(No Model.) 2 Sheets—Sheet 1.

T. E. MATHER.

LIQUID MEASURING MACHINE.

No. 590,109. Patented Sept. 14, 1897.

Fig. 1.

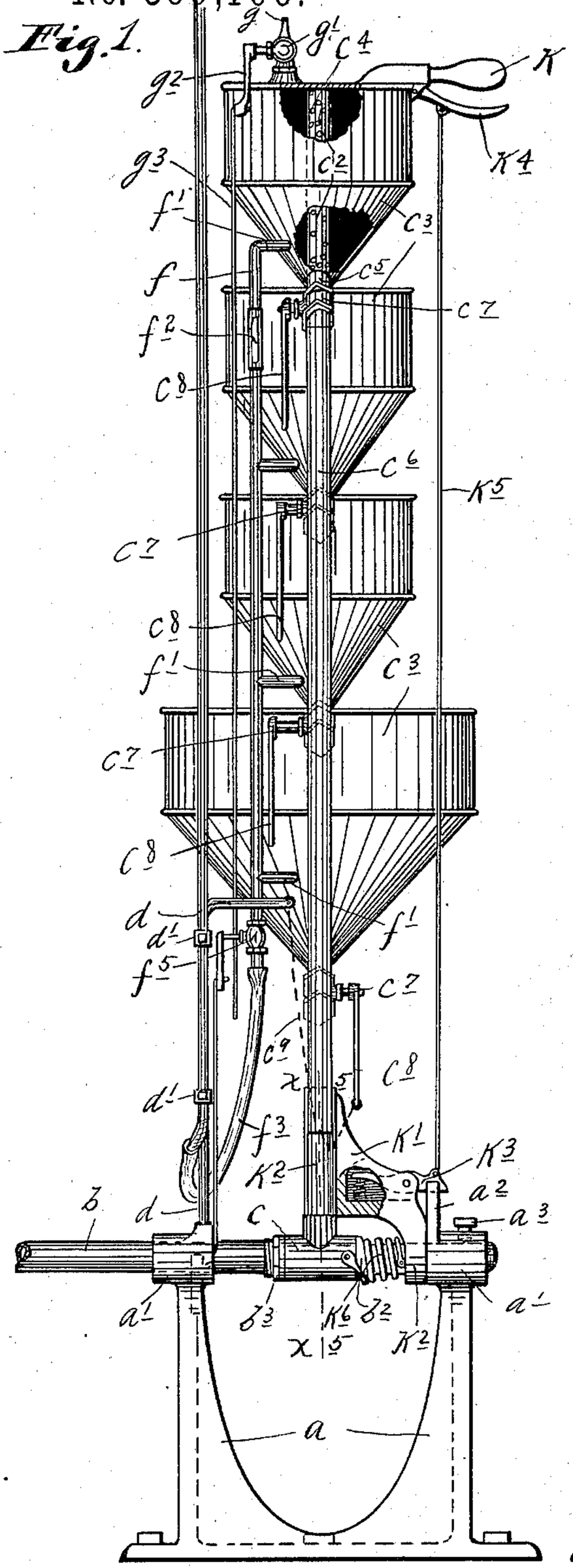
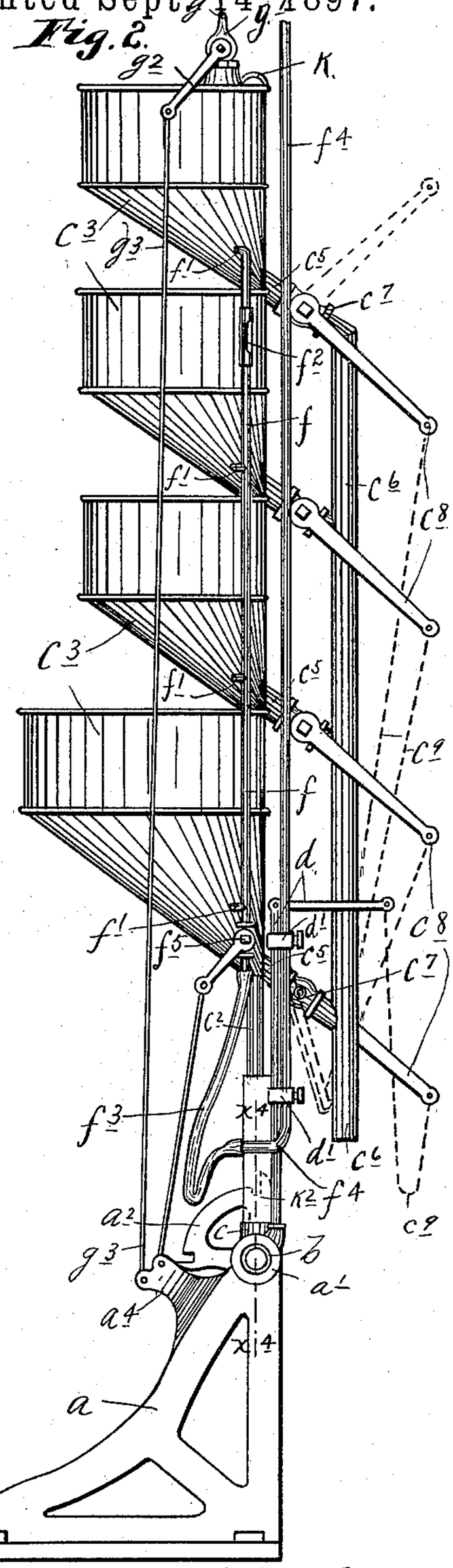


