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M. R. KENNEDY.
SAMPLE TESTER FOR PULP MAKING APPARATUS.
APPLICATION FILED JULY 28, 1906.

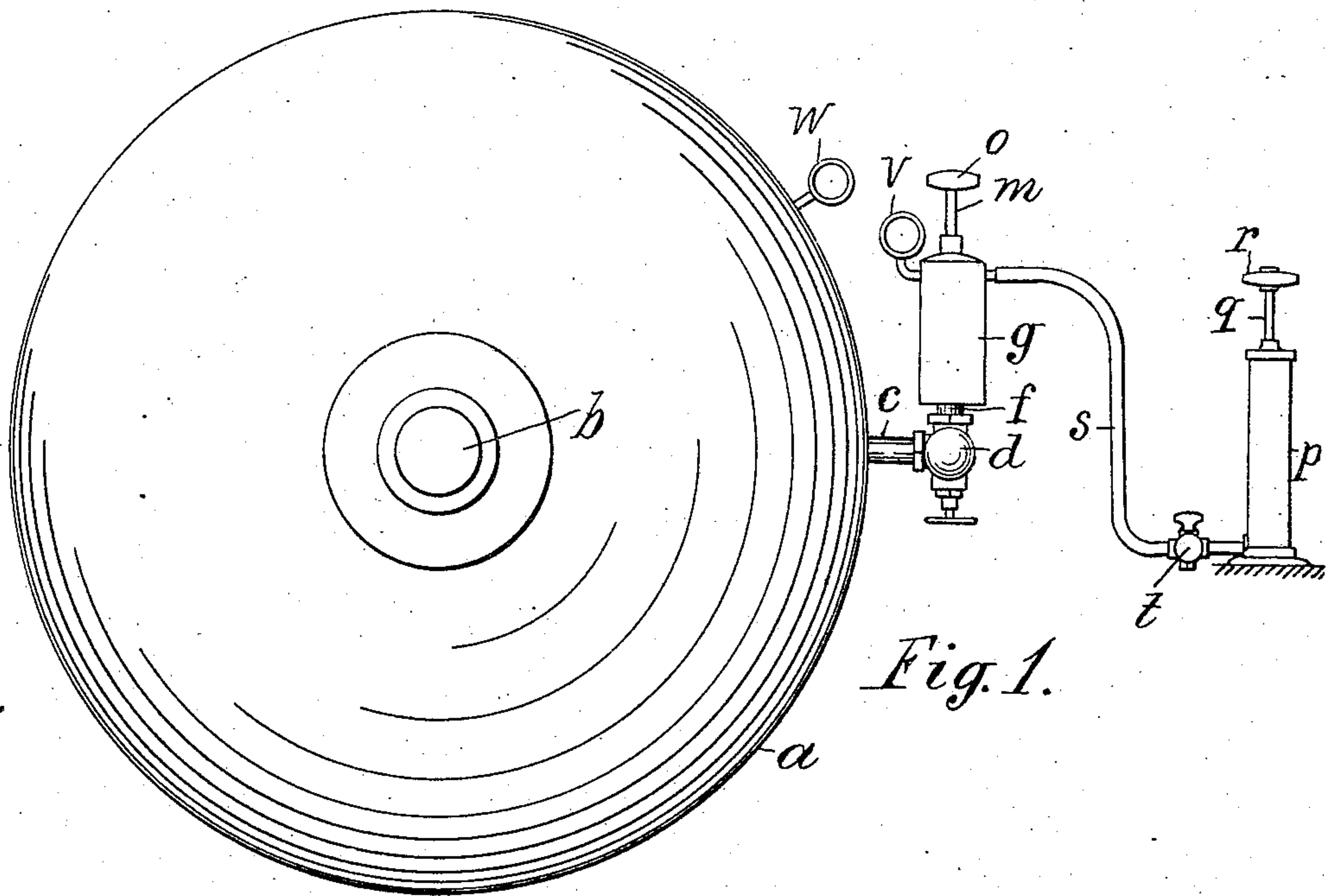


Fig. 1.

