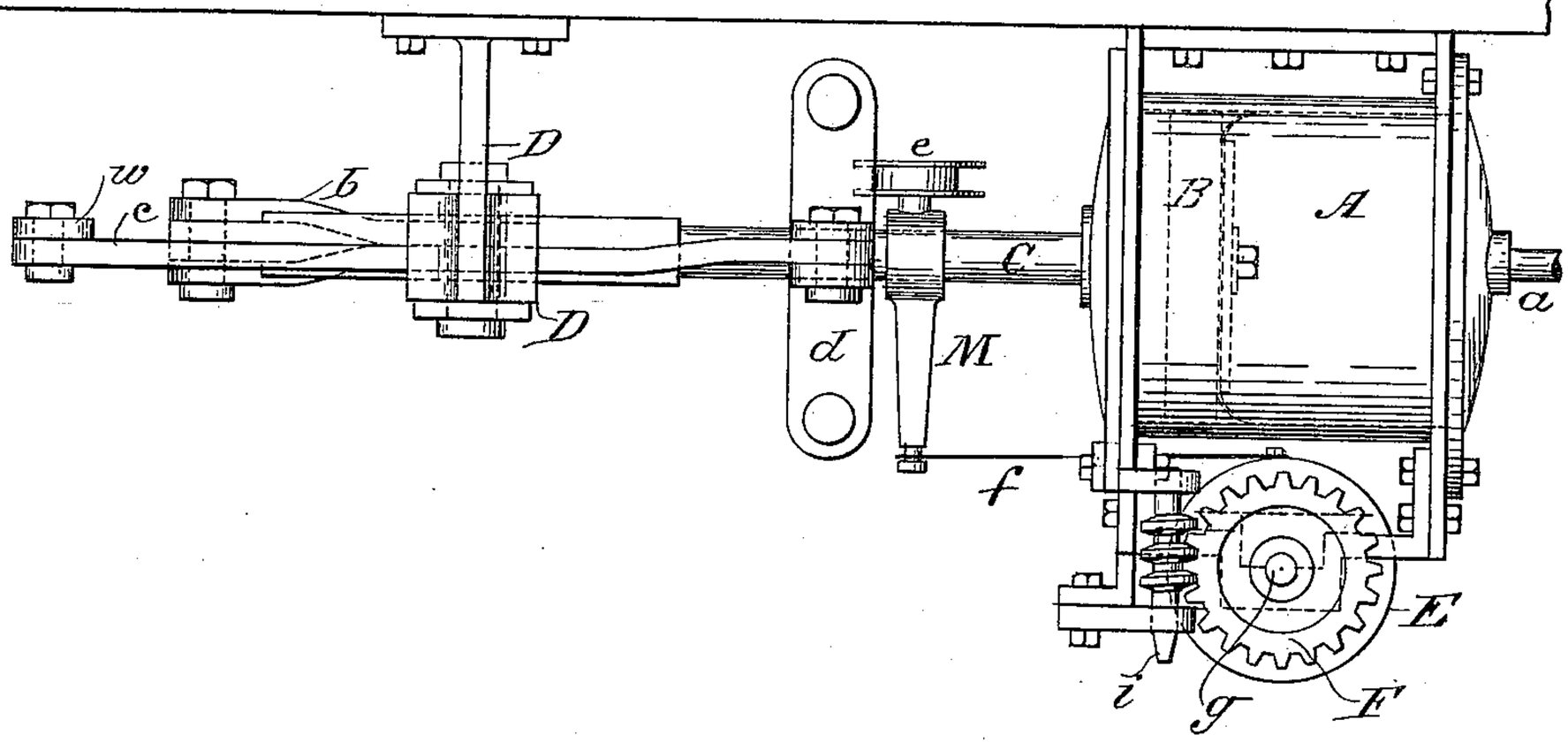