Fig. 2.



Witnesses.

C. F. Kilgore

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Inventor.

Thomas E. Mather.

By his Attorney.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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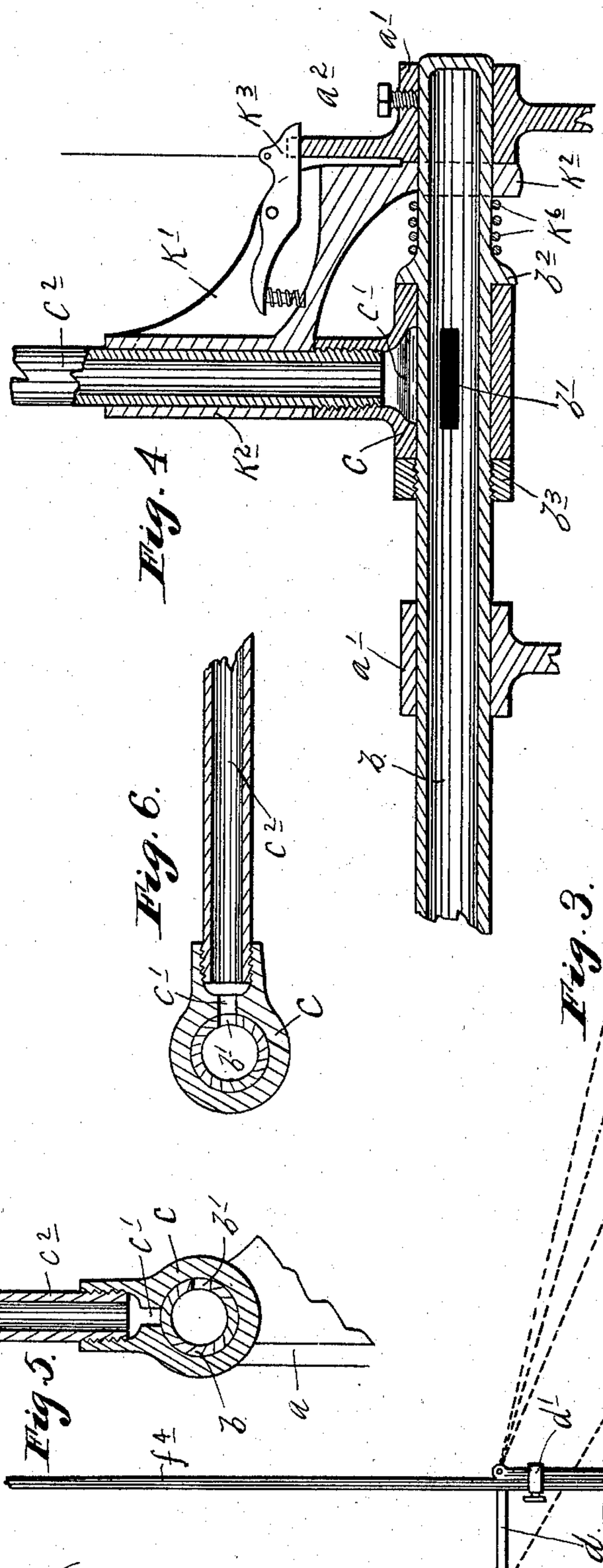

