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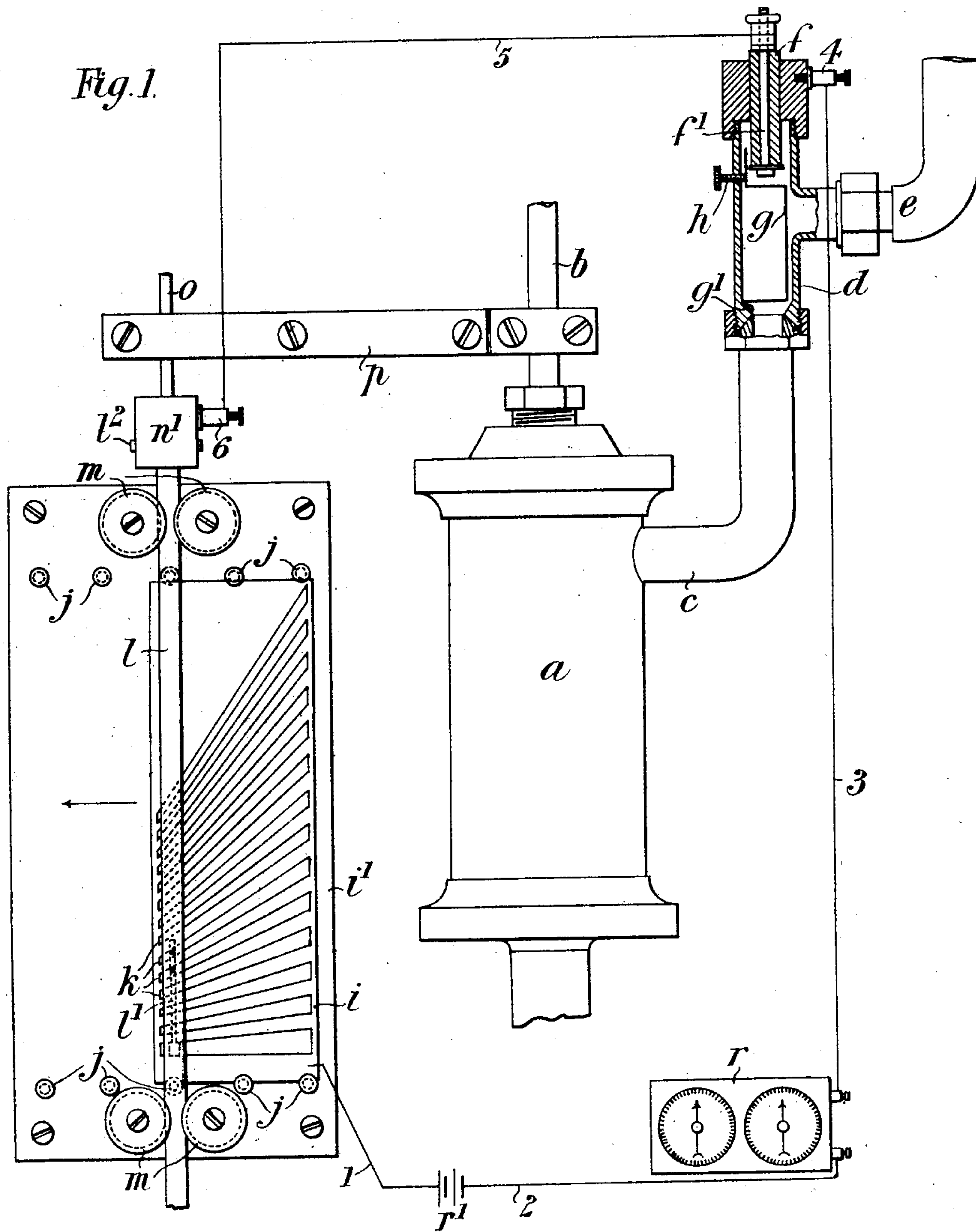
H. J. S. CASSAL.

ELECTRICAL APPARATUS FOR REGISTERING THE DISCHARGE OF
LIQUIDS BY PUMPS.

