No. 673,922. Patented May 14, 1901.

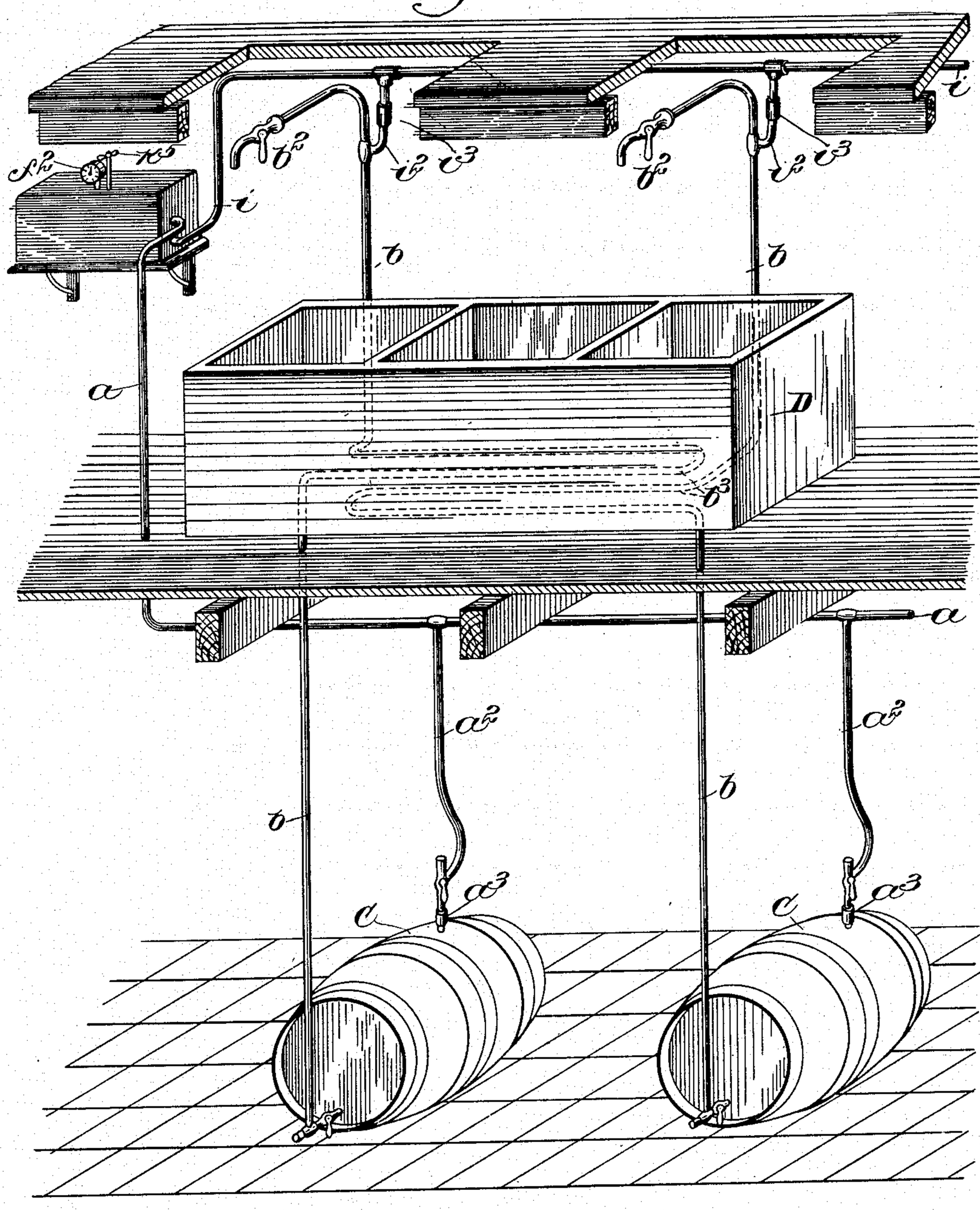
J. H. NOLAN.