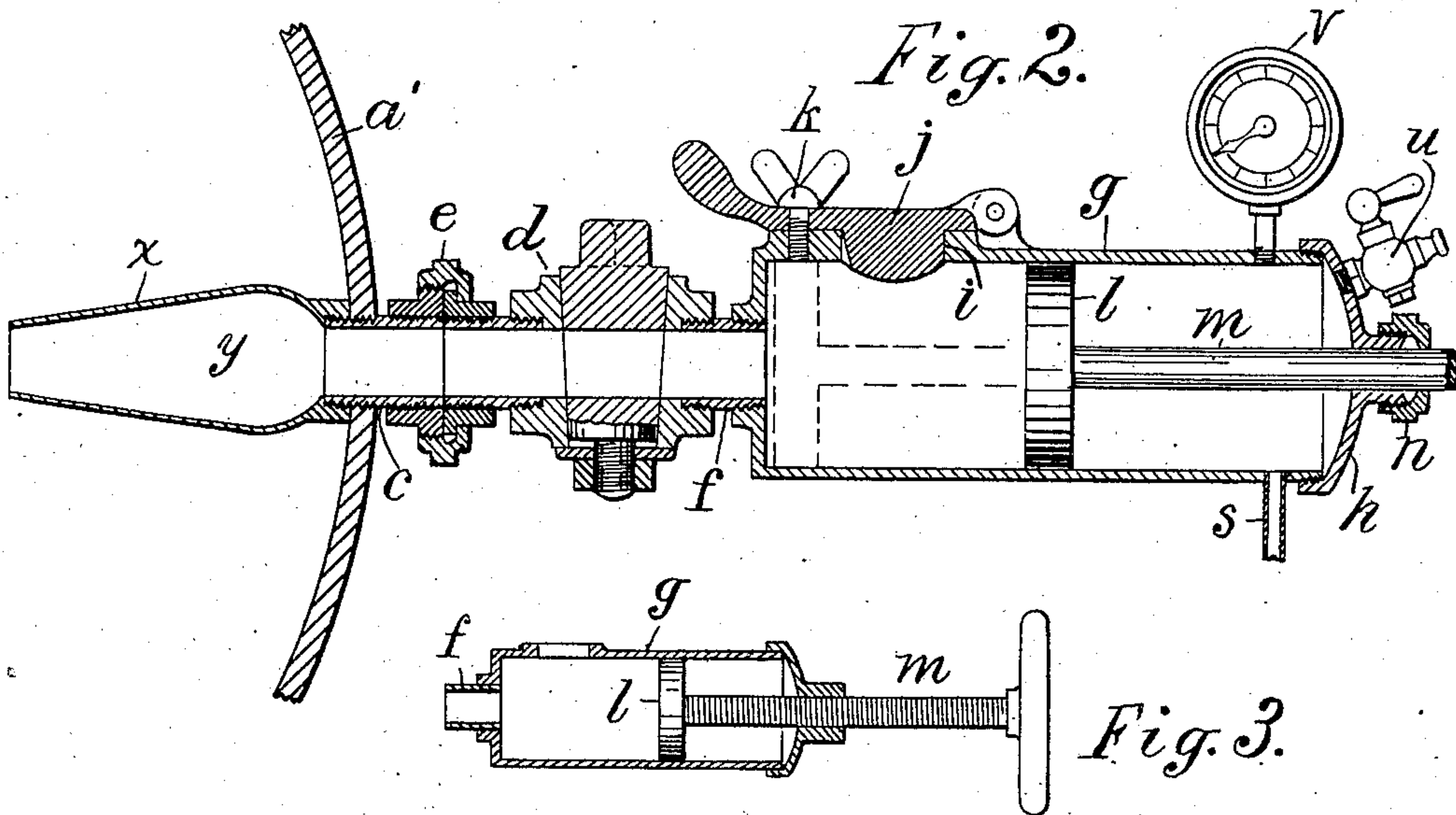


Fig. 2.

Fig. 3.

Witnesses:
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UNITED STATES PATENT OFFICE.

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SAMPLE-TESTER FOR PULP-MAKING APPARATUS.

No. 850,017.

Specification of Letters Patent.

Patented April 9, 1907.

