3 Sheets—Sheet 1.

E. LANGEN.

Centrifugal-Machine.

No. 214,670. Patented April 22, 1879.

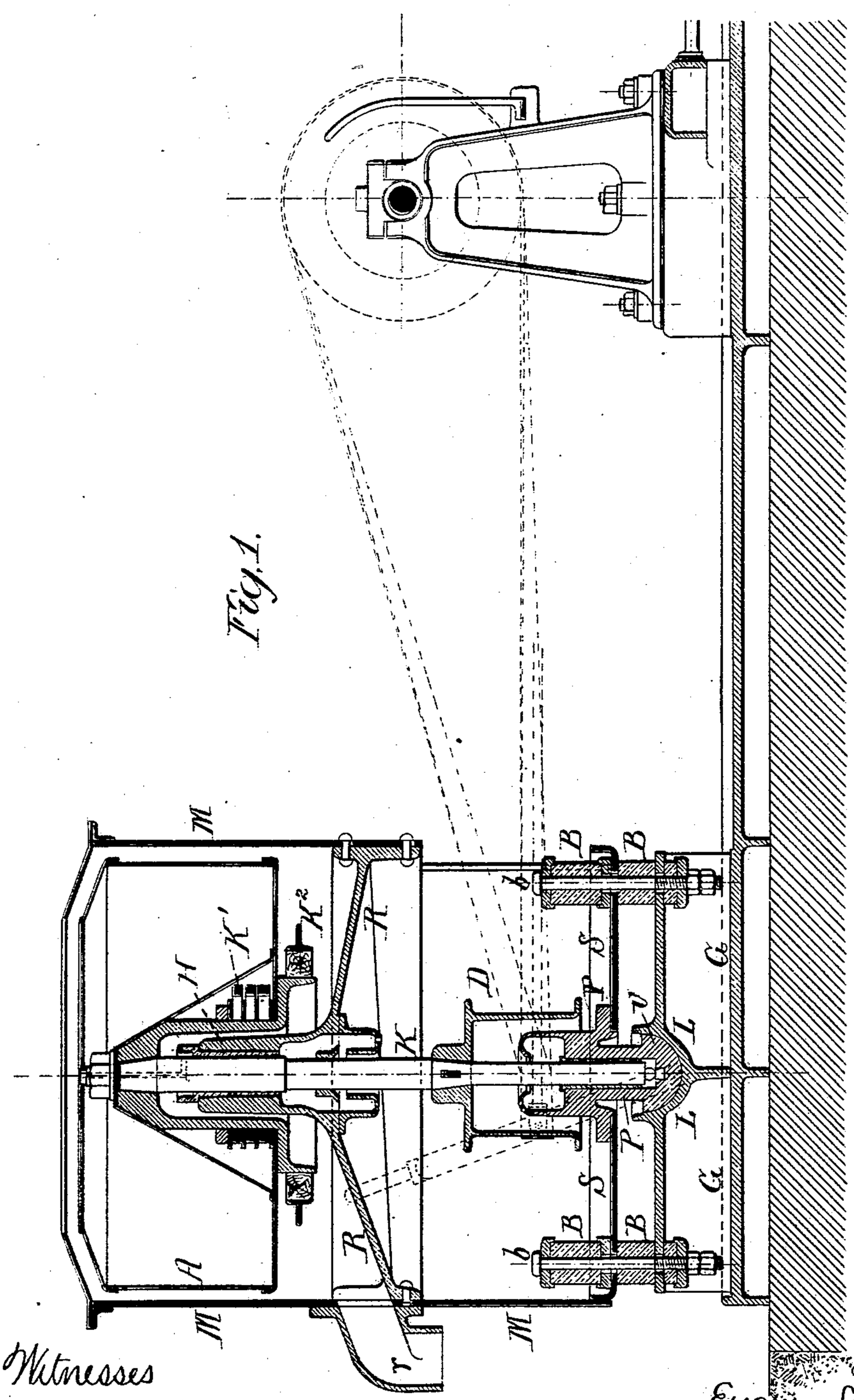

Fig. 1.