APPLICATION FILED MAR. 17, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
J. K. Moore
G. H. Hubbard

Inventor:
Hans John Stephen Cassal
By his attys
Whitaker & Prevor

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2 SHEETS—SHEET 2.

Fig. 2

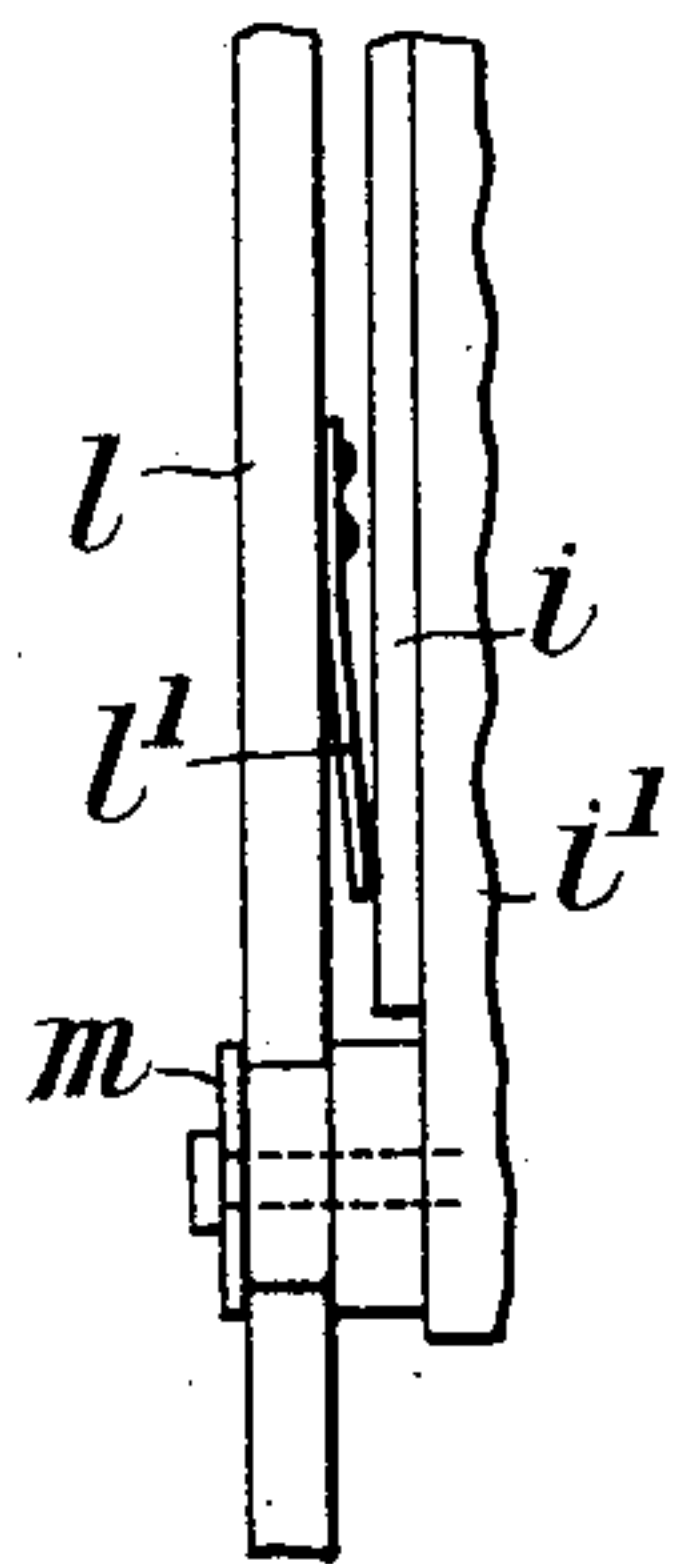


Fig. 3

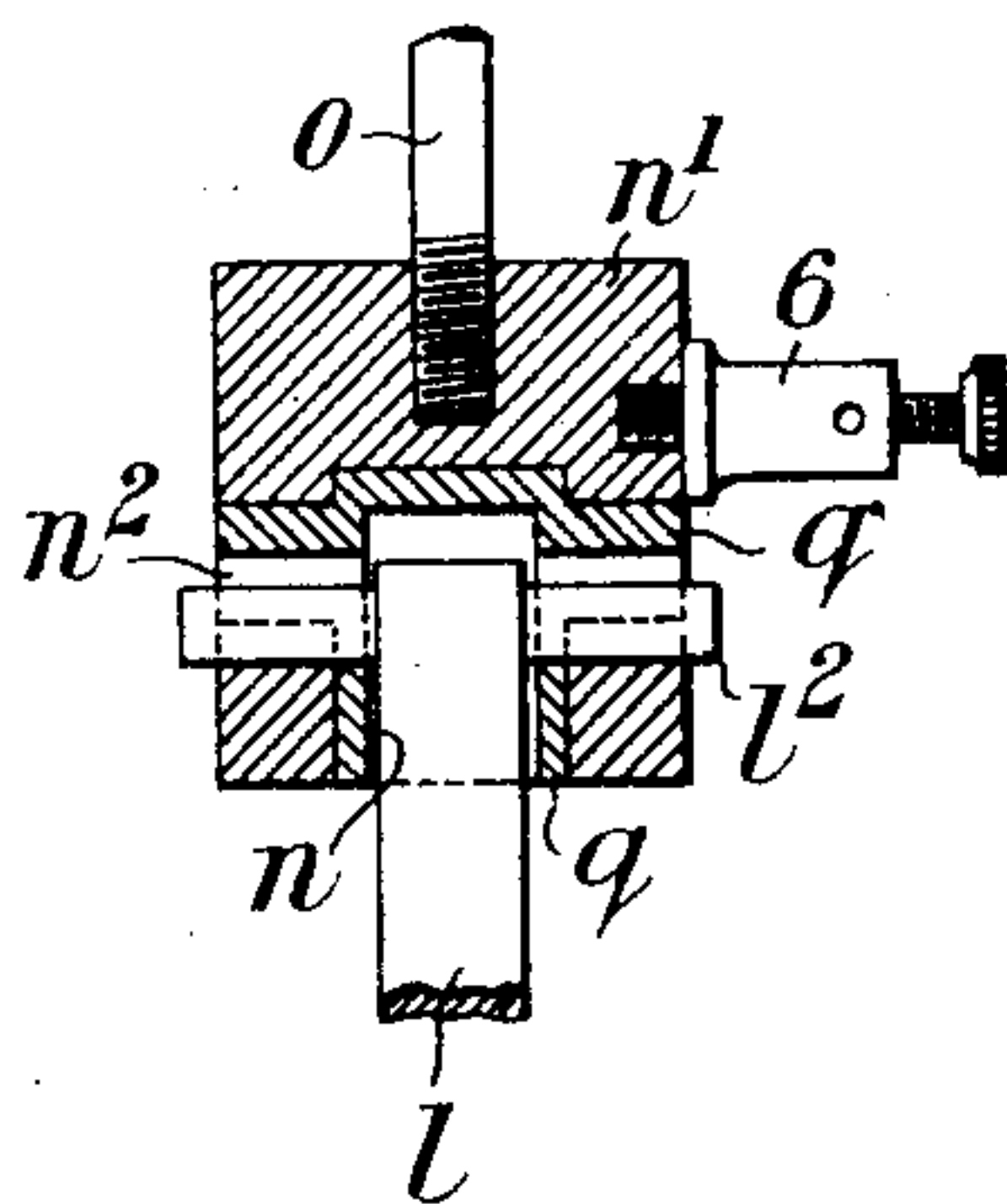


