

(No Model.)

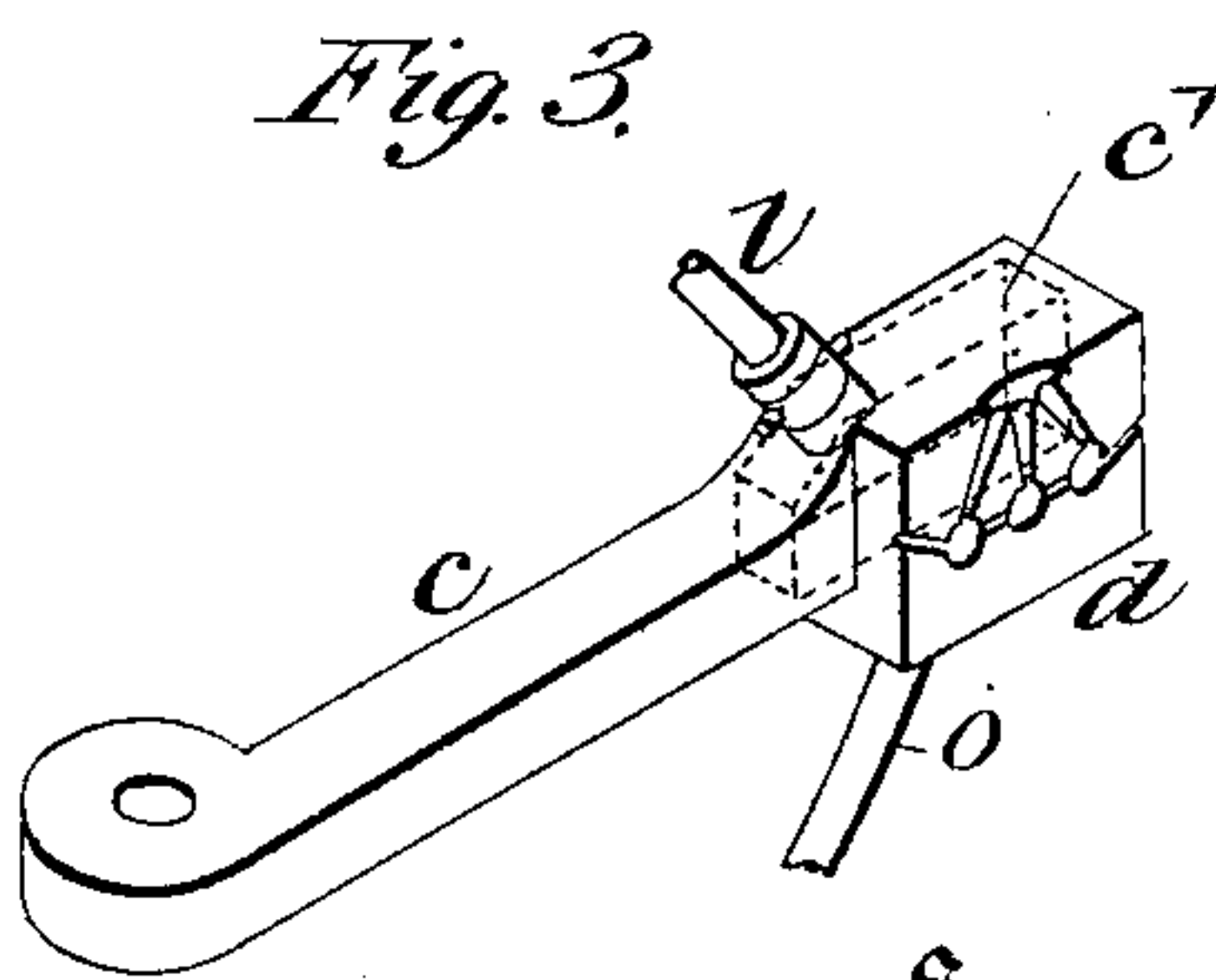