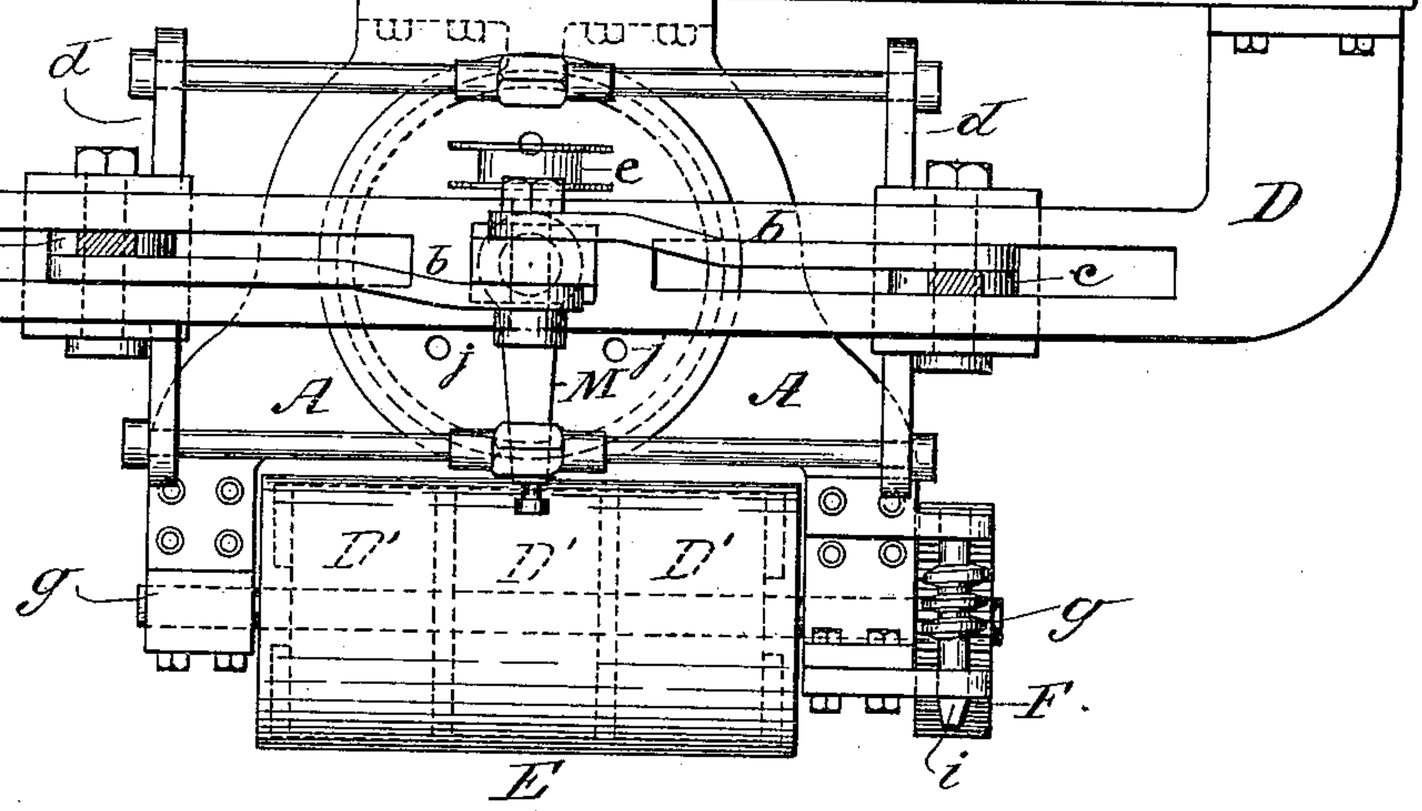