Fig. 4

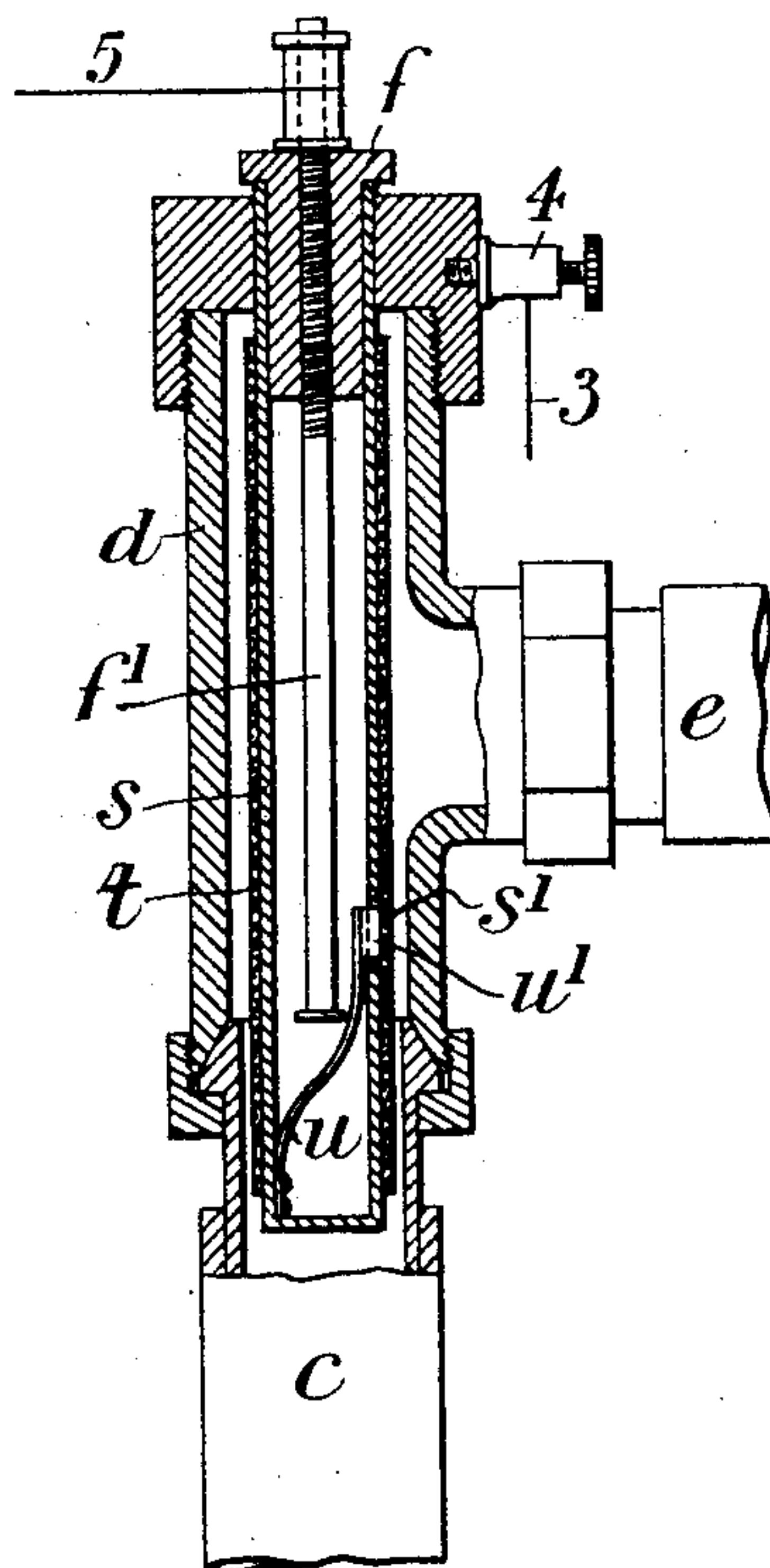
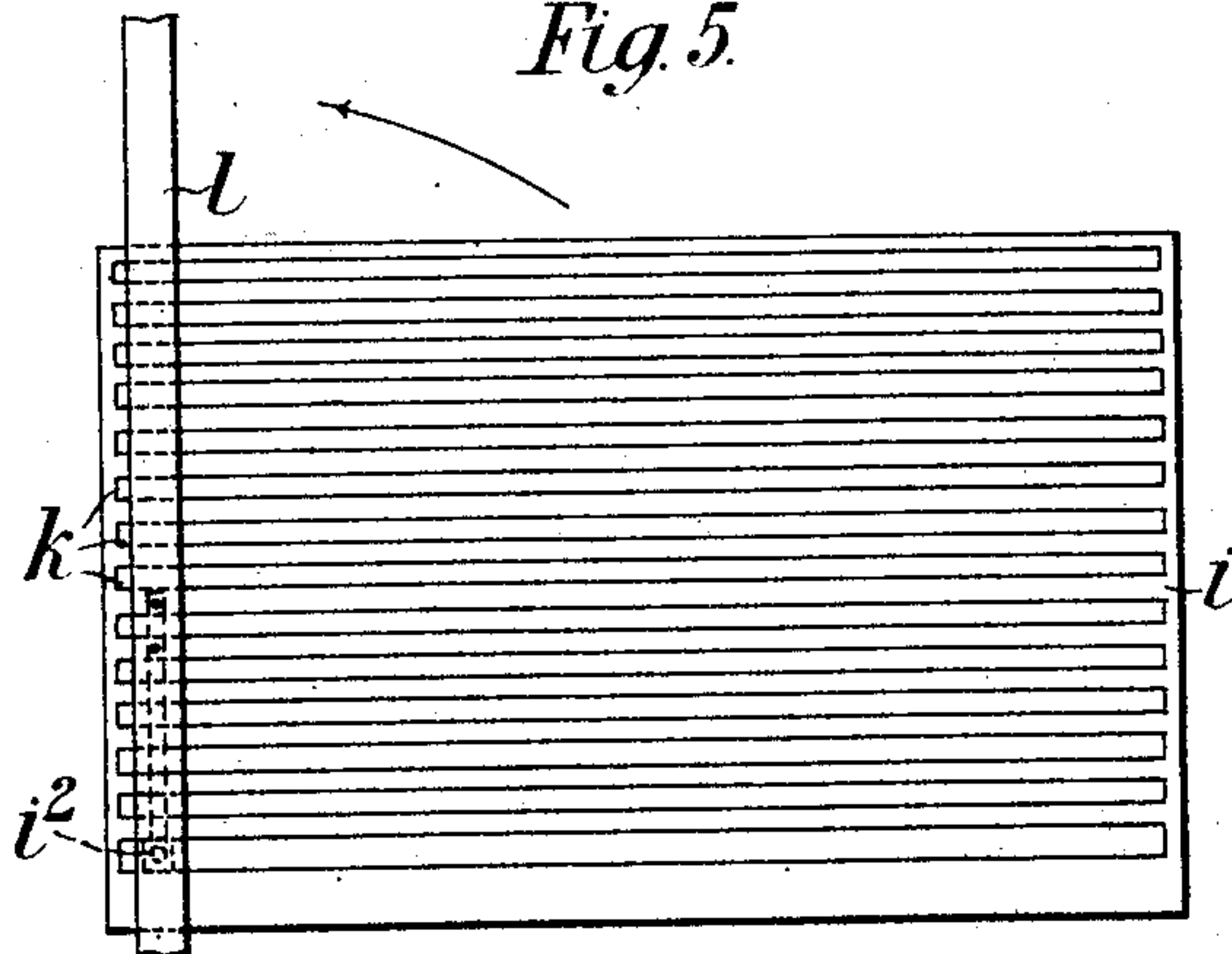