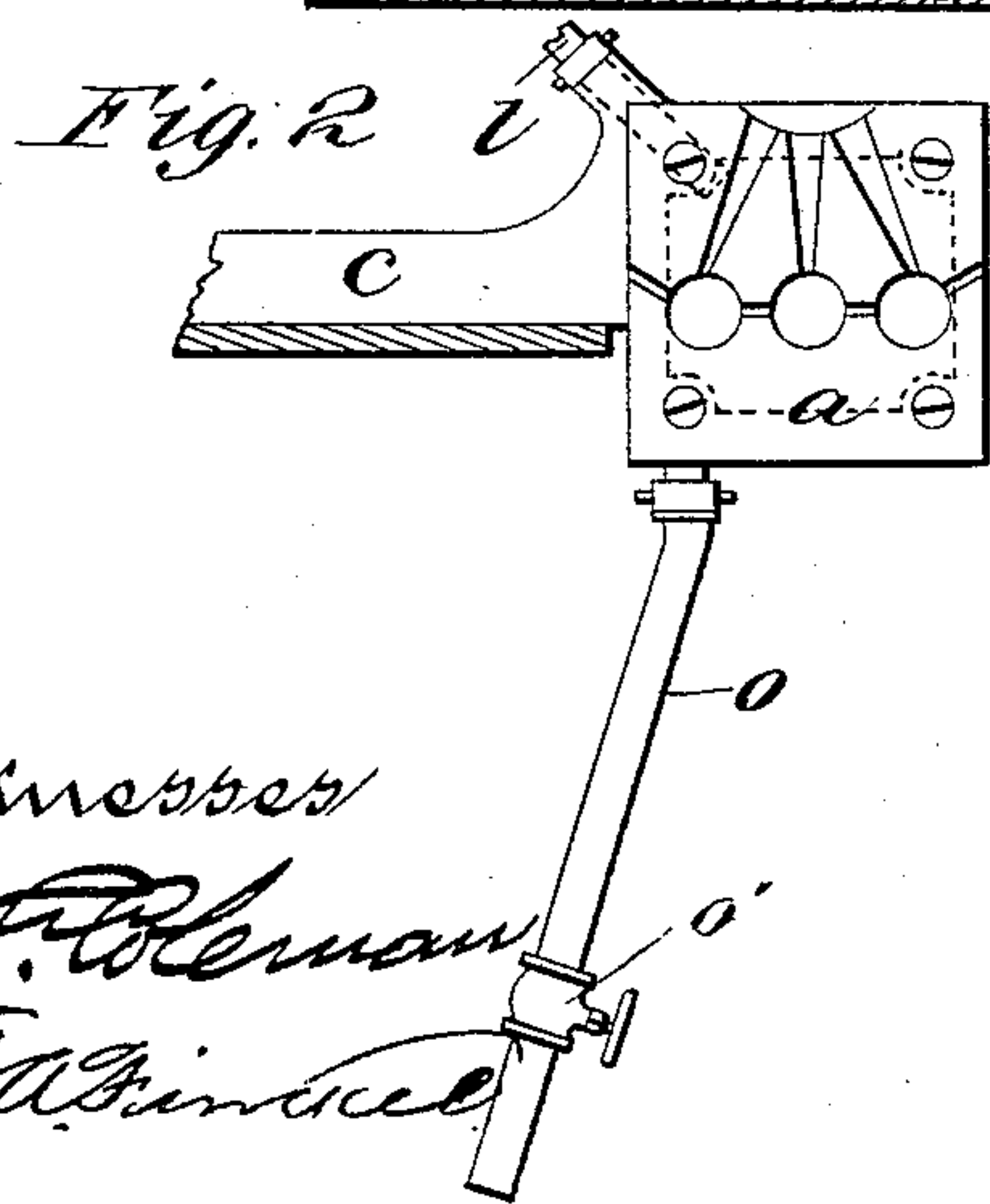
