

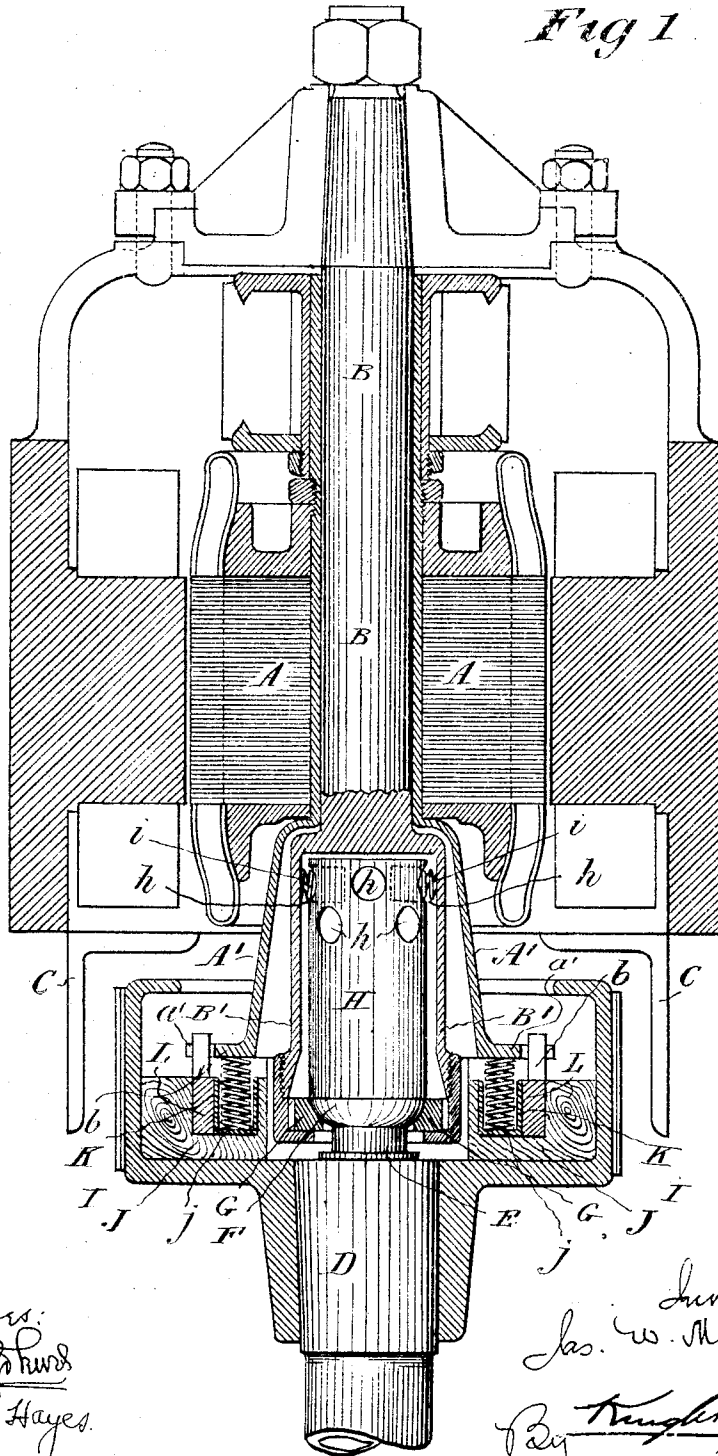
No. 781,732.

PATENTED FEB. 7, 1905.

J. W. MACFARLANE.
CENTRIFUGAL MACHINE.
APPLICATION FILED JULY 27, 1903.

5 SHEETS—SHEET 1.

Fig 1



Witness:
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5 SHEETS—SHEET 2.

