

No. 854,720.

PATENTED MAY 28, 1907.

W. F. DAWSON.  
DYNAMOMETER.  
APPLICATION FILED NOV. 14, 1905.

Fig. 1.

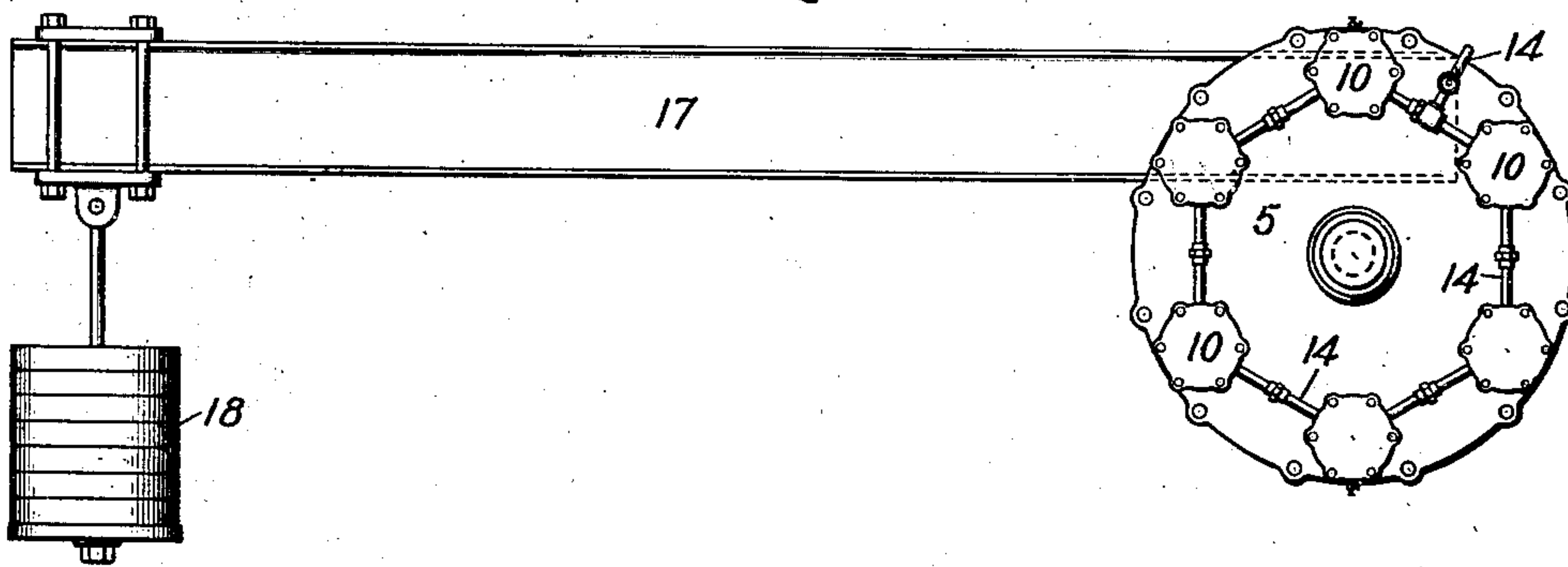
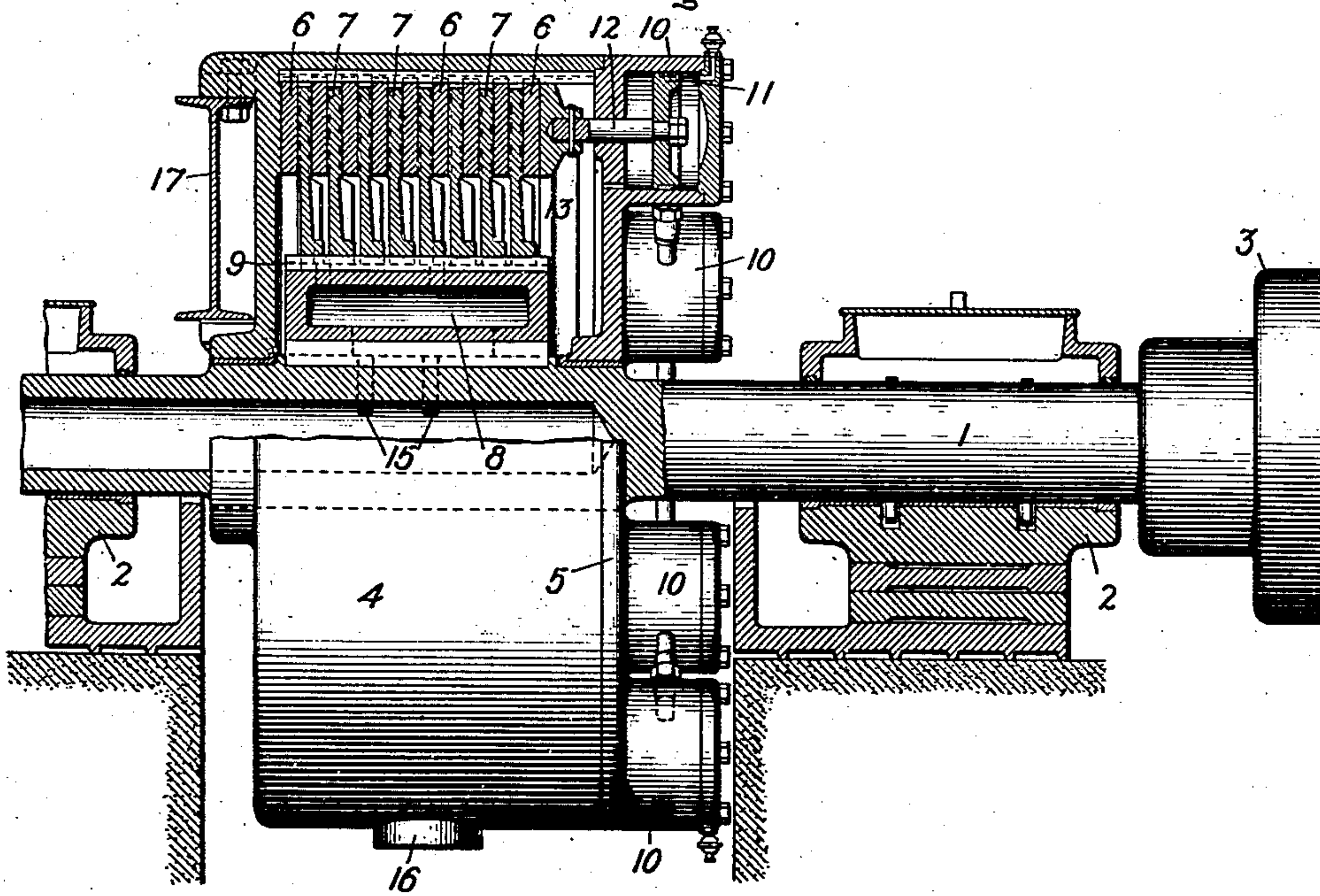