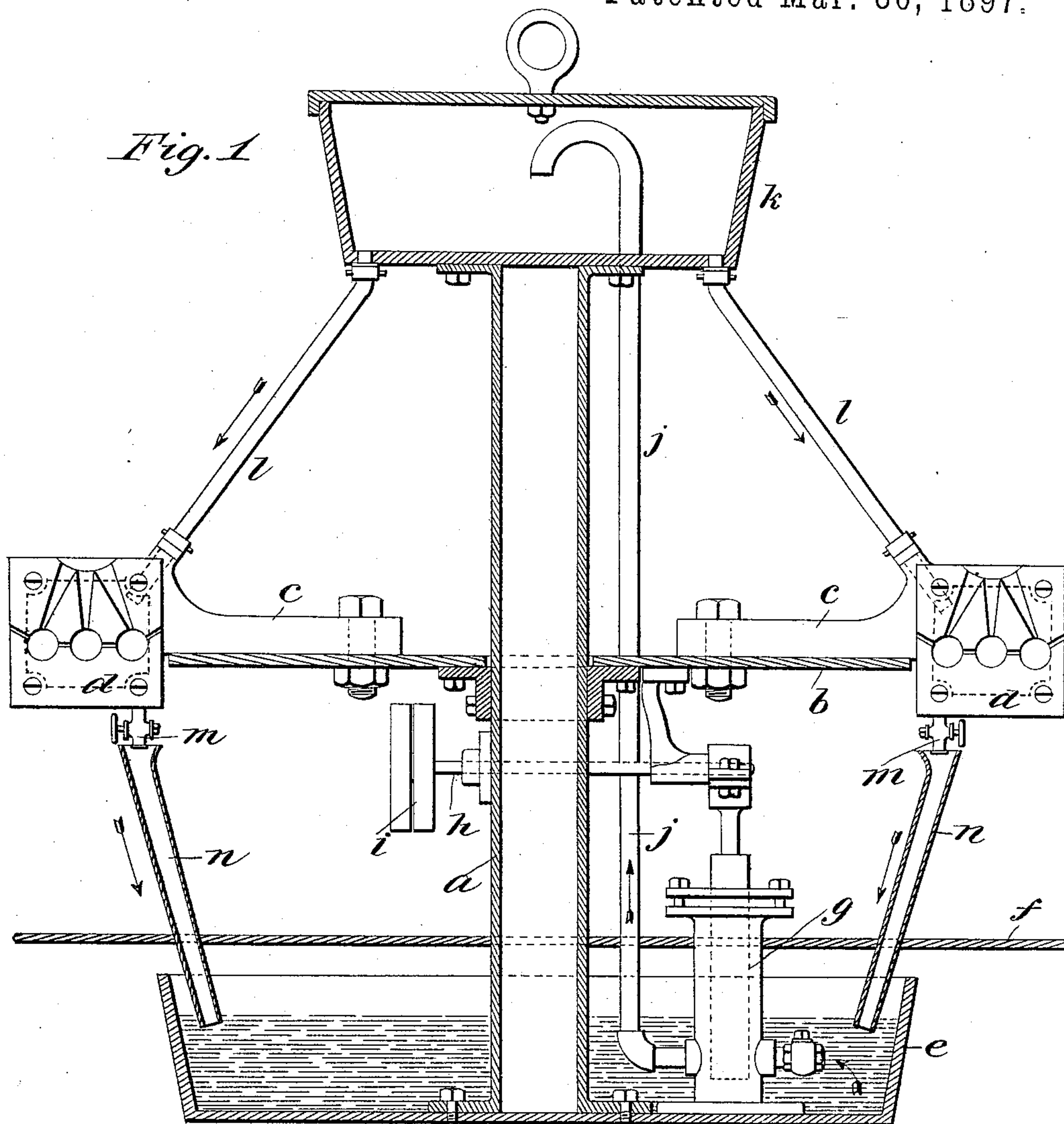
3 Sheets—Sheet 1.