DISPENSING APPARATUS.

(Application filed May 2, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

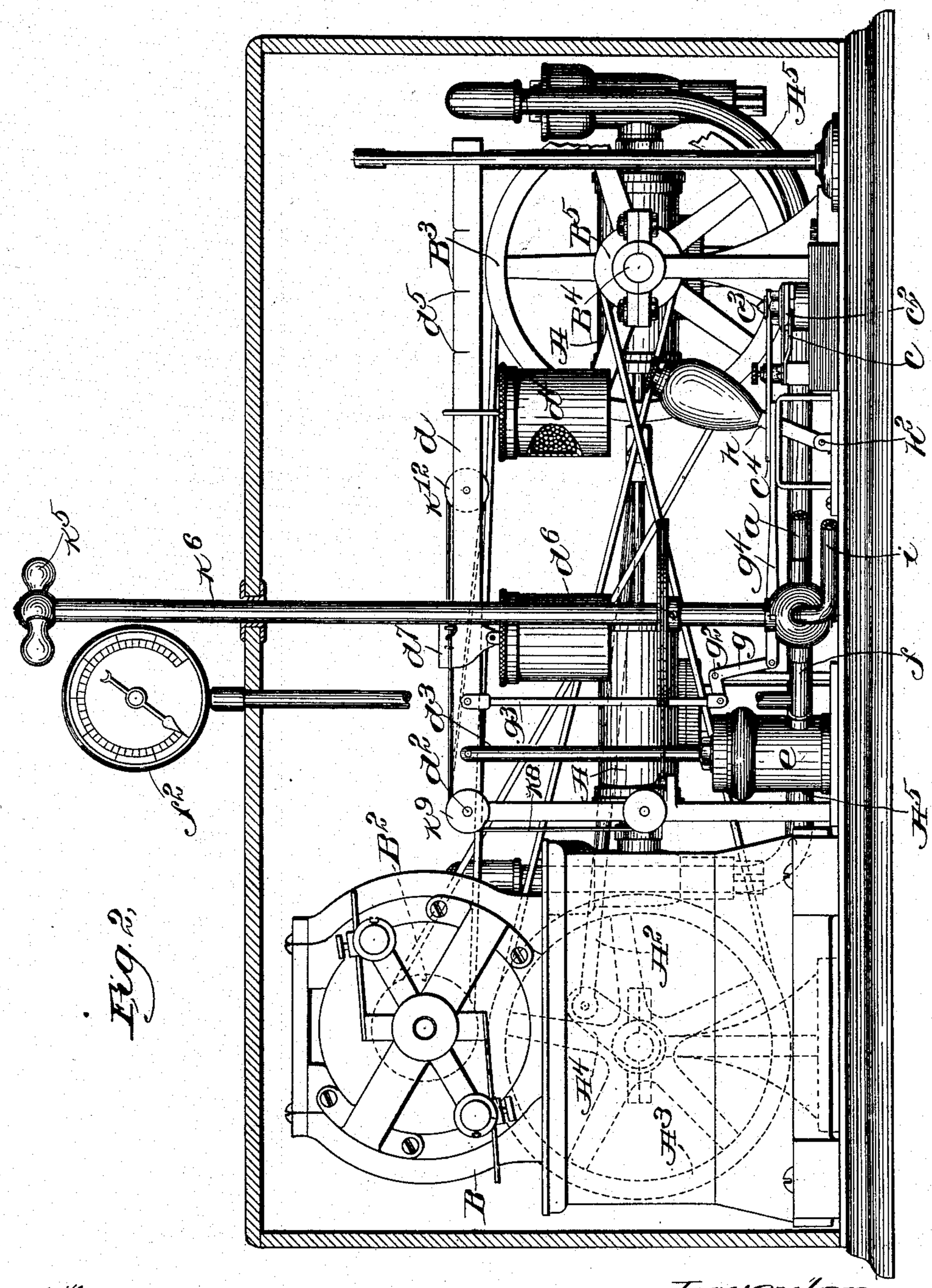

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 3.