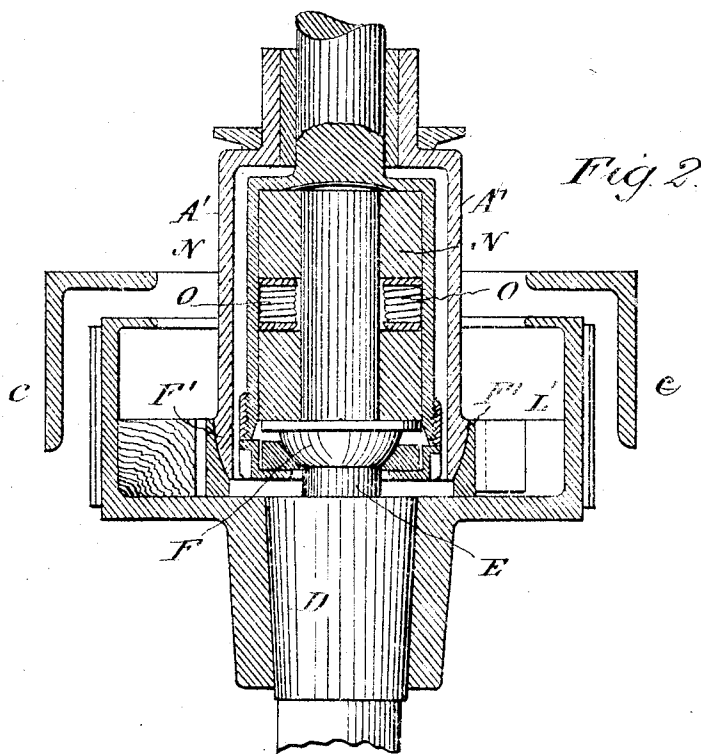
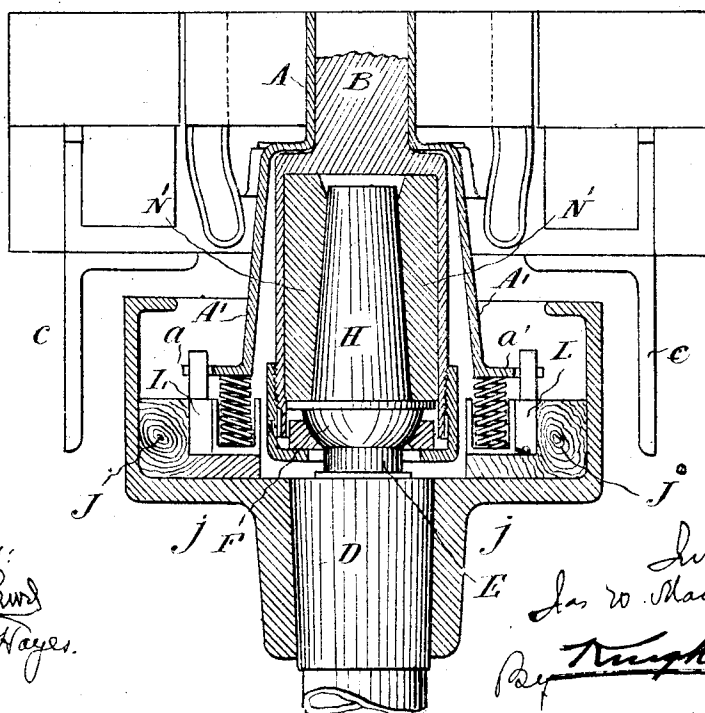


Fig. 3.