Fig. 5



Witnesses.

J. K. Moore
S. H. Hubbard

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Hans John Stephen Cassal
By his attys
Whitaker & Prevor

UNITED STATES PATENT OFFICE.

HANS JOHN STEPHEN CASSAL, OF LONDON, ENGLAND, ASSIGNOR TO
THE LIQUID (ELECTRIC) REGISTER SYNDICATE, LIMITED, OF LONDON,
ENGLAND.

ELECTRICAL APPARATUS FOR REGISTERING THE DISCHARGE OF LIQUIDS BY PUMPS.

SPECIFICATION forming part of Letters Patent No. 752,652, dated February 23, 1904.

Application filed March 17, 1903. Serial No. 148,217. (No model.)

To all whom it may concern:

Be it known that I, HANS JOHN STEPHEN CASSAL, a subject of the King of Great Britain, residing at 13 Eton Villas, South Hampstead,
5 London, England, have invented new and useful Improvements in Electrical Apparatus for Registering the Discharge of Liquids by Pumps, of which the following is a specification.

10 This invention relates to electrical apparatus for registering the quantity of liquid discharged through a pump and to that type of apparatus wherein a contact-piece arranged in connection with the rod of the pump piston
15 or plunger is caused during the reciprocation of the said plunger to make and break an electrical circuit a number of times according to the distance through which it travels, so that
20 each time the circuit is thus opened and closed an electrical impulse is transmitted to the electromagnet of a registering apparatus.

The invention has for its object to improve the construction of apparatus of this class, and comprises the improvements hereinafter de-
25 scribed.

In the accompanying drawings, Figure 1 is a sectional elevation of electrical registering apparatus having the improvements applied to it and adapted to a beer-engine. Fig. 2 is
30 a partial side view illustrating a detail. Fig. 3 is a section of a portion of Fig. 1, drawn to a larger scale; and Fig. 4 is a sectional elevation of a modified arrangement of contact device, also drawn to a larger scale. Fig. 5 is a
35 view of a modified form of contact device for intermittently making and breaking the electrical circuit.

40 a is the cylinder of the beer-engine, and b is the rod of the piston or plunger which works therein.

c is the pipe through which the liquid to be measured is discharged, and d is a chamber of metal which is attached to the end of the said pipe c and which has extending from it later-
45 ally the discharge-pipe e .

f is a plug of insulating material which is fitted into the head of the chamber d , the said

plug f having passing through it a metallic contact-piece f' .

g is a spring tongue or contact which is se- 50
cured inside the chamber d at its lowest point g' and which partially covers the opening of the lateral pipe c from the said chamber d , its end being normally separated from the con-
55 tact f' and its distance therefrom being regulated by the adjusting-screw h , as clearly shown in Fig. 1.

i is the contact-plate, which is mounted upon the wood or other insulating-support i'' , being arranged between the guide-pins $j j$, so that 60
it can be moved thereon in the direction indicated by the arrow. This plate is provided with a number of insulating-strips $k k$; but these strips instead of being parallel, as has heretofore been the case, are arranged so as 65
to diverge in the manner shown. The object of making the plate i movable and of arranging the insulating-strips k in the manner described is to enable the device to be adapted
70 to beer-engines, the cylinders of which vary in length, as is the case in practice and which has heretofore necessitated the making of a special device for each engine.

l is a rod, preferably of square section, which is provided with a spring-contact l' , 75
(see Fig. 2,) adapted to move over the metallic plate i and the insulated strips k , the said rod being guided between the rollers $m m$, pivotally mounted upon the block i' . The upper end of the rod l enters a hole n in a 80
block n' (see Fig. 3) and is provided with a cross-pin l'' , held in a transverse hole n^2 in the said block, which is connected to the rod b of the plunger of the beer-engine through the medium of the pin o and the cross-bar p , so 85
that the said block moves with the plunger b . This cross-bar p is made as a clamp, so that the contact-plate i and the pump-cylinder a can be adjusted in position with respect to one another to suit requirements. The upper 90
part of the transverse hole n^2 in the block n' and the hole n in the said block are cased with insulating material q , so that the rod l is only in electrical connection with the block n'

when in its lowermost position in the hole n^2 —that is to say, in the position shown in Fig. 3. When the said rod l rides up into the block n' , the metallic connection is broken, and to insure that it remains in this upper position it is made to fit tightly between the guide-rollers m .

In Fig. 5 there is illustrated a modified arrangement of contact-plate i , the said plate being pivoted at i^2 instead of being adapted to move horizontally, as hereinbefore described. In this construction the insulating-strips k are placed horizontally, whereby the path of the spring-contact l' is always equally divided by the said strips in any position to which the contact-plate i is turned upon its pivot i^2 .

r is a registering apparatus of any suitable construction and containing an electromagnet and an armature, the movements of which are caused to operate the fingers or pointers of the indicator in the well-known manner.

r' is the battery, which is in connection with the metallic plate i through the medium of the wire l and with the recorder through the wire 2, the said recorder being also in electrical connection by the wire 3 with a post or terminal 4 upon the head of the chamber d .