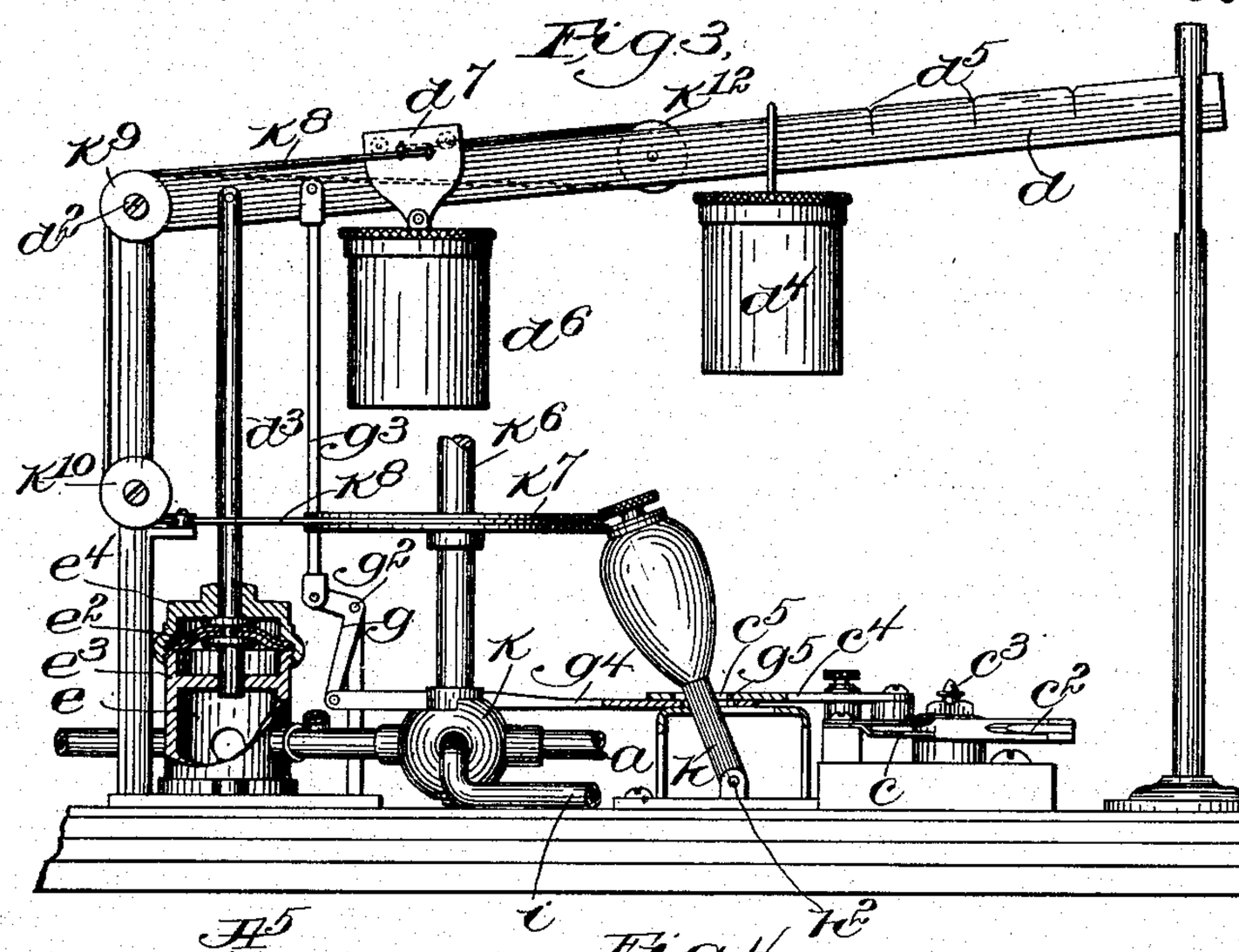


Fig. 6.