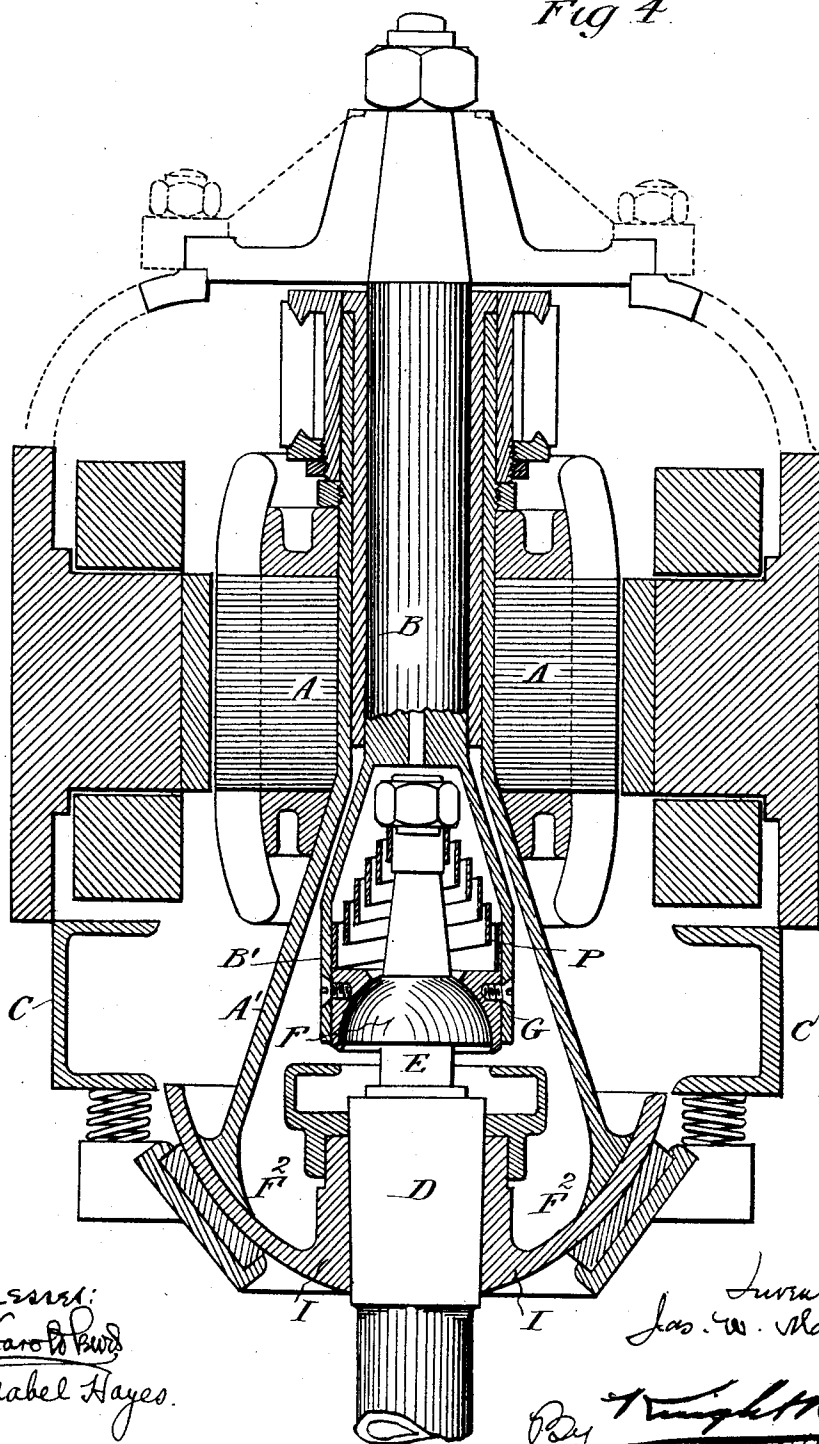
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5 SHEETS—SHEET 3.

Fig 4.