Fig. 4

Fig. 6.

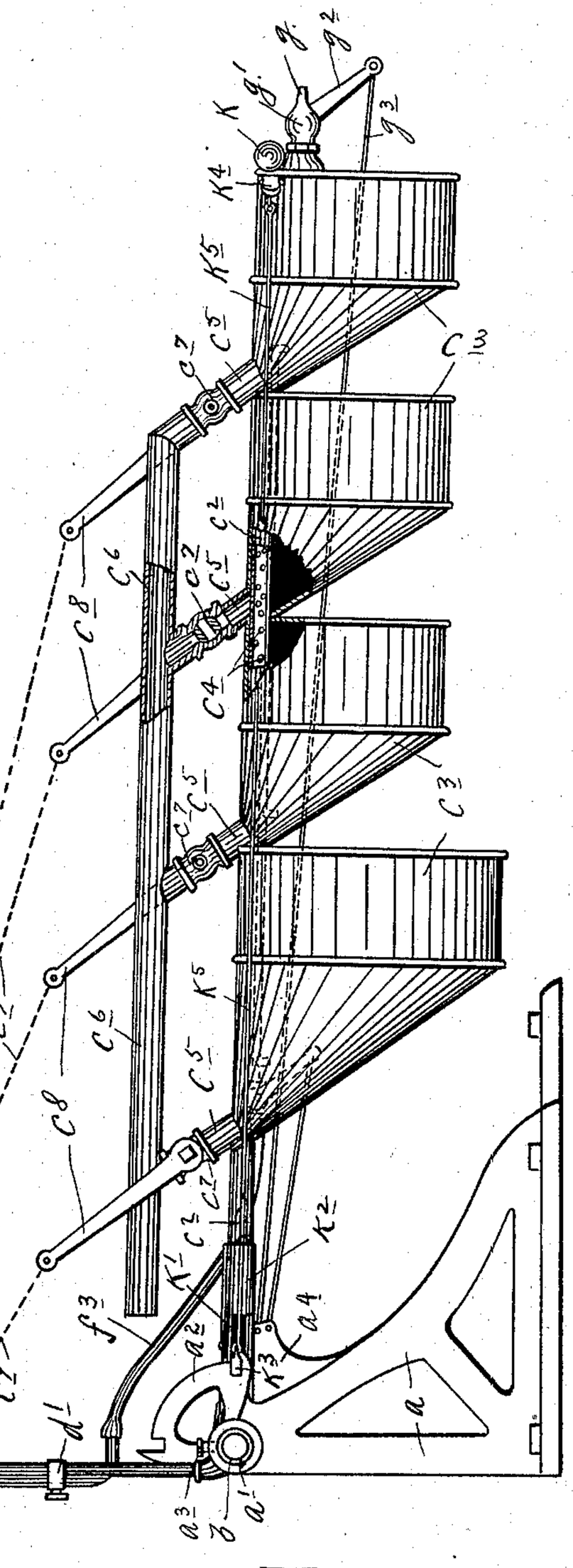

Fig. 3.

Fig. 5.

Witnesses.

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UNITED STATES PATENT OFFICE.