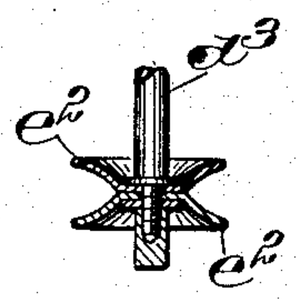


Fig. 7.

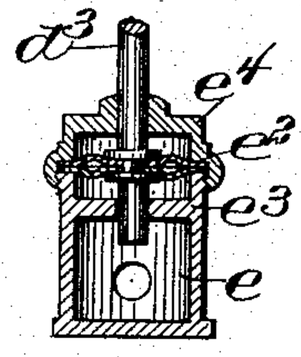


Fig. 4.

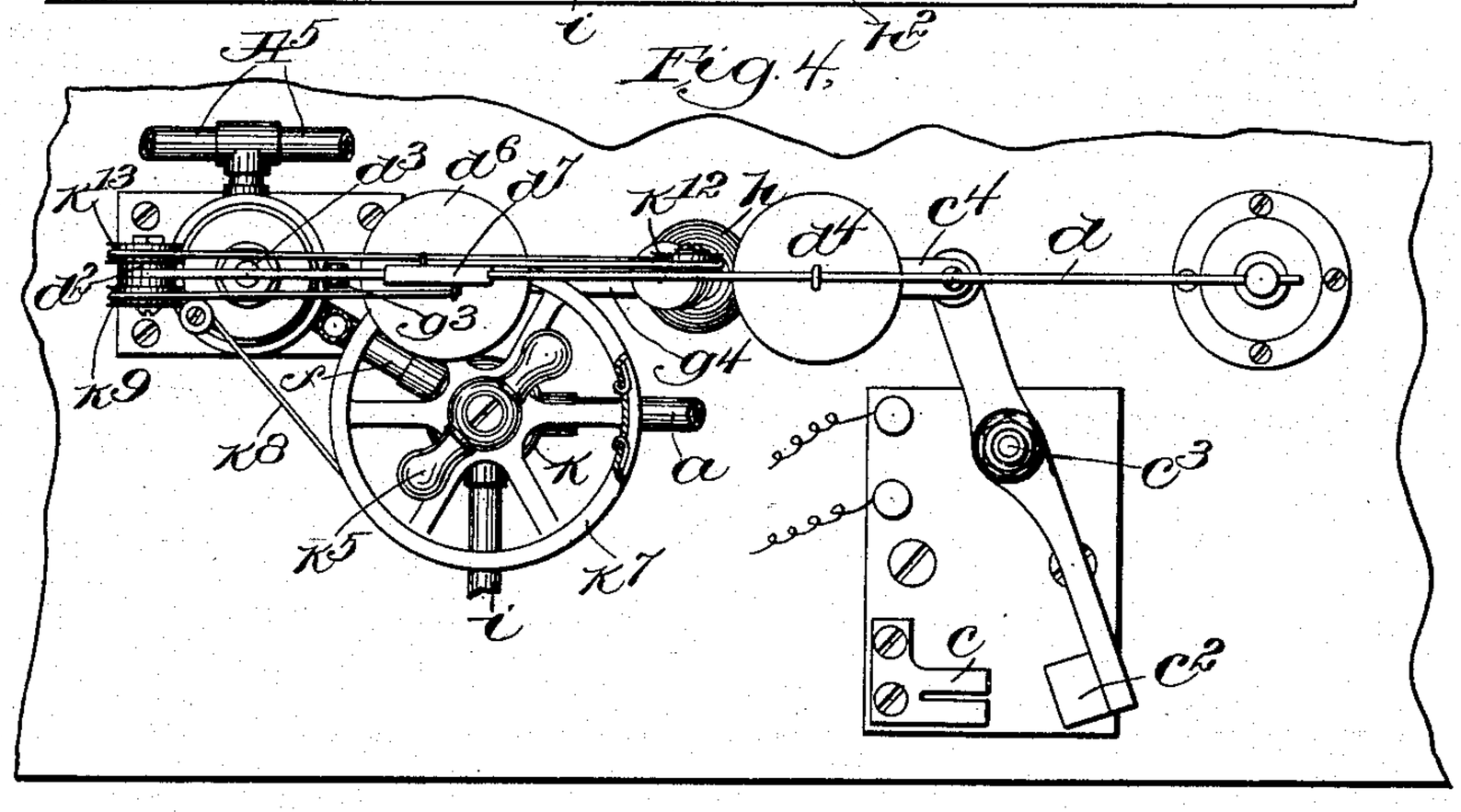
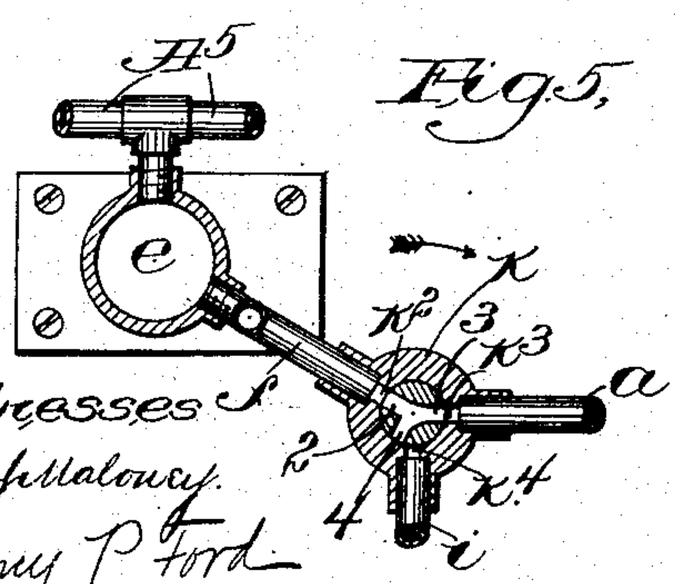