Witnesses
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Harry Smith

Inventor
Eugen Langen
by his attorneys
Howson and Sons

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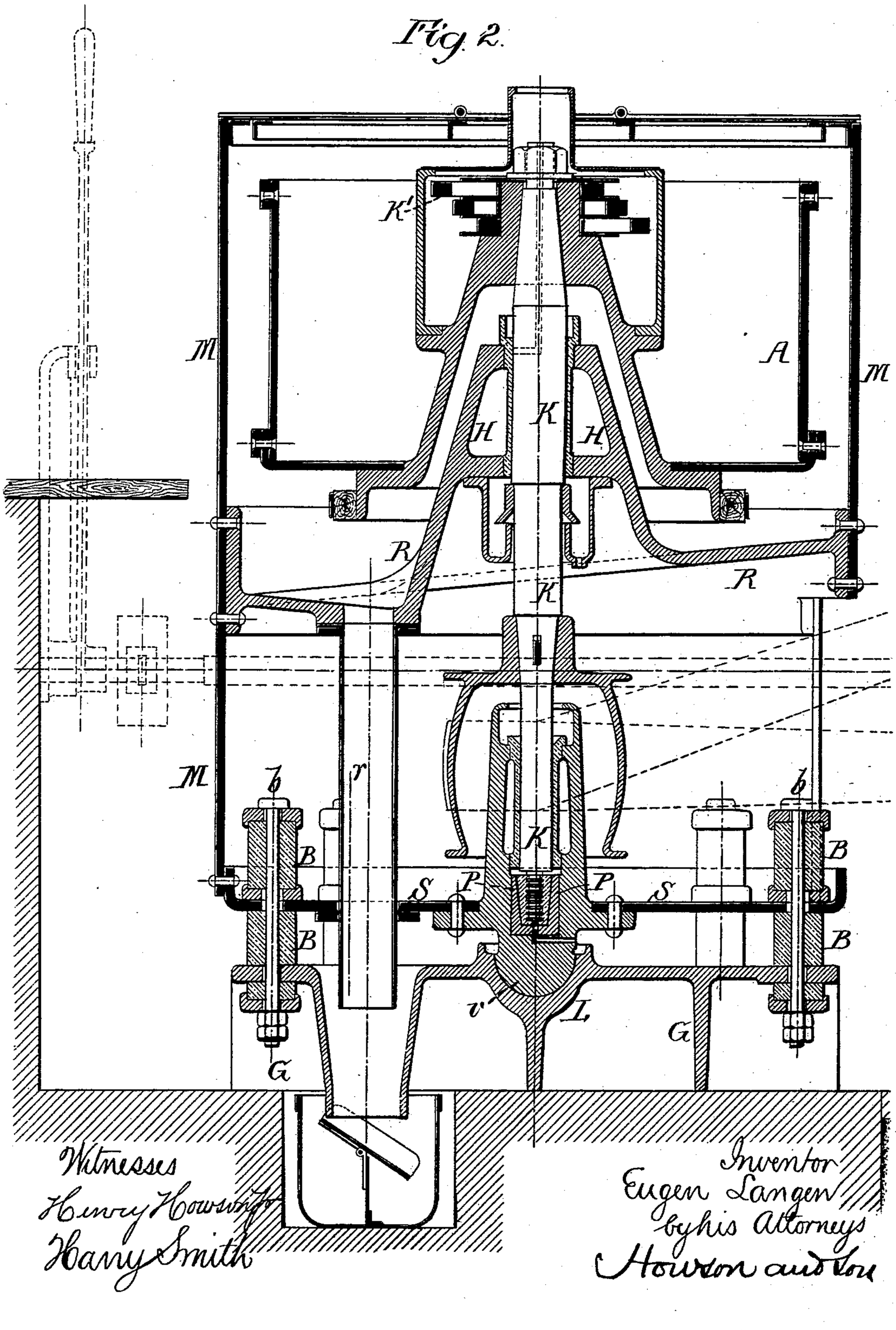
Fig. 2.



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Centrifugal-Machine.

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FIG. 3.