H. A. DALRYMPLE & P. C. McGRATH.

BALL CASTING MACHINE.

No. 579,698.

Patented Mar. 30, 1897.



Witnesses

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Inventors

Hartwell A. Dalrymple,
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(No Model.)

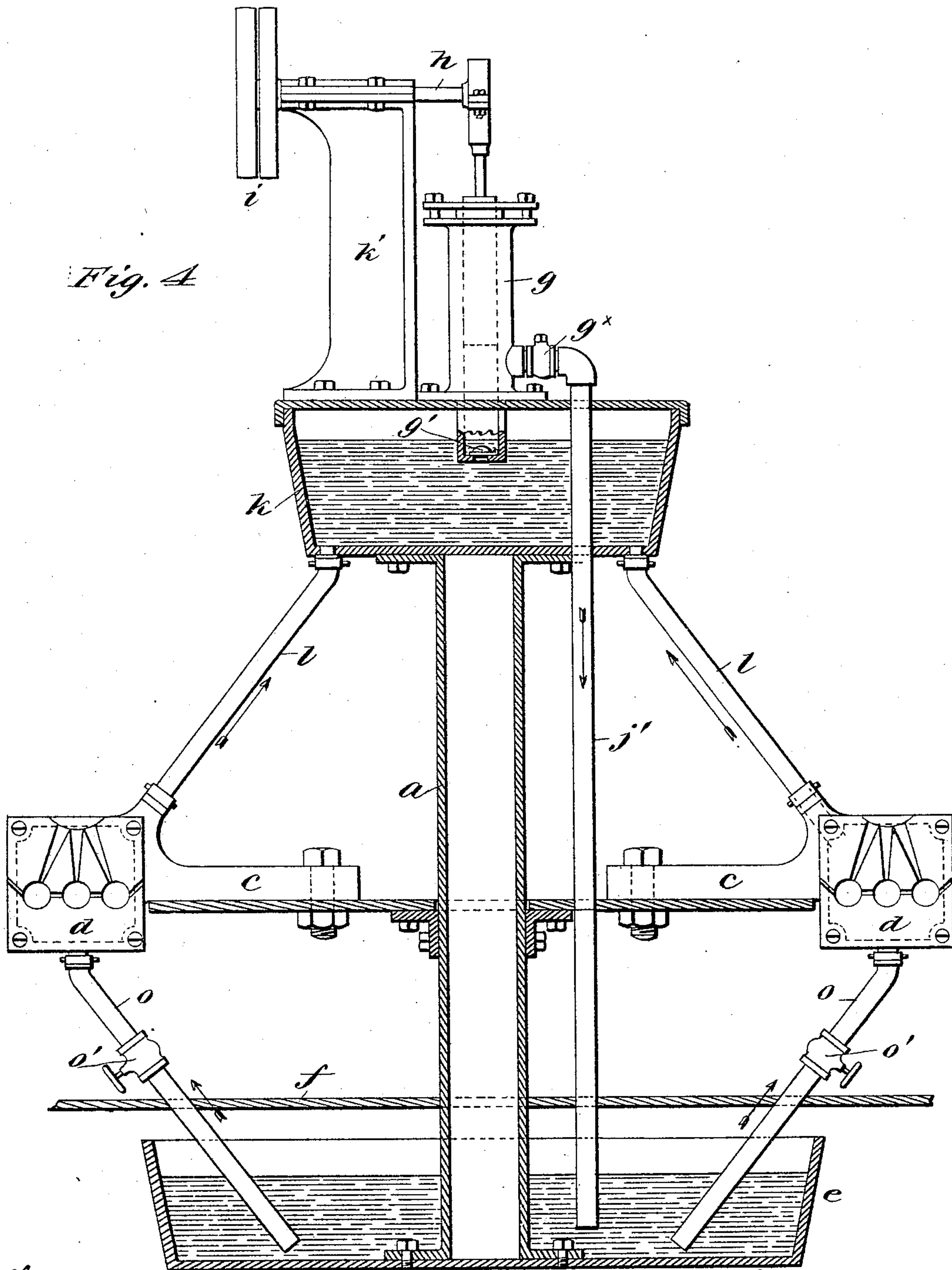
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Skinner
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(No Model.)