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN H. NOLAN, OF BOSTON, MASSACHUSETTS.

DISPENSING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 673,922, dated May 14, 1901.

Application filed May 2, 1900. Serial No. 15,210. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. NOLAN, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Dispensing Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

The present invention relates to a pump for beer, ale, or other liquids, said pump being of that class in which the liquid is forced upward from the barrels or other source of supply by means of pneumatic pressure, an air-pump being driven by a suitable motor which is automatically controlled in response to variations in pressure, the pump being automatically stopped when the desired pressure is reached and started when the pressure falls below this point.

The present invention relates mainly to novel features of construction and arrangement applied to the automatic controlling devices, and, further, to a novel system the purpose of which is to provide means for forcing the liquid standing in the pipes back into the barrel when the apparatus is not in use, so as to obviate the necessity of drawing off or wasting the liquid which has deteriorated or become stale by standing in the pipes over night. This is accomplished in accordance with the invention by providing the apparatus with means for diverting the compressed air from the usual air-inlet pipe to the outlet-pipe for the liquid, thus forcing the liquid from the said outlet-pipe back into the barrel. This feature of the invention may be embodied in a hand-pump apparatus, if desired, it being necessary only to operate the pump so as to create pressure slightly in excess of the normal in order to overcome the said normal pressure which tends to drive the liquid from the barrel into the pipes. A further feature of the invention, however, consists in the application of this system to an automatic pump, and the pressure-shifting device is arranged to also control means for varying the normal pressure, so that when the shifting device is operated the pump will not be stopped until such excessive pressure has been reached and the liquid consequently forced back into the barrel.