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To all whom it may concern:

Be it known that I, MICHAEL R. KENNEDY, a citizen of the United States, of Dansville, county of Livingston, and State of New York, have invented certain new and useful Improvements in Sample-Testers for Pulp-Making Apparatus, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to furnish a means of removing a sample of fiber or pulp from the cooking digester or boiler in which such fiber is extracted from wood or straw under suitable pressure and of maintaining in the sample-receiver the same conditions as to pressure which exist in the digester, so that the sample may be withdrawn from the digester without any material change in its texture or constitution. It has been common heretofore in removing such samples of pulp from a digester to permit a small portion of the digester's contents to be blown out of an aperture by the pressure within the digester; but in such case the difference in the environment of the pulp when exposed merely to atmospheric pressure causes an excessive and ungovernable expansion and disintegration of the fiber. The sample obtained by such means does not, therefore, exhibit the condition of the pulp within the digester, but is misleading in its indications, and even with great experience and judgment on the part of the operator he can only guess at the exact condition of the pulp within the digester.

In the present invention I furnish a sample-receiver with an inlet connected by a cock to the interior of the digester and provide in the receiver a piston which can be set close to such inlet and means for exerting upon the outer or rear side of such piston a force equal to that exerted by the pressure of the digester when the cock is opened. By then restricting the movement of the piston to a slow speed it may be gradually drawn backwardly in the receiver, and the pulp under the pressure of the digester enters the receiver without suffering any material reduction of pressure or any expansion due to an explosive movement. The force is most readily exerted on the rear side of the piston, and its backward

movement may easily be regulated by closing the rear end of the receiver and forcing air into the space between the piston and the closed end to press the piston forward against the inlet. When the cock connecting the inlet with the digester is opened, the air confined in such rear space may be gradually discharged by a vent-cock and the piston allowed under the pressure from the digester to move backwardly at a slow speed until a sufficient quantity of the pulp has been admitted to the receiver.

A hand-hole or other opening with suitable cover is provided upon the receiver to remove the sample when the cock at the inlet is closed.

The inlet of the sample-tester may be connected permanently or detachably to the digester, whether stationary or rotated to agitate its contents.

The invention will be understood by reference to the annexed drawings, in which—

Figure 1 is a diagrammatic representation of a spherical digester with the sample-tester connected thereto. Fig. 2 is a section of the sample-tester with its connection to the wall of the digester, and Fig. 3 shows a sample-tester having a receiving-cylinder with screw-thread upon its piston-rod. Many details are omitted from Fig. 1.

Fig. 1 shows the tester fitted close to the side of a rotary tester and screwed permanently thereto to avoid breaking the joint, which may expose the operator to contact with the corrosive liquids employed, which would burn the operator or his clothing. This arrangement also makes the joint more durable and maintains the tester in constant readiness for use. Fig. 2 shows a detachable construction.

a designates the globe of the digester; *b*, one of its supporting-journals; *c*, a pipe extended through the wall of the digester; *d*, a cock in such pipe outside the wall; *e*, a coupling upon the pipe adjacent to the cock, and *f* the inlet of the digester *g* adjacent to the cock, from which it may be detached.

The receiver is shown of cylindrical form with a head *h*, closing its rear end, and hand-hole *i*, having a cover *j* hinged over the same and secured by detachable screw *k*. A piston *l* is fitted to the bore of the receiver, and

a piston-rod *m* is extended through a stuffing-box *n* upon the head *h* and provided with handle *o* to move the piston by hand.

An air-pump *p* is shown in Fig. 1 with a piston-rod *q*, having handle *r* to operate the piston and the air-pipe *s*, provided with a cock *t* and connected to the space within the receiver between the piston and the head *h*.

A pressure-gage *v* is shown upon the receiver to exhibit the pressure therein, and a vent-cock *u* is provided to discharge the compressed fluid from the cylinder. A pressure-gage *w* is also shown upon the digester *a*, so that the pressure in the digester can be known and then equalized in the receiver.

A nozzle *x* is shown attached to the pipe *c* within the wall of the digester and having an opening smaller than the pipe, with an expanded chamber *y* between such opening and pipe. The chamber tapers toward the pipe *c*, so that the pulp may flow gradually from the chamber into the pipe. The purpose of this nozzle is to prevent the pulp from jamming against the inlet of the pipe *c*, and thus interfering with its free movement into the sample-receiver.