Fig. 3.



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(No Model.)

4 Sheets—Sheet 3.

R. SOLANO.

POWER BRAKE.

No. 353,892. Patented Dec. 7, 1886.

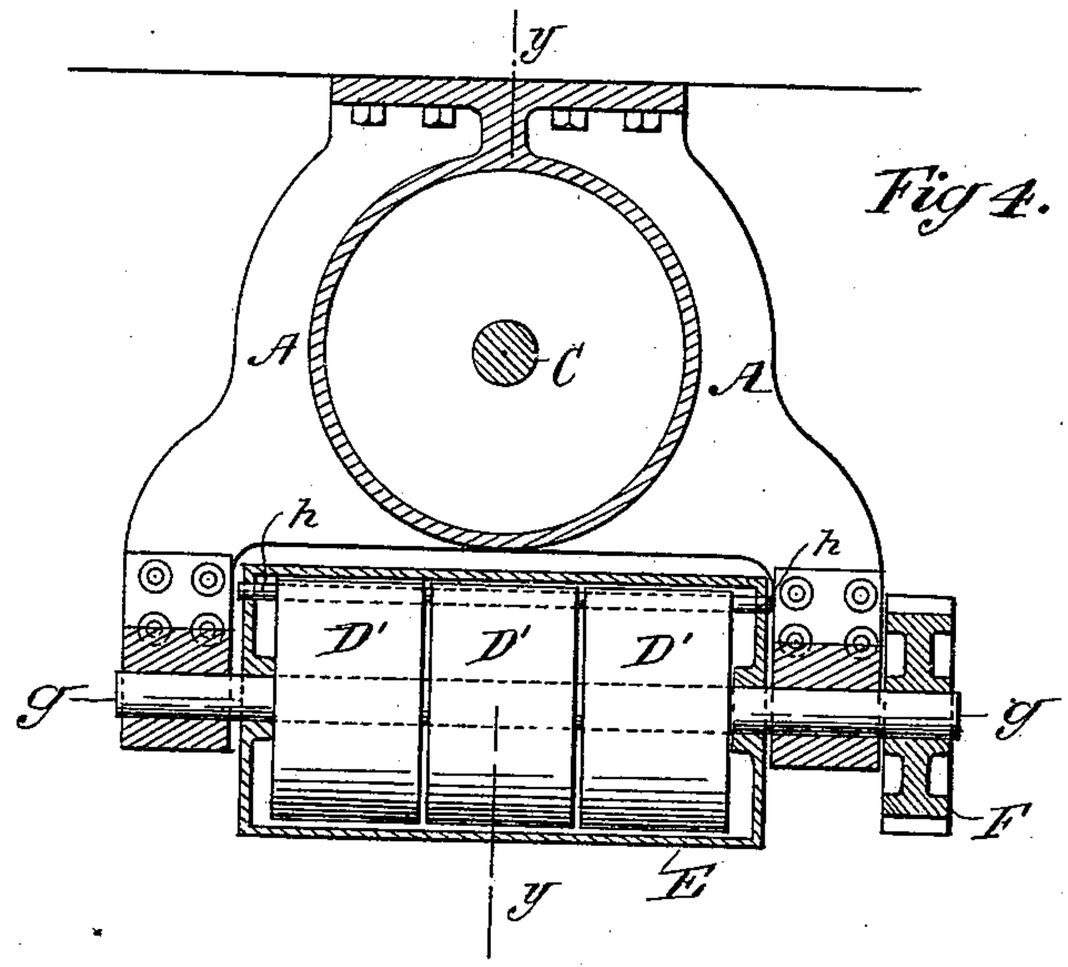
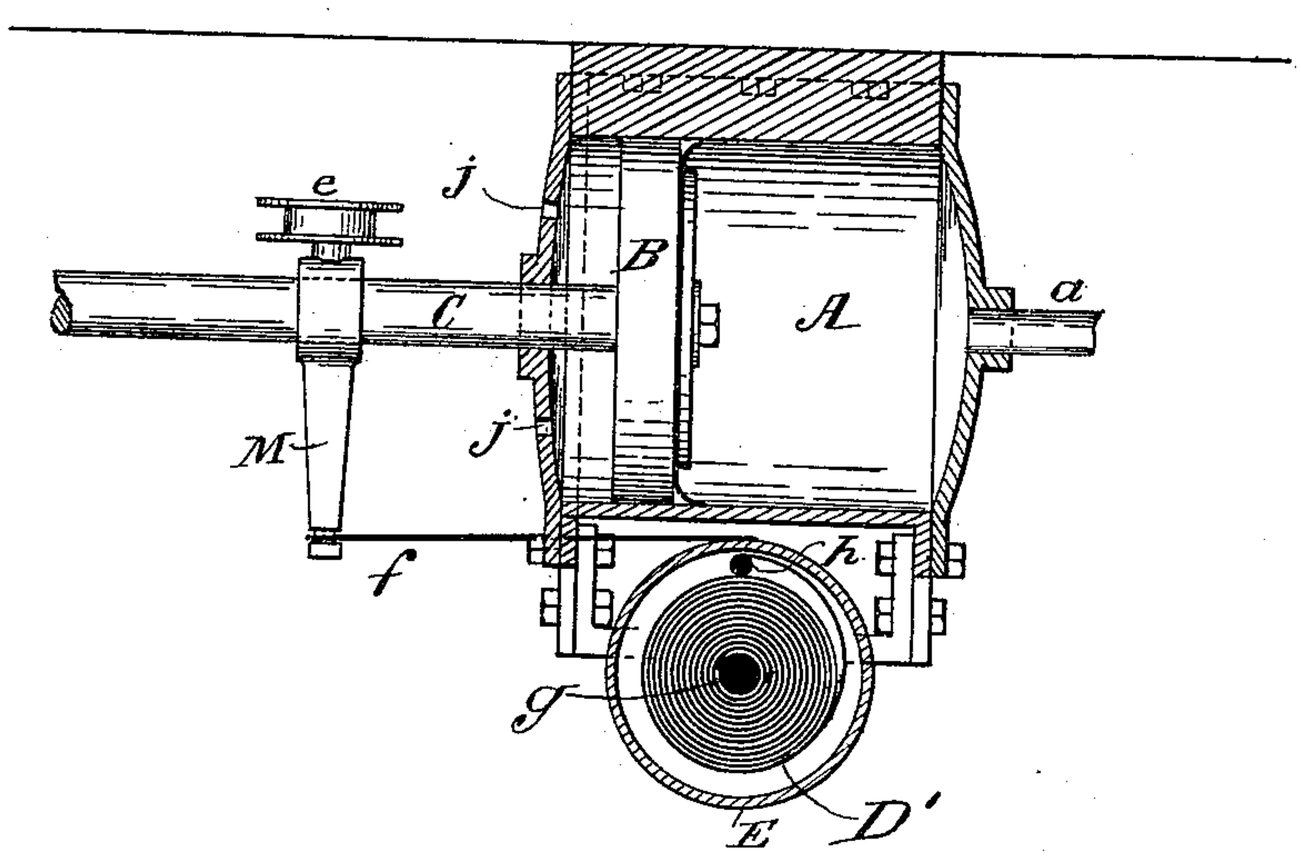