As herein shown, the liquid-outlet pipe and main-pressure inlet-pipe are both capable of being connected with the source of pressure, as by a three-way cock, and the actuating device for said three-way cock is connected with a weight hung on a lever, the movement of which lever controls the motor, the said lever being operated in response to pressure exerted upon a diaphragm in the pressure-pipe. The connection between the said lever and the actuating device for the cock is such that when the said cock is turned to divert the compressed air into the liquid-outlet pipe the weight will be moved along the lever away from the fulcrum thereof, so that the amount of pressure required to operate the lever and shut off the motor will be in excess of that normally required.

Figure 1 is a perspective view, partly in section, illustrating a system embodying the invention. Fig. 2 is a side elevation, with parts broken out, of the pumping apparatus. Fig. 3 is a detail, partly in elevation and partly in section, of the same; Fig. 4, a similar detail in plan view; Fig. 5, a sectional detail illustrating the pressure-shifting device, and Figs. 6 and 7 details showing the diaphragm which initially controls the motor.

The pump A, which may be an ordinary double-acting pump having two cylinders and two pistons mounted on a single piston-rod, is driven through the agency of a pitman A^2 from a pulley A^3 and a crank A^4, the said pulley being driven by the motor B, herein shown as an electromotor. The said motor is connected with the pump plunger or piston by speed-reducing gear, the small pulley B^2 of the motor being shown as belted to a wheel B^3 on a shaft B^4, which also has connected therewith a smaller pulley B^5, belted to the pulley A^3 of larger diameter, which directly runs the pump. These parts of the apparatus are illustrated and described merely for the purpose of showing the operation of the apparatus and form no part of the present invention.

In the operation of the apparatus the compressed air from the pump normally passes into the top of the barrel C, Fig. 1, or any number of such barrels through a pipe *a*, having branch pipes a^2 leading to the several barrels, respectively, the pressure forcing the liquid upward through pipes *b* from the lower

portions of the barrels, each pipe b having a cock or faucet b^2, from which the liquid is drawn. The pipes commonly include coils b^3 in the cooling-tank or ice-box D for the purpose of cooling the liquid as it passes upward from the barrels.

In the operation of the device the motor, Fig. 2, is set in motion and the compressed air passes into the pipes $a\,a^2$ until the desired pressure is reached, the motor then being automatically stopped. As herein shown, the motor is controlled by means of a switch having fixed and movable contact-pieces c and c^2, the latter being controlled by the movement of a lever d, pivoted at d^2, and connected, by means of a rod d^3, with a diaphragm in a pressure-chamber e, through which the compressed air passes from the pump to the pipe system.

As herein shown, the compressed air passes through pipes A^5 from the pump-cylinders into the chamber e and out of the said chamber through a pipe f, which is arranged to communicate with the pipes $a\,a^2$ or the pipes b, as will be hereinafter described. The said pipe f is shown as provided with a pressure-gage f^2, so that the amount of pressure may be determined.

In order to render the apparatus as sensitive as possible, a diaphragm of novel construction is employed to receive the pressure from the chamber e, the said diaphragm consisting of two cup-shaped or concavo-convex pieces e^2, of flexible material, clamped upon the rod d^3 in such a way that their convex surfaces are in contact with each other at the middle, as indicated in Fig. 6, the outer portions of said pieces being clamped, as shown in Fig. 7, to the walls of the chamber e, said chamber being shown as made in two parts e^3 and e^4, the latter forming a cap or cover screw-threaded upon the former, and the edges of the diaphragm members e^2 being clamped between the said parts e^3 and e^4. With this construction the rod d^3 can move readily in either direction, the two diaphragm members practically balancing each other, so that there is no resistance due to stretching, as would be the case if an ordinary flexible diaphragm were employed.