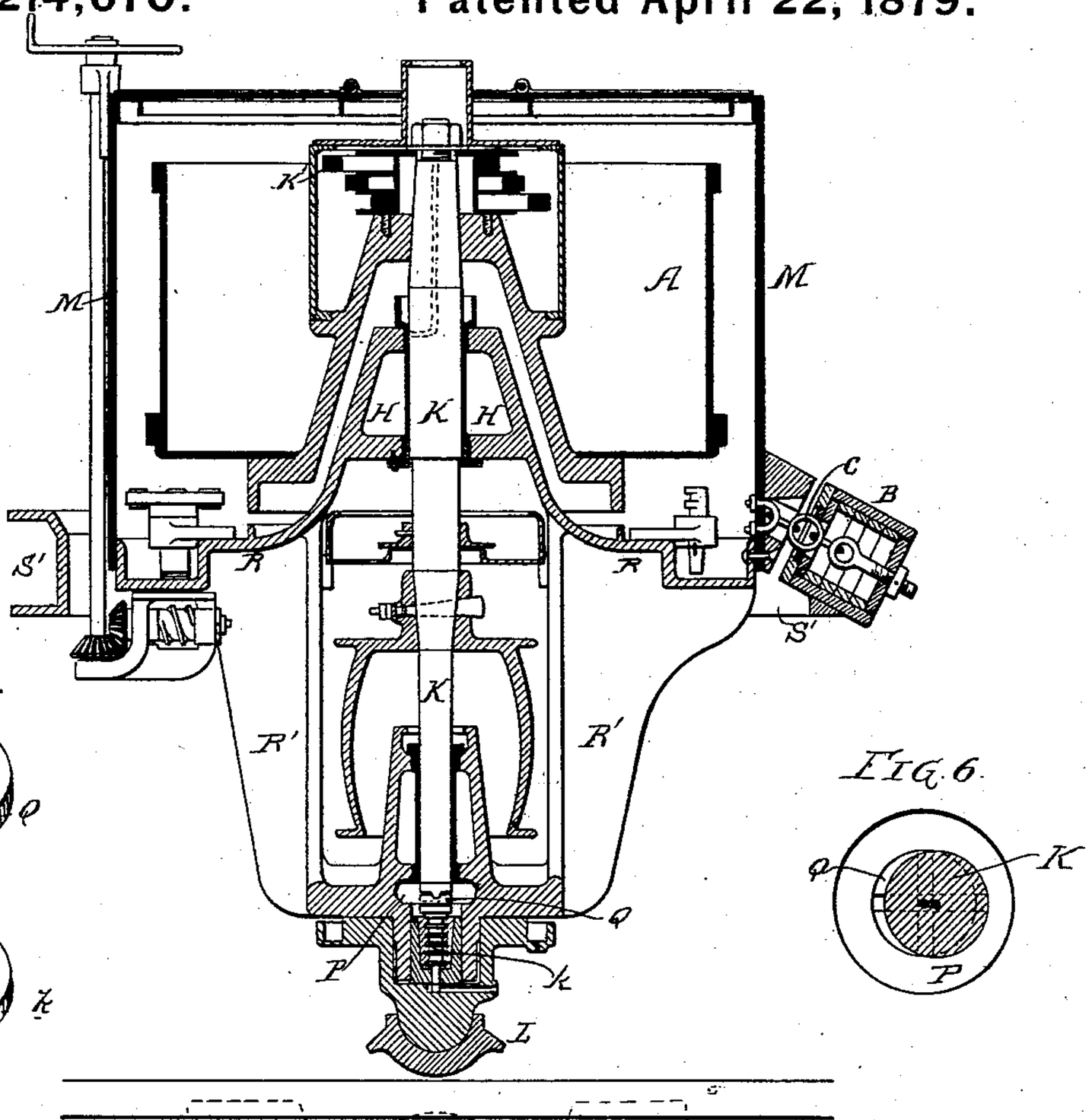


FIG. 5.