Fig 4.

Fig. 5.



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4 Sheets—Sheet 4.

R. SOLANO.

POWER BRAKE.

No. 353,892. Patented Dec. 7, 1886.

Fig. 6.

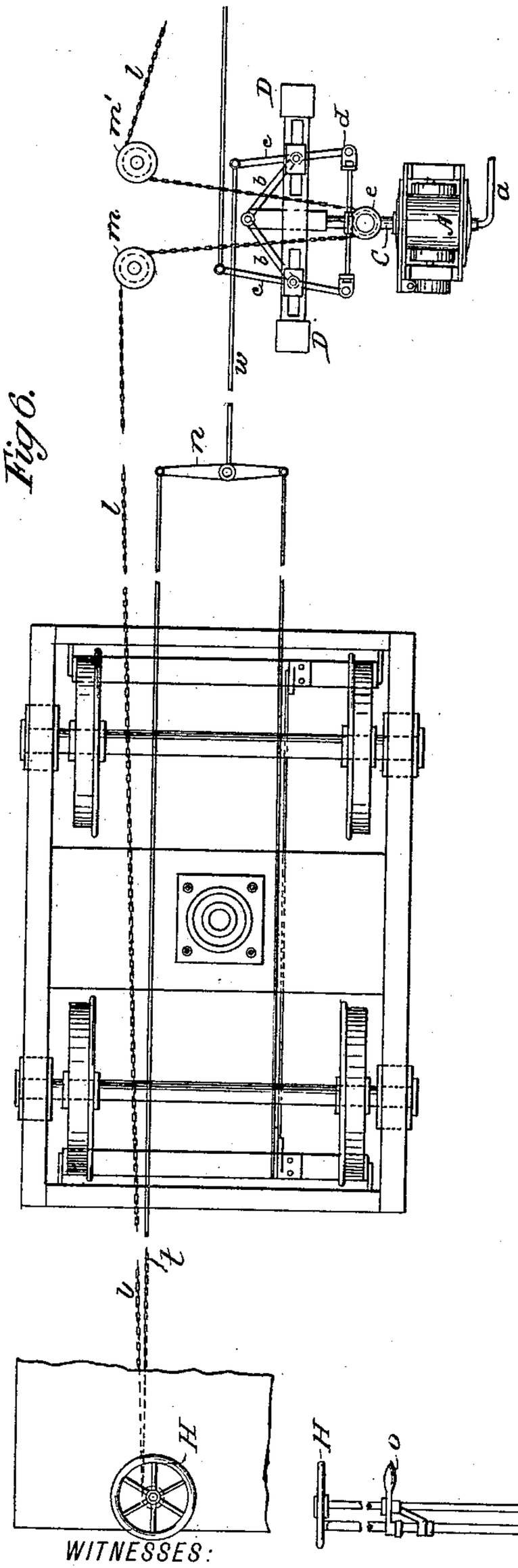


Fig. 7.