The switch member c^2, which is shown as pivoted at c^3, is connected through intermediate devices, which will be hereinafter described, with an elbow-lever g, pivoted at g^2, and connected, as by a rod g^3, with the lever d, the movement of said elbow-lever thus being transmitted to the switch member c^2 in order to open and close the switch, the switch being opened in response to the upward movement of the lever d and closed in response to the downward movement thereof, such movements taking place in response to variations in pressure, as described.

In order to provide for a complete and rapid movement of the switch to prevent arcing at the contacts, the said switch is provided with a lost-motion device of novel construction and arrangement, the said device being herein shown as comprising an intermediate member h, which is arranged to be acted upon directly by the elbow-lever g, the said member finally operating upon the switch member automatically and independently of said elbow-lever. As herein shown, the said member h comprises a weighted lever pivoted at h^2 below its center of gravity and adapted to be engaged by a slide g^4, connected with the elbow-lever g, said lever being shown as extending through a slot g^5 in said slide, the movement of said slide g^4 being sufficient only to push the lever h such a distance that the center of gravity thereof will cross the point of support, the weight then causing the lever to travel by force of gravity in the same direction. The slot g^5 is of sufficient length to permit the independent movement of the lever, and such independent movement produces the operation of the switch member c^2, the said switch member being connected with a slide c^4, which is adapted to be engaged by the lever h, being shown as provided with a slot c^5, through which extends the said lever h. The operation may be best understood by reference to Fig. 3, in which the switch is shown as open. Referring to said figure and assuming that the pressure becomes lowered sufficiently to permit the lever d to drop back to its normal position, it will be seen that a movement of the slide g^4 to the right will be produced, pushing the lever h far enough to cause the weighted end thereof to pass beyond the pivot h^2, so that the said weight will fall to the right, engaging the edge of the slot c^5 and producing a rapid movement of the switch member c^2 into contact with the switch member c. Conversely, when the lever d is lifted the lever h will be moved in the opposite direction and will promptly open the switch.

The slots c^5 and g^5 are herein shown as simple expedients for providing the slides c^4 and g^4 with engaging portions to coöperate with the lever h, it being obvious that any other suitable means for providing said slides with properly-positioned engaging portions may be utilized without departing from the invention.

To adjust the device for varying pressures, so that the proper normal pressure may be maintained for any given system, the lever d is provided with a weight d^4, which may be shifted toward and from the fulcrum of the lever, which lever is shown as provided with notches d^5 to keep the weight from slipping accidentally. As indicated in Fig. 2, the weight may consist of a case or receptacle filled with some heavy material, such as shot, part of which may be taken out or more added as a further means for controlling the pressure.

To drive the liquid standing in the pipes back into the barrels when the apparatus is not to be used for some time, the apparatus is provided with a supplemental pressure-

pipe i or "back-pressure" pipe, as it may conveniently be termed, said pipe being provided with branches i^2, communicating, respectively, with the several pipes b, the said branches i^2 having check-valves i^3 to prevent the liquid from backing up into the pipe i when the apparatus is in use. It is obvious, therefore, that if the pump is placed in communication with the pipe i and caused to operate until pressure in excess of that in the barrels is produced the liquid will be driven from the pipes b back into the barrel, as desired.

In accordance with the invention the apparatus is provided with what may be termed a "pressure-shifting" device k, which consists of a three-way cock or valve so arranged that a quarter-turn will shift the connection with the pipe f from the pipe a to the pipe i. The construction of this part of the apparatus is best shown in Fig. 5, in which the valve is shown in horizontal section, the valve-shell having passages k^2, k^3, and k^4, communicating, respectively, with the pipes f, a, and i. The valve-plug is provided with a passage having branches 2, 3, and 4, the said valve-plug being shown as in such position that the source of compressed air is in communication with the pipe a. A quarter-turn of the plug in the direction of the arrow will bring the branch 4 in line with the passage k^2 and the branch 3 in line with the passage k^4, thus placing the pipe f in communication with the back-pressure pipe i.