THOMAS E. MATHER, OF MINNEWAUKON, NORTH DAKOTA.

LIQUID-MEASURING MACHINE.

SPECIFICATION forming part of Letters Patent No. 590,109, dated September 14, 1897.

Application filed July 10, 1896. Serial No. 598,701. (No model.)

To all whom it may concern:

Be it known that I, THOMAS E. MATHER, a citizen of the United States, residing at Minnewaukon, in the county of Benson and State of North Dakota, have invented certain new and useful Improvements in Liquid-Measuring Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an improved apparatus for measuring liquids.

To this end my invention comprises the novel devices and combinations of devices hereinafter described, and defined in the claims.

The preferred form of my invention is illustrated in the accompanying drawings, wherein, like letters referring to like parts throughout the several views—

Figure 1 is a view in rear elevation, showing the preferred form of my invention, the measuring device being turned into its upright position. Fig. 2 is a view in left side elevation, showing the device illustrated in Fig. 1, the parts thereof being shown in the same position. Fig. 3 is a view in right side elevation, showing the measuring device turned downward into its horizontal or filling position. Fig. 4 is a vertical transverse section taken substantially on the line x^4 x^4 of Fig. 2, some parts being broken away. Fig. 5 is a vertical section taken substantially on the line x^5 x^5 of Fig. 1, showing the stem of the measuring device turned into its upright position, as illustrated in Figs. 1 and 2; and Fig. 6 is a vertical section corresponding to Fig. 5, but showing the stem of the measuring device turned into its horizontal position, as indicated in Fig. 2.

a indicates a bracket or base support, which is rigidly secured to the floor and is provided with pipe seats or boxes *a'*, the right-side member of which is formed with a latch-sector a^2. The delivery end of a horizontally-disposed liquid-supply pipe *b* is rigidly secured in the pipe-seats *a'* by means of a set-screw a^3, which works through the right member of said seats *a'* and impinges upon the right-side end of said pipe *b*. It will be noted that the extreme right end of the pipe *b* is closed or plugged. The front face of the pipe *b* is provided with a longitudinal slot or elongated discharge-passage *b'*. Just to the right of this passage *b'* the pipe *b* is provided with a fixed collar b^2, and just to the left of said slot the pipe *b* is provided with an adjustable screw-threaded collar or nut b^3.

Pivoted on the pipe *b*, between the collar b^2 and nut b^3, is the hub of a recessed head *c*, which is provided with a port or laterally-elongated slot *c'* of substantially the same dimensions as the slot *b'* of the pipe *b*. When this head *c* is turned into its horizontal position, as indicated in Fig. 6, the slots *b'* and *c'* will be brought into registration with each other, but when said head *c* is turned into an upright position, as shown in Fig. 5, said slots *b'* and *c'* will be turned away from each other, and both will thereby be closed. Into the cavity of the head *c*, in line with the port or slot *c'*, is screw-threaded the lower end of a pipe or hollow stem c^2. This pipe c^2 extends through and is secured to the interior of a series of measuring vessels c^3. As shown, the extreme free end of the pipe c^2 is rigidly secured to and is closed by the top plate of the upper member of the vessels c^3. Within the vessels c^3 the pipe c^2 is perforated, as shown at c^4, thus throwing all of said vessels into communication with each other.

It will be noted that all of the vessels c^3 are provided with hopper-like bottoms and that they all project forward from the pipe or stem c^2. Hence when the measuring device is turned into its horizontal position, as shown in Fig. 3, the vessels c^3 will be filled by the action of gravity, while when turned upright, as shown in Figs. 1 and 2, their contents may be readily drawn off under the action of gravity. The lower portions of the conical bottoms of each of the vessels c^3 are connected by means of stub-pipes c^5 with a common discharge-pipe c^6, which is disposed substantially parallel to the shaft or stem c^2 on the rear side of the same. In each of these stub-pipes c^5 is a valve c^7, provided with a projecting lever or arm c^8. The free ends of each of the levers or arms c^8 are connected by means of flexible connections c^9 to a fixed bracket *d*, which is rigidly secured to and rises from the standard or base bracket *a*. The length of the connections c^9 and the lo-

cation of their points of attachment to the bracket b are such that when the measuring device is turned into its horizontal or filling position (indicated in Fig. 3) all of the said connections will be drawn taut and the valves c^7 will be so turned as to close the passages in the stub-pipes c^5.