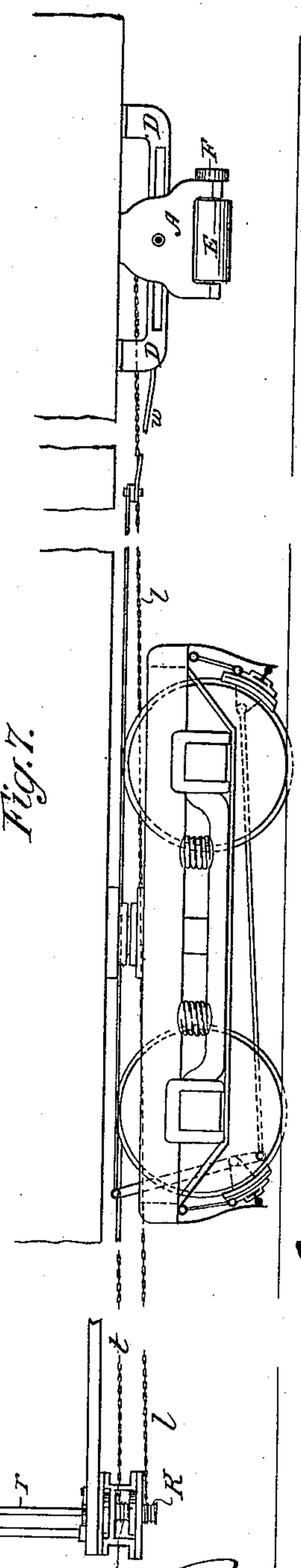


Fig. 10.

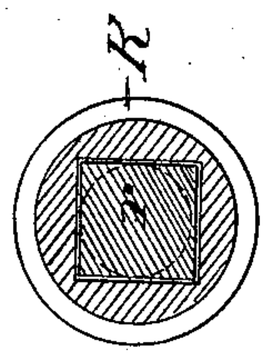


Fig. 9.

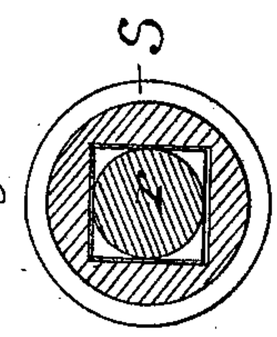
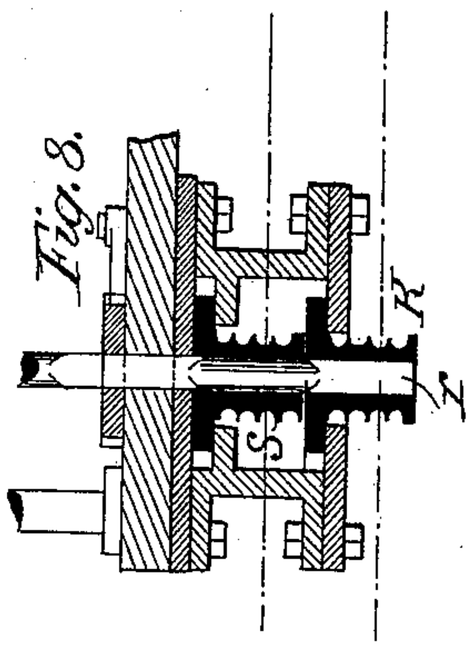


Fig. 8.



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UNITED STATES PATENT OFFICE.

RENALDO SOLANO, OF BROOKLYN, NEW YORK, ASSIGNOR OF TWO-THIRDS TO JOHN W. HOWARD AND DAVID R. MORSE, BOTH OF SAME PLACE.

POWER-BRAKE.

SPECIFICATION forming part of Letters Patent No. 353,892, dated December 7, 1886.

Application filed June 28, 1886. Serial No. 206,461. (No model.)

To all whom it may concern:

Be it known that I, RENALDO SOLANO, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Power-Brakes, of which the following is a specification, reference being had to the accompanying drawings, forming part of the same, in which—

Figure 1 is a plan view partly in section; Fig. 2, a side elevation; Fig. 3, an end elevation; Fig. 4, a transverse sectional view on the line *x x*, Fig. 1; Fig. 5, a vertical sectional view on the line *y y*, Fig. 4; Fig. 6, a plan view of the brake and its operative parts in connection with a car-truck embodying my invention. Fig. 7 is a side view of Fig. 6; and Figs. 8, 9, and 10, enlarged and detailed views of certain operative parts.