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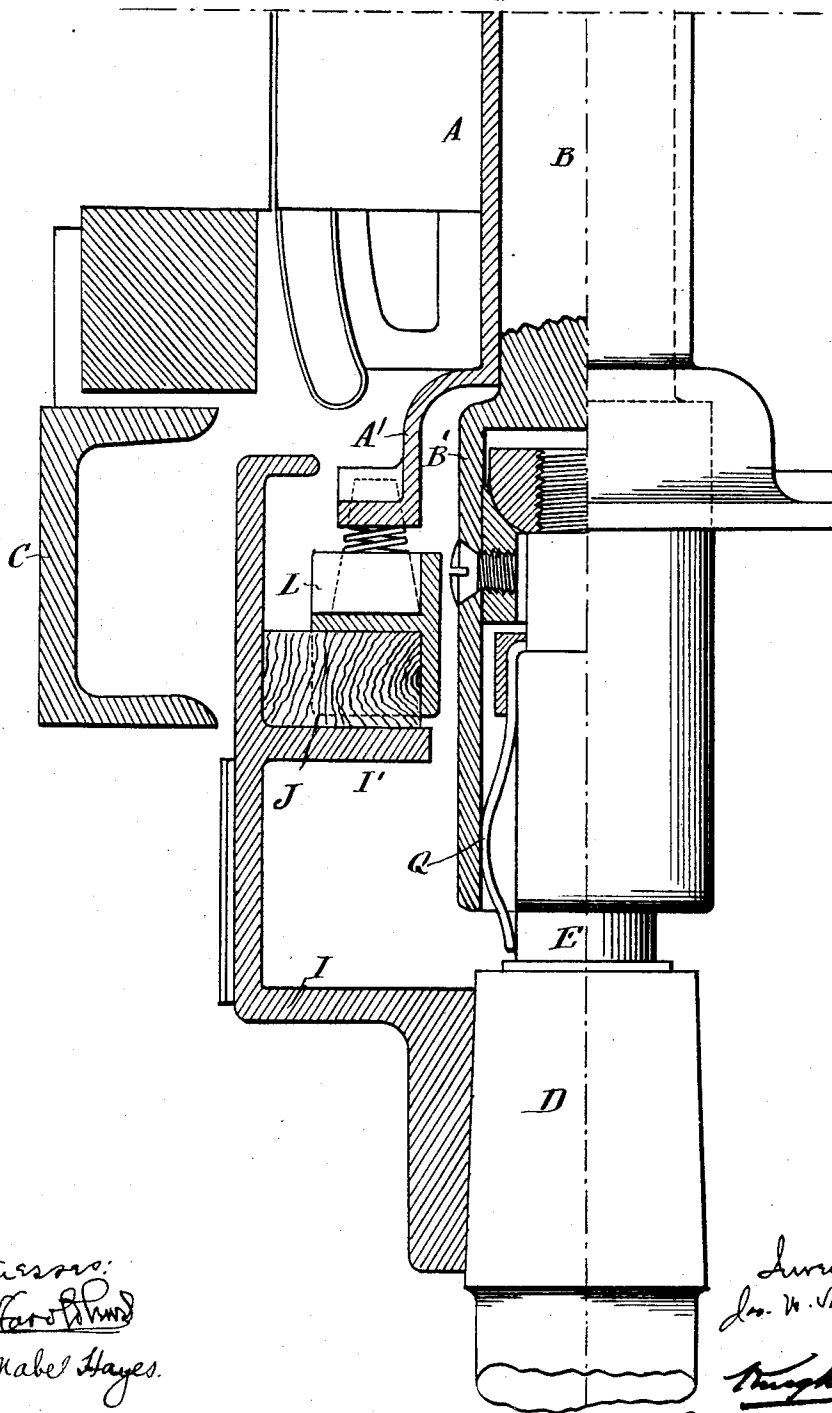
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5 SHEETS—SHEET 4.

Fig. 5.