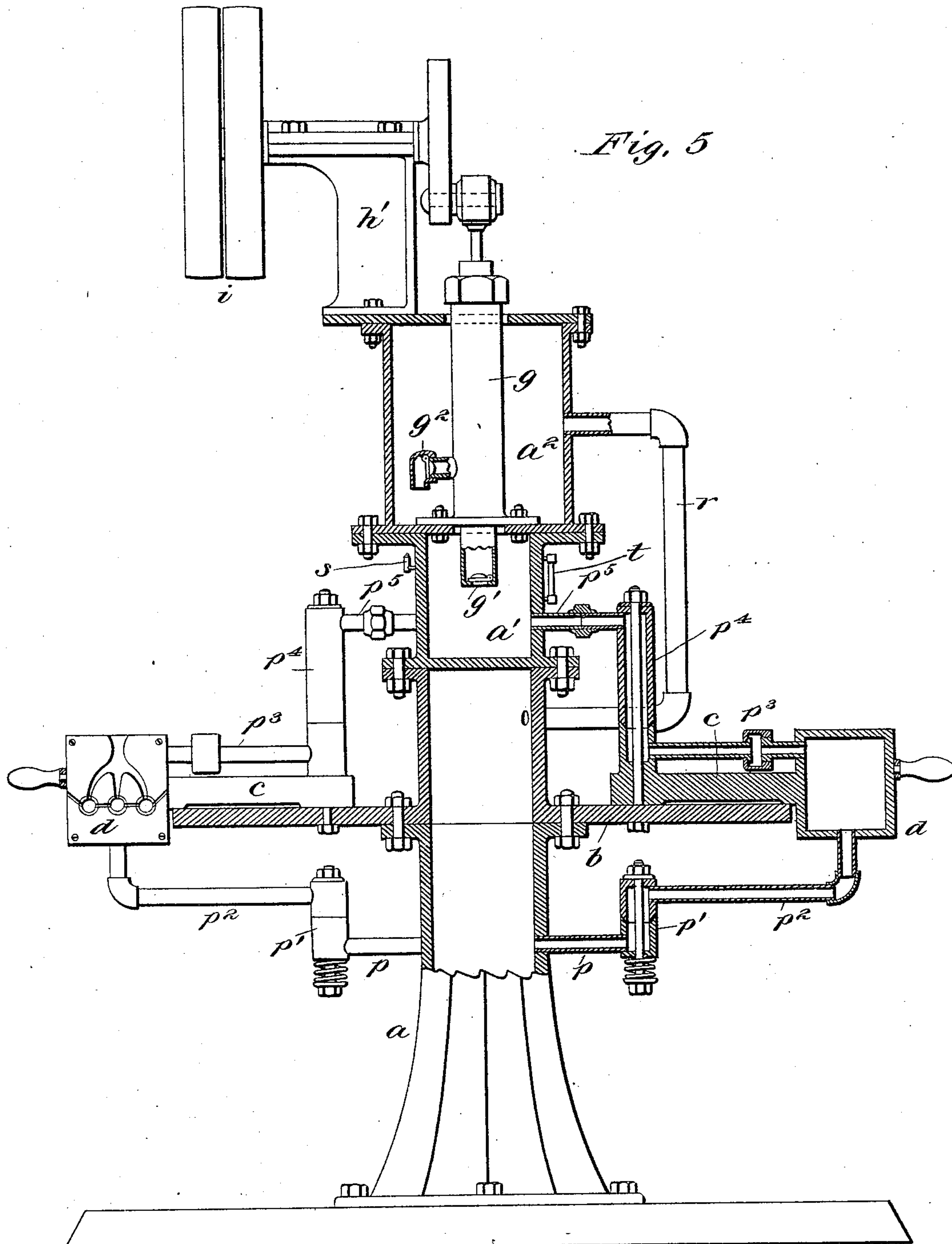
3 Sheets—Sheet 3.

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Witnesses

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UNITED STATES PATENT OFFICE.

HARTWELL A. DALRYMPLE AND PATRICK C. McGRATH, OF RUTLAND,
VERMONT.

BALL-CASTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 579,698, dated March 30, 1897.

Application filed July 25, 1896. Serial No. 600,494. (No model.)

To all whom it may concern:

Be it known that we, HARTWELL A. DALRYMPLE and PATRICK C. McGRATH, citizens of the United States, residing at Rutland, in the county of Rutland and State of Vermont, have invented a certain new and useful Improvement in Ball-Casting Machines, of which the following is a full, clear, and exact description.

10 The object of this invention is to provide a machine for casting balls which are afterward dressed to form ball-bearings; but the invention is not limited in its application to that class of machines alone, its principle being applicable to machines for casting other
15 objects, particularly small objects. The special end in view is to provide for the circulation of a medium for keeping the molds at an equable temperature.

20 In the accompanying drawings, illustrating our invention, in the several figures of which like parts are similarly designated, Figure 1 is a vertical sectional elevation of sufficient of a ball-casting machine to illustrate our in-
25 vention. Fig. 2 is a view of a fragment of a machine, illustrating a modification. Fig. 3 is a perspective view of one of the mold-arms and molds detached. Fig. 4 is a vertical section and partial elevation of one modification, and Fig. 5 is a similar view of another.

30 a is a standard, upon which is erected a horizontal table b , and upon this table are pivoted the mold-arms c , to the faces of which are secured the molds d . The backs of the
35 mold-arms are made hollow, as indicated by dotted lines at c' , Fig. 3, and as shown in Fig. 5. These mold-arms are arranged in pairs, as usual, and may be separated to discharge the castings.

40 Referring more particularly to Figs. 1, 2, and 3, e is a vessel or tank which may be arranged beneath the floor f and which may receive and support the standard. This vessel contains a pump g , of any approved construction, which may be driven from the shaft h ,
45 on which are the fast and loose pulleys i . The pump is provided with a pipe j , which opens into an overhead vessel or tank k , erected upon the upper end of the standard
50 a . The vessel or tank k is connected by any suitable pipes l with the hollow backs of the

arms c , and said hollow backs have the return-cocks m , which open into funnels or tubes n , leading into the vessel or tank e .