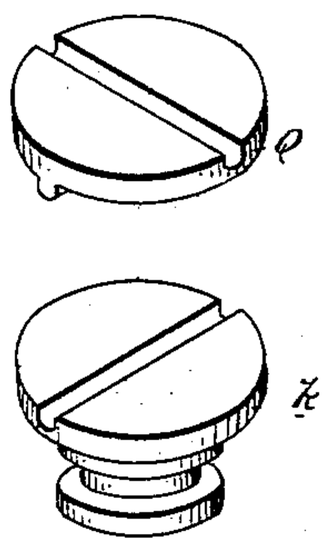
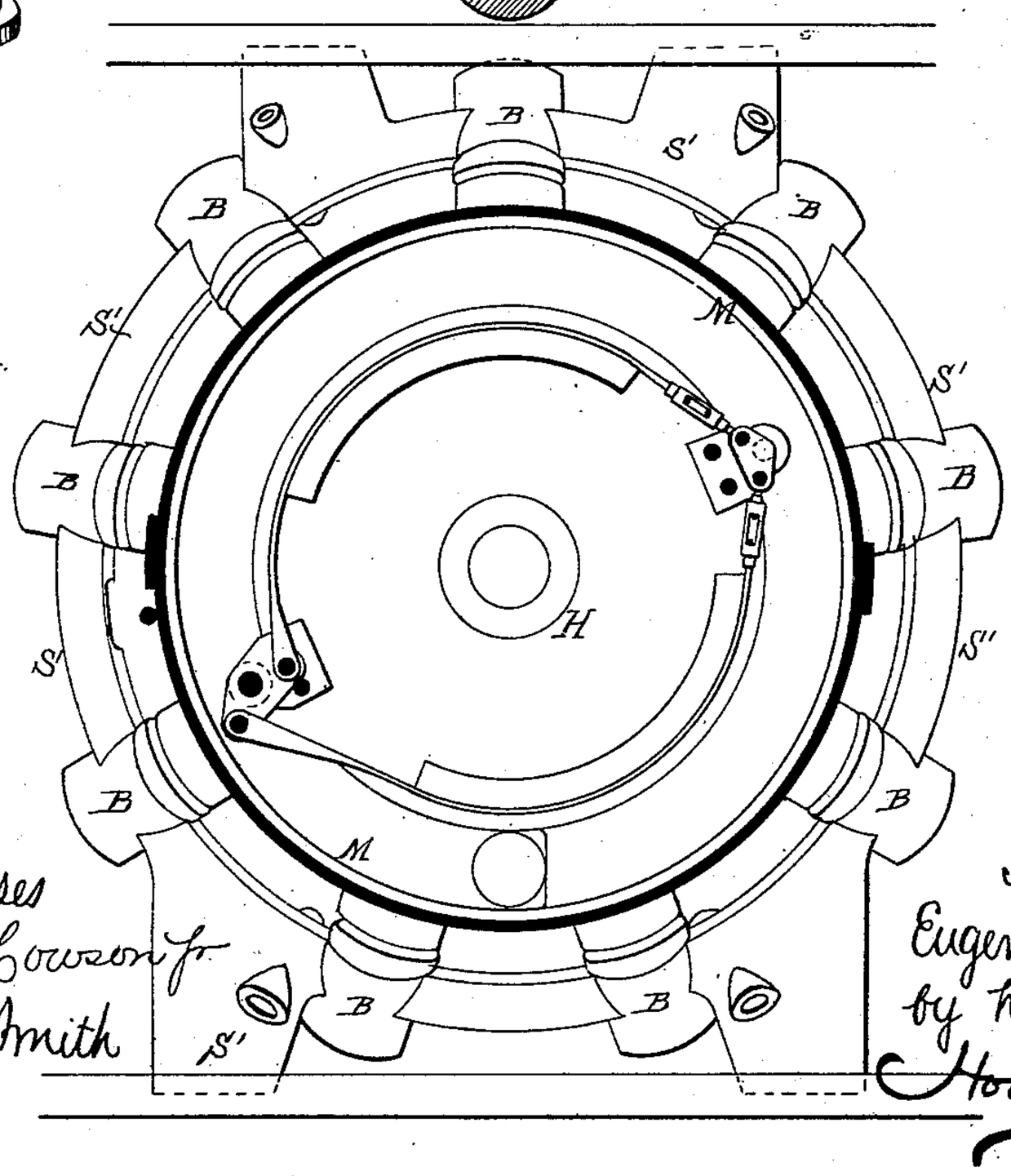


FIG. 6.

FIG. 4.



Witnesses
Henry Howson Jr.
Harry Smith

Inventor
Eugen Langen
by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

EUGEN LANGEN, OF COLOGNE, GERMANY.

IMPROVEMENT IN CENTRIFUGAL MACHINES.

Specification forming part of Letters Patent No. **214,670**, dated April 22, 1879; application filed December 23, 1878.

To all whom it may concern:

Be it known that I, EUGEN LANGEN, of Cologne, Germany, have invented certain new and useful Improvements in Centrifugal Machines, of which the following is a specification.

This invention relates to that class of centrifugal machines in which the vertical shaft of the centrifugal drum is driven from below; and the object of my invention is to so construct machines of this character that they may occupy less space than usual, and that there may be less danger from accidental bursting of the drum.

This object I attain by securing the neck and step bearings for the drum-shaft rigidly to the outer casing, and allowing the latter, together with the said shaft, bearings, and drum, to have a slight oscillating motion on the foundation-plate to which the machine is secured, as more fully described hereinafter.

In the accompanying drawings, Figure 1, Sheet 1, is a vertical section of a centrifugal machine constructed according to my invention; Fig. 2, Sheet 2, a vertical section of a slightly-modified form of machine; and Figs. 3 and 4, Sheet 3, a vertical section and sectional plan, respectively, of another modification.