5 is a wire which places the plug f in electrical connection with the post or terminal 6, screwed into the metallic block n' , so that when the rod l is in its lowermost position in the transverse hole n^2 the said rod is in electrical connection with the wire 5.

The operation of the device is as follows—that is to say, assuming the pump-plunger to be operated so as to cause liquid to be discharged into the pipe c , the said liquid flows into the chamber d and escapes through the discharge-pipe e . In doing so it moves the spring-contact g , and so causes its free end to move against the contact f' of the plug f . By this means current is enabled to flow from the battery r' through the recording device r , wire 3, terminal 4, walls of the chamber d , spring-contact g , contact f' , wire 5, post 6, block n' , and rod l , assuming the spring l' on the said rod is upon the metallic plate i . As the said spring is raised with the rod by the upward movement of the plunger-rod l , the circuit is alternately made and broken by the spring-contact l' passing over the contact-plate, so that a series of current impulses is sent through the registering device, thus giving a register of the discharge of the liquid. When the plunger-rod l has reached the limit of its upward movement and has started on its return motion, the transverse pin l^2 on the rod l comes into contact with the insulating-lining q , thus interrupting the electric circuit, so that on the downward movement of the said plunger the registering device r is not operated.

In the arrangement illustrated in Fig. 4 the contact f' in the plug f extends down into a closed tube s , of metal, depending in the

chamber d , the said metallic tube s being inclosed in a rubber tube or jacket t . The metal tube s is formed with a hole s' , and a spring contact-piece u is fixed inside the metal tube s at the lower end thereof and is provided at its free end with a piece u' , which enters the hole s' and bears against the rubber tube or jacket t . With this arrangement when liquid is caused to flow through the pipe c in the manner above described the pressure of the said liquid bulges the rubber tube or jacket t inward at the hole s' , and so slightly moves the spring contact-piece u , and thus brings it against the contact f' , so completing the circuit in the manner above described.

In the drawings the improvements are shown applied to apparatus of the kind wherein the electric circuit is closed by the flow of the liquid discharged from the pump; but it will be obvious that the improvements in connection with the contact-plate can also be used with apparatus in which the circuit is not influenced by the flow of the liquid.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In an electrical registering apparatus of the kind described, the combination with the pump-cylinder, of a discharge-pipe connected therewith provided with a chamber, an outlet for said chamber, a stationary contact in said chamber and a coacting spring-contact within said chamber and arranged adjacent to the outlet thereof whereby said contact will be operated directly by the liquid passing there-through, and a register electrically connected with said contacts, substantially as described.

2. In an electrical registering apparatus of the kind described, the combination with the reciprocating contact-rod, adapted to be connected to the piston-rod of a pump, of a plate movable with respect to said rod and provided with a plurality of contacts, and means for adjusting said contact-plate with respect to said rod, in accordance with the stroke of the pump with which the apparatus is connected, and a register electrically connected with said contacts, substantially as described.

3. In an electrical registering apparatus of the kind described, the combination with the reciprocating contact-rod, adapted to be connected to the piston-rod of a pump, of a plate movable with respect to said rod and provided with a plurality of contact-strips arranged in converging lines, and means for adjusting said plate transversely with respect to said contact-rod in accordance with the stroke of the pump to which the apparatus is connected, and a register electrically connected with said contact-strips, substantially as described.

4. In electrical registering apparatus of the kind described, the combination with the cylinder of the pump, of a chamber connected

therewith and provided with an outlet, a metallic tube extending into said chamber closed at its end and provided with an orifice, a spring-contact having a part lying in said
5 orifice, a piece of flexible material engaging the exterior of said tube and covering said orifice, and a stationary contact within said tube coacting with said spring-contact where-

by the pressure of liquid within said chamber will actuate said spring-contact, and a register 10 electrically connected with said contacts, substantially as described.

HANS JOHN STEPHEN CASSAL.

Witnesses:

JOHN E. BOUSFIELD,
C. G. REDFERN.