In order to obtain an increase of pressure when the valve is turned to the position above described, the valve-actuator, which is shown as a handle k^5 at the end of a rod k^6, which is connected with the valve-plug, is arranged to operate the pressure-controlling device, herein shown as a supplemental weight d^6, hung on the lever d and arranged to be moved along the said lever toward and from the fulcrum thereof. The movement of said weight is produced in reponse to the operation of the actuator k^5, so as to accompany the operation of the pressure-shifting device, and as a convenient and practical means for connecting these parts the rod k^6 is shown as provided with a wheel k^7, having connected therewith a belt k^8, so that turning the said wheel produces a longitudinal movement of the said belt. One end of said belt is connected with the slide d^7, from which the weight d^6 is hung, and is carried over pulleys k^9 k^{10}, while the opposite end of the belt, which is also connected with said slide, is carried over pulleys k^{12} and k^{13}, the pulley k^{12} being mounted on the lever d for the purpose of changing the direction of movement of the belt. As best shown in Fig. 4, therefore, a quarter-turn of the actuator k^5 in the direction to connect the pipe f with the pipe i will move the weight d^6 away from the fulcrum of the lever d, so that increased pressure is required to lift the said lever, the result being that the pump will continue to operate until such increased pressure is reached, whereby the liquid will be forced back out of the pipes b into the barrels before the pump stops. The several pipes a^2 are provided with check-valves a^3 near the barrels to prevent the liquid from backing up into said pipes. The motor will stop when the pressure is sufficient to force the liquid back into the barrels, and the three-way valve may then be restored to its normal position. The pressure will become equalized in the barrels, so that when any of the faucets b^2 is opened the liquid will flow and will continue to flow until the pressure becomes reduced far enough to operate the motor-controlling device to start the pump, the compressed air then being in communication with the main-pressure pipe a.

It is not intended to limit the invention to the specific construction and arrangement of the apparatus shown and described, since modifications may be made without departing from the invention.

I claim—

1. In a pumping system for beer or other liquids; a plurality of barrels or receptacles; a source of pneumatic pressure; a main-pressure pipe leading from said source and communicating with all the receptacles in use; an outlet-pipe leading from each receptacle; a supplemental-pressure pipe leading from said source and communicating with each of said outlet-pipes; and a check-valve to control each of such points of communication whereby the contents of the several receptacles are prevented from entering the supplemental-pressure pipe, substantially as described.

2. In a pumping system for beer or other liquids, the combination with a source of pneumatic pressure; of a main-pressure pipe leading to the barrels; means for automatically controlling the amount of pressure; an outlet-pipe leading from the barrels; means for connecting the source of pressure with said outlet-pipe and at the same time disconnecting said source of pressure from the main-pressure pipe; and means for changing the pressure-controlling device whereby different pressures are obtained in response to the change of connection, as set forth.

3. In a pumping system for beer or other liquids, the combination with a source of pneumatic pressure; of a main-pressure pipe leading to the barrels; outlet-pipes, one for each barrel; a back-pressure pipe communicating with the several outlet-pipes and provided with a check-valve for each; a three-way cock for connecting the source of pressure with said main-pressure and back-pressure pipes respectively; and means for causing the source of pressure to produce an increased pressure in response to that movement of the three-way cock which changes the connection from the main-pressure pipe to the back-pressure pipe, as set forth.

4. In a pumping system for beer or other liquids, the combination with an air-pump;

of a motor operating said pump; means for starting and stopping the said pump; a lever provided with a movable weight adapted by its movement to operate said starting and stopping means; a main-pressure pipe leading to the barrels; a back-pressure pipe communicating with the beer-outlet pipes from the barrels; a three-way valve for connecting the source of pressure with said normal-pressure pipe and back-pressure pipe respectively; an actuator for said three-way valve; and means for moving the movable weight along the lever in response to the movement of said actuator, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN H. NOLAN.

Witnesses:

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JAS. J. MALONEY.