Referring to Fig. 1 of the accompanying drawings, M is the outer casing of the chamber, in which is contained the rotary strainer-drum A, secured to the upper end of the vertical shaft K, and carrying the usual balance-rings K^1 and suitable braking mechanism K^2. The lower end of the shaft is adapted to a step, P, and carries, above the latter, the usual belt-pulley D, driven from any suitable counter-shaft. The cylindrical casing M is extended down below the cast-metal bottom R of the sirup-chamber, and is bolted or riveted to a plate, S, to which the step P of the shaft K is firmly secured. The upper or neck bearing, H, of the shaft is cast in one piece with or secured to the bottom plate, R, of which the outlet-branch *r* forms a part, so that the outer casing and the two bearings are rigidly connected to each other. The step P is made semi-spherical at its lower end, which is adapted to a corresponding socket, L, in the raised portion of the bed-plate G, while the outer edge of the plate S is connected to the bed-plate by bolts and nuts *b*, with intervening springs, B, preferably in the form of rubber blocks; hence the casing M, together with the bearings P and H and the centrifugal drum and its shaft, can oscillate in the ball-and-socket bearing L, when the machine is in operation, to the limited extent permitted by the springs B B.

The modification shown in Fig. 2 differs from the construction shown in Fig. 1 only in the location of the outlet-pipe *r* and in the construction of the step-bearing. In this case, in order that the machine may be used for heavy charges, the step P of the drum-shaft is formed as a thrust-bearing—that is, a series of collars formed on the lower end of the shaft K are adapted to corresponding grooves in the bearing P, the wear being thus distributed over a number of surfaces.

In the modification shown in Figs. 3 and 4, the construction of the lower part of the casing or frame and the manner of connecting the casing to the stationary frame differ from those described above. The step P is rigidly connected to the bottom R of the casing M by pendent brackets R′, which I prefer to cast in one piece with the said bottom R and neck-bearing H. The socket L for the step may, in this case, either form part of a foundation-plate on the lower floor or may be supported by strong pendent arms from the ring-frame S′, which carries the springs B, and which may form part of a floor, into which the lower part of the machine is sunk. The casing M is connected to the springs B by means of links C, so as to allow the machine to have a slight oscillating movement on the socket L. In this case also the drum-shaft is formed as a thrust-bearing; but the part *k* of the shaft, which carries the collars, is a separate piece from the shaft, and is connected thereto and is caused to turn therewith through the medium of a grooved and feathered plate, Q, Figs. 3 and 5. In the upper surface of the part *k* is formed a transverse groove, in which fits a rib or feather on the under side of the plate Q, and on the upper surface of this plate is formed a groove at right angles to the feather on the under side. To this groove in the plate Q is adapted a feather on the bottom of the main shaft K, so that if the axis of the shaft K should not coincide accurately with the axis of the part *k* in the bearing, as indicated in the detached plan, Fig. 6,

the two parts will continue to turn together without causing any side strains on said bearings.

In machines of this class, as usually constructed, the outer casing has been rigidly connected to the base, while the upper or neck bearing for the drum-shaft has been connected to the frame through an elastic medium, so that the drum-shaft and bearing might oscillate to a limited extent within the outer casing, and hence a comparatively large space was necessary between the drum and casing to allow for this oscillation. By constructing the machine in the manner described above I obviate the necessity for this large space, and, by bringing the casing close to the drum, any strain on the casing, in the event of the accidental bursting of the drum, is greatly diminished. Thus, by making the casing of strong boiler-plate, it may be made to serve as a protective casing.

I claim as my invention—

1. In a centrifugal machine, the combination of the neck and step bearings of the drum-shaft with a casing, M, rigidly secured to the said bearings, and connected to the foundation-plate by yielding connecting devices, whereby the said casing and bearings may oscillate together on such foundation-plate, as set forth.

2. The combination of the casing and the neck and step bearings, all rigidly connected together with a ball-and-socket joint, on which said step-bearing rests, substantially as specified.

3. The combination of the casing, the neck-bearing, and step-bearing, all rigidly connected to each other, with the foundation-plate and intermediate spring-connections, B, as set forth.

4. In a centrifugal machine, the combination of the neck and step bearings for the drum-shaft with the casing M, extending down below the bottom R of the sirup-chamber, and secured to a plate carrying the step-bearing, and with spring-connections between said plate and foundation, as described.

5. The combination of the drum-shaft K with bearing-piece *k* and connecting-plate Q, as and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 7th day of October, 1878.

EUGEN LANGEN.

Witnesses:
C. PRANZEN,
OTTO FERBER.