The portions of the measuring vessel c^3, which in the horizontal or filling position of the measuring device are the highest from the ground or floor, are also in communication through a small air-pipe f, the branches f' of which open one into each of said vessels. This pipe f, with its branches f', are of course carried with the vessel c^3 and pipe c^2. If desired, the pipe f may be provided near its upper end with a glass gage or sighting-tube f^2. The extreme lower end of the pipe f is connected by means of a flexible hose f^3 with the lower end of a small vertically-disposed and rigidly-secured air-pipe f^4, the lower end of which is secured to the bracket d by means of keepers d'. In case the oil or other liquid is fed to the pipe b by the action of gravity the air-pipe f^4 should extend to an altitude above the supply-tank. In the lower end of the air-pipe f is a valve f^5, which is provided with an arm f^6, the free end of which is connected by means of a light rod f^7 to a lug a^4, which projects forward from the base a. The relations of the valve f^5, arm f^6, and rod f^7 are such that when the measuring device stands in its upright position, as shown in Figs. 1 and 2, the valve f^5 will close said air-pipe f, but when the measuring device is turned downward into its filling position said valve f^5 will be so turned as to open the passage in said pipe f. In the upper head of the uppermost member of the measuring vessel c^3 is an air-discharge nipple g, which is provided with a valve g', to the stem of which is rigidly secured a lever or arm g^2, the free end of which is connected by means of a light rod g^3 to a portion of the lug a^4. The relations of the valve g', arm g^2, and connecting-rod g^3 are such that when the measuring device is turned into its upright position, as shown in Figs. 1 and 2, said valve g' will open the passage in the nipple g, but when the measuring device is turned into its filling position (indicated in Fig. 3) the said valve g' will close the passage in said nipple g.

The measuring device is readily moved from one position to another by taking hold of a handpiece k, secured to the upper member of the measuring vessels c^3.

k' indicates a latch-bracket, which is secured on the lower end of the pipe or hollow stem and has a hub portion k^2, which works loosely on the pipe b. A spring-held latch-dog k^3 is mounted on and carried by this bracket k'. This latch-dog k^3 is adapted for engagement with either one of a pair of notches formed in the latch-segment a^2, and thereby to hold the measuring device either in its horizontal or vertical position, according to which notch is engaged. The dog k^3 is released from the notches of the latch-arch a^2 by means of a finger-piece k^4, which is pivoted to the under side of the handpiece k and connected by means of a light rod k^5 to the free end of said dog k^3.

k^6 indicates a coiled spring one end of which is secured to the pipe b and the other to the head c.

The operation and use of the apparatus is substantially as follows: The measuring device being turned into its horizontal position, as shown in Fig. 3, the valve c^7 will close the stub-pipe c^5, the valve g' will close the passage in the nipple g, and the valve f^5 will open the passage in the air-escape pipe f. As the slots or passages b' and c' of the pipe b and head c, respectively, are now in registration, the oil or other liquid will, under the action of gravity or pressure applied to the source of supply, flow through the hollow stem or pipe c^2 and fill the measuring vessel c^3. During this filling action the air previously contained in the vessel c^3 finds a ready escape through the pipe f, hose f^3, and stand-pipe f^4. When the measuring device is moved into its vertical position, the valve f^5 will close the passage in the air-pipe f and the valve g' will open the passage in the air-supply nipple g, but the valves f^7 will still close the stub-pipes c^5. After first placing the vessel which is to be filled under the lower end of the discharge-pipe c^6 the desired amount of liquid may be drawn off from the measuring vessels by the following manipulation of the valves c^7 and levers c^8: Let it be assumed that the three uppermost measuring vessels c^3 will contain each one gallon, while the lowermost member will contain two gallons. Now if the uppermost valve c^7 is opened the upper member of the vessels c^3 will be emptied, and hence one gallon will be drawn off. If, however, without moving this uppermost member of the valves c^7 the next lower valve c^7 is opened, the contents of both of the upper members of the vessels c^3 will be emptied and two gallons of the liquid will be drawn off. This is due to the fact of course that the vessels c^3 are always in communication with each other through the perforated pipe c^2. Again, if without opening any other of the valves c^7 the lowermost member of said valves is opened all of the vessels c^3 will be emptied and five gallons of oil will be drawn off.