The mouths of the funnels or tubes n may
55 be wide enough to permit the necessary swinging of the molds in opening, or the cocks m may be above the said funnels for the same purpose.

Instead of using return-cocks and funnels
60 or pipes n , as just described, we may use a pipe or tube o , provided with a valve or cock o' , for the return from the hollow backs, as shown in Fig. 2, and in this case the pipes or tubes may be flexible to permit the swinging of the
65 molds.

The operation of the form of the invention shown in Figs. 1, 2, and 3 is as follows: The fluid by which it is desired to preserve an
70 equable temperature in the molds is placed in the vessel e , and is pumped thence into the vessel k , and from the latter vessel is distributed to the molds through the pipes l , and, as desired or necessary, is let out of the molds through the cocks or pipes hereinbefore re-
75 ferred to and returned to the vessel e . If desired, a continuous circulation of fluid may be obtained by leaving open the outlet-cocks. The cocks may be used to regulate the reflux
80 of the fluid, being opened more or less to this extent. The vessel e may be covered in, if desired.

In the form of the invention shown in Fig. 4 the pump is erected upon the top of the vessel k and is provided with an inlet-valve
85 g' , opening into said tank. The outlet-valve g^x has the pipe j' connected to it, and said pipe j' serves as a return-pipe. The shaft h is mounted in a standard k' , which is erected upon the vessel k . In this form of our ap-
90 paratus the fluid is lifted from the vessel e by the pump through the pipes o and hollow mold-backs and the pipes l into the vessel k , and is returned to the vessel e through the pipe j' , thus effecting a forced circulation.
95

In the form of the invention shown in Fig. 5 the standard is divided into sections a a' a^2 , and these sections serve, respectively, in the places of the standard and the two ves-
100 sels of Fig. 1. The pump g is arranged in section a^2 and draws the fluid from section a through pipes p , knuckle-joints p' , and pipes

p^2 into the hollow mold-backs, and thence
 through pipes p^3 , knuckle-joints p^4 , and pipes
 p^5 into the section a' , and thence into the sec-
 tion a^2 , whence it is returned through pipe r
 5 to the section a . An inlet-valve g' opens into
 the pump g from the section a' , and said
 pump discharges into the section a^2 through
 the outlet-valve g^2 . The section a' may have
 the pop-valve s and the water-gage t . The
 10 pump-shaft is mounted in a standard h' ,
 erected upon section a^2 . The knuckle-joints
 are used in order to provide for the swinging
 movements of the molds in opening and clos-
 ing them, and they may be of any approved
 15 construction. This form of the invention in-
 sures a positive forced circulation of the tem-
 perature-regulating fluid and makes a very
 compact machine.

What we claim is—

20 1. In a casting-machine, means for insuring
 the circulation of a medium for preserving an
 equable temperature in the molds, the same
 comprising the combination of a fluid-dis-
 tributing and a fluid-receiving vessel, con-
 25 structed as a standard divided into independ-
 ent sections, arranged one above the other, a
 fluid connection between the fluid-distribut-
 ing and fluid-receiving vessels, molds hav-
 ing hollow backs, fluid connections between
 30 the distributing vessel and the hollow backs
 of the molds and between the receiving ves-

sel and the hollow backs of the molds, and a
 fluid-forcing medium for circulating the fluid
 through these connections, vessels and molds,
 and for returning it to the distributing ves- 35
 sel, substantially as described.

2. In a casting-machine, means for insuring
 the circulation of a medium for preserving an
 equable temperature in the molds, the same
 comprising the combination of a fluid-dis- 40
 tributing and a fluid-receiving vessel, con-
 structed as a standard of three sections, di-
 vided from one another, the two lower sec-
 tions having pipe connections with the hol-
 low backs of the molds, and the uppermost 45
 section communicating with the section next
 below it and independently connecting with
 the lowermost section, a pump arranged in
 the uppermost section and communicating
 independently with the section next below 50
 and the lowermost section and to circulate
 the fluid through the molds, combined with
 the molds and their hollow backs, substan-
 tially as described.

In testimony whereof we have hereunto set 55
 our hands this 23d day of July, A. D. 1896.

HARTWELL A. DALRYMPLE.
 PATRICK C. McGRATH.

Witnesses:

M. J. FRANCISCO,
 T. F. MARK.