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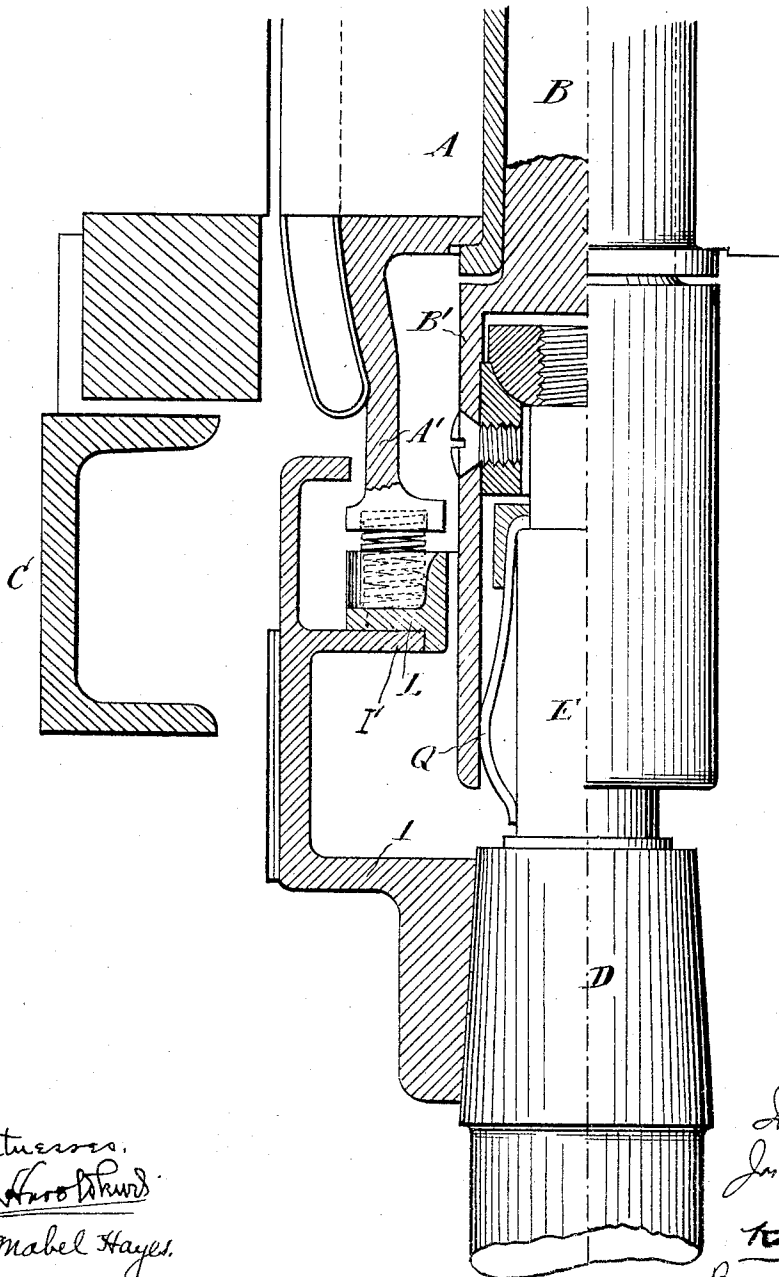
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5 SHEETS—SHEET 5.

Fig. 6.



Witnesses.
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UNITED STATES PATENT OFFICE.

JAMES WRIGHT MACFARLANE, OF SOUTH GLASGOW, SCOTLAND.

CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 781,732, dated February 7, 1905.

Application filed July 27, 1903. Serial No. 167,149.

To all whom it may concern:

Be it known that I, JAMES WRIGHT MACFARLANE, engineer, of the firm of Watson, Laidlaw & Co., of 98 Dundas street, South Glasgow, Scotland, have invented certain new and useful Improvements in and Connected with Centrifugal Machines, of which the following is a specification.

This invention relates to improvements in the method of driving centrifugal machines of the type known as the "suspended Weston" directly by means of electric or fluid motors.

Hitherto when driving direct the motors have been attached to the spindle itself and wholly or partly supported by it, so that in attaching the motor the design and arrangement had to provide for the oscillation of the spindle in such a manner that the motor either wholly or partly would partake of the oscillating movement.

The object of my invention is to make the connection between the revolving part of the motor and the revolving spindle of the centrifugal in such a manner that while the essential features of the Weston spindle will be retained I do not allow any part of the motor to be free to oscillate along with it.

The manner in which I propose to carry out my invention is as follows: I place the electric or other motor above the point of suspension of the centrifugal and fix it rigidly to the framing which supports the centrifugal machine. I make the revolving part of the motor hollow and vertical and pass through it a fixed shaft, which forms a bearing or guide for the revolving part or spindle of the motor. I hang the stationary spindle of the Weston centrifugal to the lower end of this fixed shaft by means of a suitable flexible connection and provide springs or buffers to control the oscillation of the spindle. I fix suitable driving appliances to the revolving part of the motor, which engage with the revolving spindle of the centrifugal machine and cause it to rotate.

In order that my invention may be properly understood and readily carried into effect, I have hereunto appended five sheets of drawings.