It will thus be seen that by providing the proper number and proper sizes of measuring vessels any desired amount of liquid may by the proper combinations of the same be measured and drawn off. The tension of the spring k^6 is in a direction which tends to raise the device into the position shown in Figs. 1 and 2. This spring therefore assists the operator to lift the loaded measuring vessels and serves also to prevent the same from falling too rapidly if released by the operator while in an intermediate position.

It will be understood, of course, that various alterations in the details of construction

of the apparatus above described may be made without departing from the spirit of my invention.

It will be understood that the terms "in communication with each other" and "adapted to be opened to a common discharge-tube," as used in certain of the claims, are used in a broad sense and are intended to include such connections whether made directly or by roundabout or indirect means; also, that while the apparatus is intended and especially adapted for measuring heavy liquids—such as oils, molasses, water, &c.—yet that the same might be used for measuring all liquids and even other forms of fluids.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a liquid-measuring apparatus, the combination with a supply-pipe provided with a liquid-discharge passage, of a series of measuring vessels mounted on a common pipe or hollow stem, the lower end of which stem is pivoted on said supply-pipe and provided with a port adapted for coöperation with the discharge-passage of said supply-pipe, substantially as described.

2. In a liquid-measuring apparatus, the combination with a supply-pipe provided with a liquid-discharge passage, of a series of measuring vessels mounted on and in communication with a common pipe or hollow stem, the lower end of which stem is pivoted on said supply-pipe and provided with a port which, in the horizontal position of the same, registers with the discharge-passage of said supply-pipe, substantially as described.

3. In a liquid-measuring apparatus, the combination with a supply-pipe provided with a liquid-discharge passage, of a hollow pipe or stem pivoted on said supply-pipe and provided with a port adapted to register with the discharge-passage of said supply-pipe in the horizontal position of said stem, a series of measuring vessels mounted on said stem and in communication therethrough, a series of branch discharge-pipes extending one from each of said vessels, valves in said branch pipes, and means for positively closing all of said valves by the downward pivotal movement of said pivoted stem.

4. In a liquid-measuring apparatus, the combination with a supply-pipe provided with a liquid-discharge passage, a stem or pipe pivoted on said supply-pipe and provided with a port which in the horizontal position of said stem is adapted to register with the discharge-passage of said supply-pipe, a series of measuring vessels mounted on and in communication through said stem, a common discharge-pipe, branch pipes extending from each of said vessels to said discharge-pipe, valves in said branch pipes provided with valve-arms, and flexible connections secured to said valve-arms and to a fixed support, substantially as described.

5. In a liquid-measuring apparatus, the combination with a supply-pipe provided with a discharge-passage, of a pipe or hollow stem pivoted on said supply-pipe and provided with a port which, in the horizontal position of said stem, registers with said supply-pipe discharge-passage, a series of measuring vessels mounted on and in communication with said stem, an air-vent pipe opening from each of said vessels, a valve in said vent-pipe, connections which automatically close said valve when said pivoted stem is turned upright, an air-inlet in the uppermost vessel, a valve in said air-inlet, and connections from said latter valve which automatically open the same when said hollow stem is turned into an upright position, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS E. MATHER.

Witnesses:

BESSIE B. NELSON,

F. D. MERCHANT.