The operation of the apparatus is as follows: When it is desired to draw a sample from the digester, the digester is turned in such a position that the pulp would lie against the inlet of the pipe *c* or nozzle *x*, the cock *d* being closed. The pressure in the digester is then noted by the pressure-gage *w* thereon, and air (if air be used) is forced into the receiver behind the piston until its pressure corresponds by the gage *v* with that in the digester. The cock *d* being opened, no movement of pulp would result, as the pressure upon both sides of the piston would be equal; but the opening of the vent-cock *u* permits the escape of the air and the reduction of the pressure behind the piston at any desired rate, thus permitting the pulp to flow through the inlet into the receiver and push the piston backwardly. When a sufficient amount of pulp has been withdrawn, the vent-cock *v* is closed, and the cock *d* is also closed to shut off the connection with the digester, and the hand-hole *j* may then be opened by removing the screw *k* and the sample extracted from the receiver. A sample removed from the digester in this manner is not subjected to any violent treatment, but is withdrawn in a perfectly natural condition and exhibits perfectly the chemical and physical condition of the pulp within the digester, so that its treatment can be accurately known, and further action within the digester can be correspondingly regulated.

The essential feature of the invention is the restraining of the piston movement as the sample flows into the receiver, so that the flow although under high pressure may be slow and uniform and no violent or explosive movements result. It is therefore immate-

rial what force be exerted upon the piston to balance the pressure within the digester or how the backward movement of the piston be restrained and regulated during the inflow of the pulp.

In Fig. 3 the piston-rod is shown with a screw-thread, so that it may be turned slowly backward by hand, such screw being an equivalent for fluid-pressure, and any other means may be employed for producing a slow backward movement of the piston to admit the pulp slowly to the receiver while under the high fluid-pressure within the digester.

Having thus set forth the nature of the invention, what is claimed herein is—

1. In a sample-tester, the combination, with a sample-receiver having an inlet at one end, with means for connecting the inlet with the digester, and a cock to admit the pulp under pressure from the digester, of a piston movable to and from the inlet within the receiver, and means for exerting a force upon the outer side of the piston equal to that in the digester before admitting the sample to the receiver.

2. In a sample-tester, the combination, with a sample-receiver having an inlet at one end, with means for connecting such inlet with the digester and having a hand-hole with cover for removing the sample, of a piston movable to and from the inlet within the receiver, a piston-rod extended outside of the receiver to move the piston, and means for restricting the piston to a slow movement from the inlet when receiving a sample from the digester.

3. In a sample-tester, the combination, with a sample-receiver having an inlet at one end, with means for connecting such inlet with the digester, and having a hand-hole with cover for removing the sample, of a piston movable to and from the inlet within the receiver, and means for compressing air upon the outer side of the piston with pressure equal to that in the digester, and means for gradually discharging such compressed air to permit a slow movement of the piston when receiving the sample from the digester.

4. In a sample-tester, the combination, with a sample-receiver having a closed rear end and an inlet at the front end with means for connecting the inlet to the digester, and a cock for closing the connection, of a piston movable to and from the inlet within the receiver, means for exerting a fluid-pressure in the space between the piston and such rear end, and a vent-cock for discharging the fluid from such space when receiving a sample from the receiver.

5. In a sample-tester, the combination, with a sample-receiver having an inlet at the front end with means for connecting such inlet with the digester, and having a hand-hole with cover for removing the sample and a

closed head at the rear end, of a piston movable to and from the inlet within the receiver, means for compressing air in the space between the piston and the rear head, and a
5 pressure-gage connected with such space to determine the force exerted upon the rear side of the piston.

6. In a sample-tester, the combination, with a sample-receiver having inlet at one
10 end extended within the wall of the digester, of a nozzle extended from the inlet into the

digester, and having opening smaller than the inlet, with an expanded chamber between such opening and the inlet, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing
15 witnesses.

MICHAEL R. KENNEDY.

Witnesses:

PARLEY M. HAMMOND,

CHAS. H. URWARZAGT.