In the several figures similar letters of reference indicate corresponding parts.

In order that others may understand and apply my invention, I will first proceed to describe a construction and operation of parts embodying it, and subsequently to point out in the claims its novel features.

In the drawings, A represents an air or steam cylinder provided with the usual air or steam inlet, *a*, and relief-openings *j*, B the working piston, C the piston-rod, and D a rigid slotted frame to which the toggle-bars *b b*, levers *c c*, and equalizing-bar *d* are connected, and by means of which motion is communicated to the brake through the connecting-rods *w* in a manner similar to the device described in a former application.

To the piston-rod C, I secure a depending arm, M, and upon the upper end of said arm I place a pulley, *e*, and at the opposite or lower end a chain or rope, *f*, is fastened that extends to a revolving cylinder, E, arranged beneath and transversely to the air or steam cylinder A, as shown in Figs. 2, 3, 4, and 5, the journal-bearings of the cylinder E being supported upon the extended flanges of the cylinder A.

Within the cylinder E, I arrange a series of coiled springs, D′, which are fastened at their inner ends to an independent central shaft, *g*, and at their outer ends to a cross-bar, *h*, secured to the shell of the inclosing-cylinder. These springs are wound upon the central shaft, *g*, by means of a worm-gear, F *i*, as shown, and in operation rotate the inclosing-cylinder in the usual way that spring-barrels are operated, the tension of the springs being regulated by the worm-gearing to produce sufficient power to draw upon the connected chain or rope *f* and move the piston-rod C, so as to straighten the toggle-bars *b b*, and thereby communicate motion to the connecting-rods *w*, that actuate the brake-shoe.

When the train is in motion, the brakes are released by admitting a preponderating air or steam pressure into the cylinder A through the inlet-pipe *a*, which counteracts the effect of the springs D′, and when said air or steam pressure is relieved the springs D′ are free to act to set the brakes as described, such action being automatic in the event of accident by the separation of the cars or of the air or steam hose, and consequent escape of the steam or air pressure.

In the event of a failure of the air or steam pressure to act to release the brake, I provide an auxiliary device, as shown in Figs. 6 and 7, consisting of a hand-wheel, H, and spindle *r*, connecting with a winding-winch. (Shown detached and enlarged in Figs. 8, 9, and 10.)

The winch is composed of two winding parts, S and K, separated to act independently of each other, and the spindle *r* is constructed with a squared section and made capable of being raised and lowered, so that such squared part of the spindle may be made to engage with and operate the winding part K to operate the rope or chain *l*. This chain is fastened at one end to the bottom of the car or other fixed part, and extended to and around a small pulley, *m*, and to the pulley *e* on the arm M, and returned around a pulley, *m′*, and to the opposite hand-brake spindle. By this means the tension of the springs D′ is overcome and the operative parts moved to release the brake.

In the event of failure to act, or breakage of all the springs D′, the spindle *r* is raised by the hand-wheel H, which brings the squared section of the spindle into engagement with the winding part S, whereby the power is transferred to the chain *t*, yoke *n*, and con-

necting-rods *w* to apply the brake, the spindle *r* being secured in its elevated position by a fastening device, *o*, engaging with a shoulder upon the spindle *r*, as shown in Fig. 7.

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

1. The combination, in a power-brake, of mechanical power devices for applying the brake, consisting of a revolving cylinder, E, containing the coiled springs D′, connected chain or rope *f*, piston-rod C, toggle-bars *b b*, equalizing-bar *d*, levers *c*, and rod *w*, with counteracting devices for releasing the same, actuated by a preponderating air or steam pressure.

2. The combination, in a power-brake, of mechanical power devices, substantially as described, for applying the brake, and auxiliary hand-power devices for releasing the same, consisting of a winding-winch composed of two connected and independently-operated parts, S K, chain or rope *l*, and connected hand-wheel H, substantially as described.

3. The combination of power devices, substantially as described, actuated by air or steam pressure for releasing a brake, and auxiliary hand-power devices for applying the same, consisting of a winding-winch composed of two connected and independently-operated parts, S K, chain or rope *l*, and connected hand-wheel H, substantially as described.

RENALDO SOLANO.

Witnesses:
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GEO. M. BELDEN.