Fig. 2.



Witnesses.

*Nancy M. Gilden*  
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Inventor.

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by *Albert S. Davis*  
Att'y



# UNITED STATES PATENT OFFICE.

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ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## DYNAMOMETER.

No. 854,720.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed November 14, 1905. Serial No. 287,257.

*To all whom it may concern:*

Be it known that I, WILLIAM F. DAWSON, a citizen of the United States, residing at Rugby, England, have invented certain new and useful Improvements in Dynamometers, of which the following is a specification.

This invention relates to that class of dynamometers or brakes known as "absorption" dynamometers. The function of such an apparatus is to transform kinetic energy into heat by means of friction, and to dissipate the heat by means of a current of liquid, such as water, which absorbs and carries it away. The friction elements are thus maintained at a constant temperature, and an accurate measurement can be obtained of the power consumed. For determining loads of different values, means are provided for varying the pressure between the friction elements.

In my invention I have aimed to provide a simple, strong and readily controlled absorption dynamometer of the Prony brake type, capable of measuring large powers with a comparatively low speed of revolution.

The machine consists of a rotatable shaft and a stationary drum sleeved thereon, said shaft and drum each carrying a plurality of annular friction elements, those in the shaft alternating with those in the drum. Said elements are splined to the shaft and the drum respectively, so as to be capable of longitudinal movement. Fluid-pressure devices are provided to force the elements into more or less close contact. The shaft is hollow, so that water or other cooling liquid can be forced into it and pass out through radial holes into the drum and between the friction elements, draining off at the bottom of the drum. A weighted arm is secured to the drum to enable the power absorbed to be measured, in the usual manner.

In the accompanying drawing, Figure 1 is a side elevation of a Prony brake or dynamometer embodying my invention; Fig. 2 is an end elevation, on a large scale and partly in section.

The shaft 1 is journaled in suitable pillow-blocks 2, and has a belt-pulley 3 for conveying power thereto. Sleeved on the shaft is a drum 4, having one head or end 5 removable. Inside the drum is a plurality of annular flat plates or friction elements 6, splined to the drum so as to be incapable of rotating therein, but yet movable longitudinally thereof.

Interposed between these plates and alternating therewith are the flat disks 7 carried by the shaft. The disks are preferably mounted on a hub 8 keyed to the shaft and having a spline 9 by which said disks are compelled to revolve with the shaft while still capable of longitudinal movement along the same.

In order to exert a longitudinal pressure on these plates and disks, the head 5 of the drum is provided with one or more small cylinders 10 whose axes are parallel with the shaft 1. In each cylinder is a piston or other abutment 11 connected by a rod 12 with an annular follower 13 which rests against the adjacent plate 6. By means of a pipe 14 hydraulic or other pressure can be conveyed to the cylinders, forcing the pistons inward and causing the friction elements to be pressed together with a force depending on the degree of fluid pressure in the cylinders.

The shaft 1 is hollow for a portion of its length, and the hub 8 may be hollow also, as shown. By means of ports 15 in the shaft and hub, water or other cooling liquid can be forced into the drum and between the friction elements to absorb the heat generated by said elements. The hot water drains off through a spout 16 at the lowest point of the drum. A beam 17 is secured to the drum and carries the weights 18 by means of which the power is measured in the usual manner.

The operation of the device is as follows: Power is conveyed to the shaft by means of a belt on the pulley 3. The rotating shaft carries with it the disks 7, and since they are pressed closely between the stationary plates 6 a large amount of friction results, tending to revolve the drum. This tendency is resisted by the weighted beam, and the work of overcoming the friction caused by the disks rubbing on the plate appears as heat, which is absorbed and conveyed away by the cooling liquid.

What I claim as new, and secure by Letters Patent of the United States, is,—

1. In a dynamometer, the combination with a rotatable shaft, of a drum sleeved thereon, annular plates splined in said drum, disks splined on said shaft and alternating with said plates, means for forcing said plates and disks together, and means for conducting liquid to and from the surfaces of said disks and plates.



2. In a dynamometer, the combination with a rotatable shaft, of a drum sleeved thereon, annular plates splined in said drum, disks splined on said shaft and alternating  
5 with said plates, one or more fluid-pressure devices for forcing said plates and disks together, and means for conducting liquid to and from the surfaces of said disks and plates,

3. In a dynamometer, the combination  
10 with a rotatable shaft, of a drum sleeved thereon, annular plates movable lengthwise in said drum, disks movable lengthwise on said shaft and alternating with said plates. one or more cylinders on one end of said  
15 drum, and movable abutments in said cylinders acting on said plates and disks to move them lengthwise.

4. In a dynamometer, the combination with a hollow rotatable shaft having ports  
20 therethrough, of a drum sleeved on said shaft and having a drain-spout, and the

chamber of said drum in communication with said ports annular plates in said drum, disks on said shaft, and means for forcing said plates and disks together. 25

5. In a dynamometer, the combination with a hollow rotatable shaft, of a hollow hub thereon, said shaft and hub having ports, disks splined on said hub, a drum  
30 sleeved on said shaft and having a drain-spout, annular plates in said drum alternating with said disks, cylinders on one end of said drum, a piston in each cylinder, a follower acted on by said pistons, and pipes for  
35 conveying fluid-pressure to said cylinders.

In witness whereof, I have hereunto set my hand this first day of November, 1905.

WILLIAM F. DAWSON.

Witnesses:

WALTER W. BALL,  
F. HOOD.