Referring to Figure 1, the revolving part or spindle of the motor is marked A'. The fixed shaft, which forms a bearing or guide, is marked B. The main part of the electric motor is fixed rigidly to the angle-irons *c c*, which form part of the framing and which support the centrifugal machine. The revolving spindle of the centrifugal machine is marked D. The stationary spindle of the centrifugal machine is marked E. There is a portion of a spherical ball F at the top of the stationary spindle, which rests in a socket G. The said spherical portion F terminates upwardly with a cylindric enlarged prolongation H. This enlarged part H is provided with a number of holes *h* at its upper end, in which lie the springs *j*, as indicated. The fixed shaft B has a hollow end B', which incloses the enlarged part H of the stationary spindle E and carries, as indicated, the socket G, which supports the spherical ball F, and therefore the whole weight of the centrifugal machine. The stationary spindle is free to swing on the ball-and-socket joint, and the springs press against the enlarged hollow part B' of the fixed spindle B, thus forming the flexible connection referred to in the preparatory description of the specification. A pulley is fixed on the upper end of revolving spindle. This pulley I is hollow, as shown. There are two or more circumferential friction-blocks J. These friction-blocks J are provided with slots K, in which lie castings L or other suitable loose pieces. These loose pieces L engage with the friction-blocks, so that both must move together. The revolving cylindric part of the motor A has at its lower end a conical enlargement A', which has suitable slots *a* formed in the flanges *a'* at its lower end, which slots engage with pins *b*, forming part of the loose pieces L. The turning of the revolving part of the motor A A' causes the friction-blocks to revolve round the pulley I by means of the pins *b* in the loose pieces L. The friction-blocks J rubbing on the inside of the pulley I cause it to revolve and through the pulley I the external spindle D. Springs *j*, as shown, are provided to add to the flexibility of the whole

and assist the springs already described in controlling the oscillation.

Fig. 2 shows a modification of the flexible connection and the means of connecting the revolving part of the motor to the revolving spindle. The springs are replaced by a combination of buffers N, which surround the internal spindle, and springs *e* interposed vertically between these. The revolving part A of the motor has also a hollow enlargement A', but is provided at its lower end with a spherical surface F' of sufficient radius to permit the revolving spindle to oscillate freely. This surface engages with the loose pieces L' and drives them by friction, as in Fig. 1.

Fig. 3 is another modification of Fig. 1 and differs from it in so far that the buffer N', as shown, replaces the transverse springs.

Fig. 4 is a modification illustrating a fixed shaft, as before, with the ball F and socket G reversed, so that the spring P, which is here a volute, has to support the whole weight of the centrifugal and keep the ball in place, as well as control oscillation. Friction-blocks are not used; but the hollow part or enlargement A' on the revolving part of motor A has a spherical surface F'', which drives the pulley. The pulley has a corresponding spherical interior surface. The brake which is used to stop the centrifugal is also spherical. In the previous figures a cylindrical strap-brake is shown.

In Fig. 5 springs Q are placed below ball and socket, and there is a slight modification in the arrangement of the friction-blocks J

and loose pieces L, which are somewhat similar to Fig. 1.

Fig. 6 is a modification of Fig. 5, the loose pieces L in this case acting as friction-blocks against the upper surface of the flange I' on the inside of the pulley and not on the vertical inside surface, or, in other words, these friction-blocks act only by gravity, while those in Figs. 1, 2, 3, and 5 act by both centrifugal force and gravity.

I claim—

1. In a centrifugal machine, the combination with the motor, a fixed shaft forming a bearing for the revolving part of the motor, a second fixed shaft suspended flexibly from the first-mentioned fixed shaft, a part revolving on the second fixed shaft, and means for communicating rotation from the motor to the part revolving on the second fixed shaft.

2. In a centrifugal machine the combination of the motor fixed against oscillation directly above the center of suspension, a fixed shaft forming a bearing for the motor, a fixed shaft flexibly suspended from the first-mentioned fixed shaft, and a rotary shaft surrounding the second fixed shaft and having a flexible connection with the motor.

In testimony whereof I have hereunto affixed my signature in presence of two witnesses.

JAMES WRIGHT MACFARLANE.

Witnesses:

JOHN LIDDLE,

AGNES MACKINTOSH.