No. 859,816 PATENTED JULY 9, 1907.

R. S. KELSCH.

LIQUID FLOW ALARM.

APPLICATION FILED MAY 3, 1907.

2 SHEETS—SHEET 1.

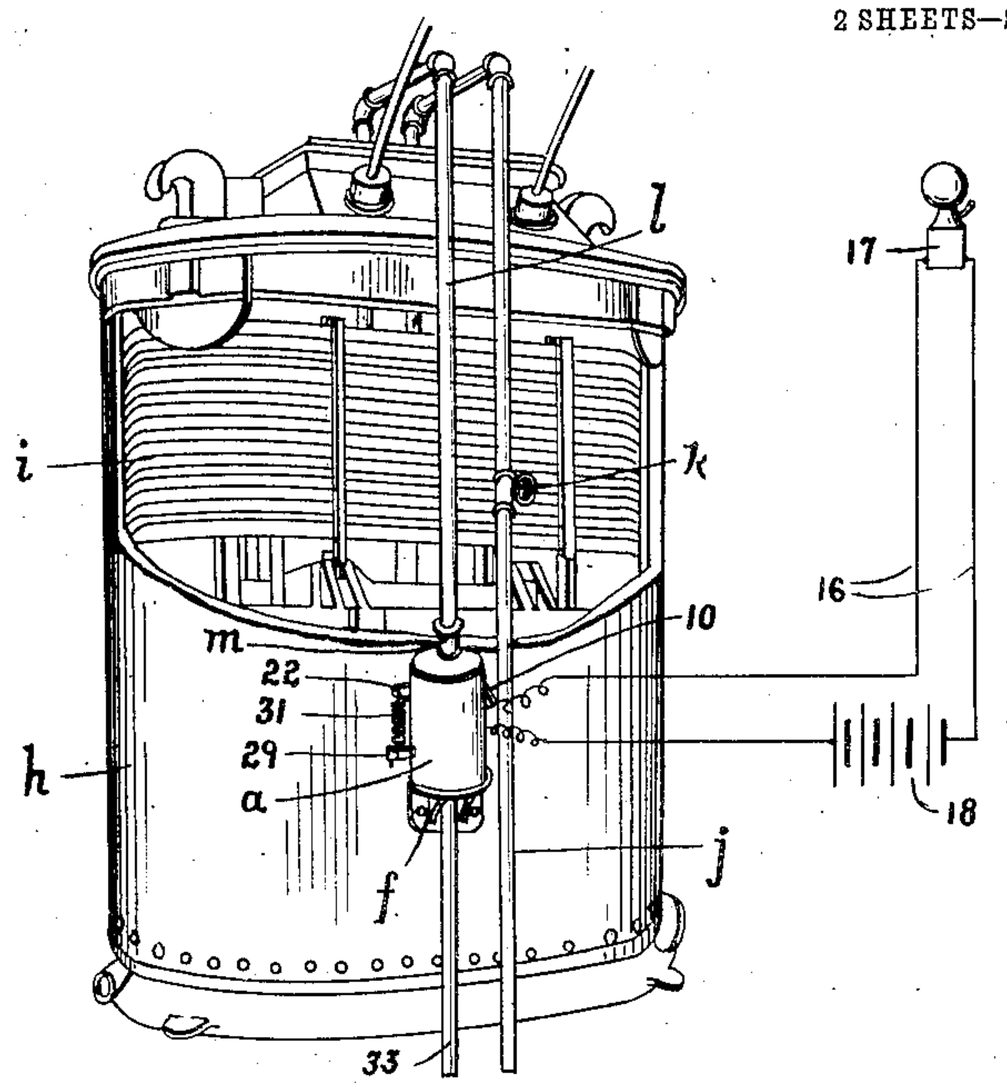

Fig. 1.

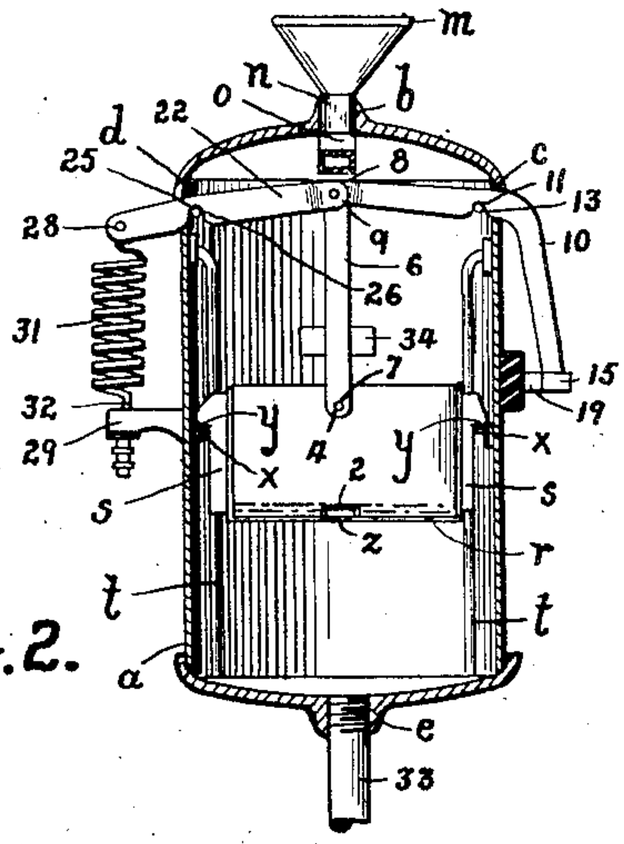

Fig. 2.

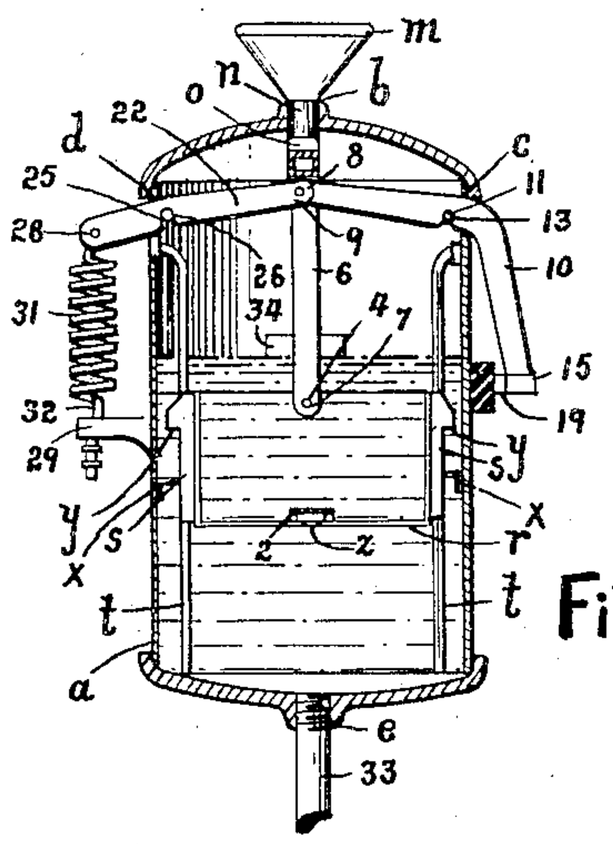

Fig. 3.

Witnesses.

Lloyd Blackmore

D. W Colton.

Inventor.

R. S. Kelsch

by E. J. Fitzsimmons atty.

No. 859,816. PATENTED JULY 9, 1907.

R. S. KELSCH.

LIQUID FLOW ALARM.

APPLICATION FILED MAY 3, 1907.

2 SHEETS—SHEET 2.

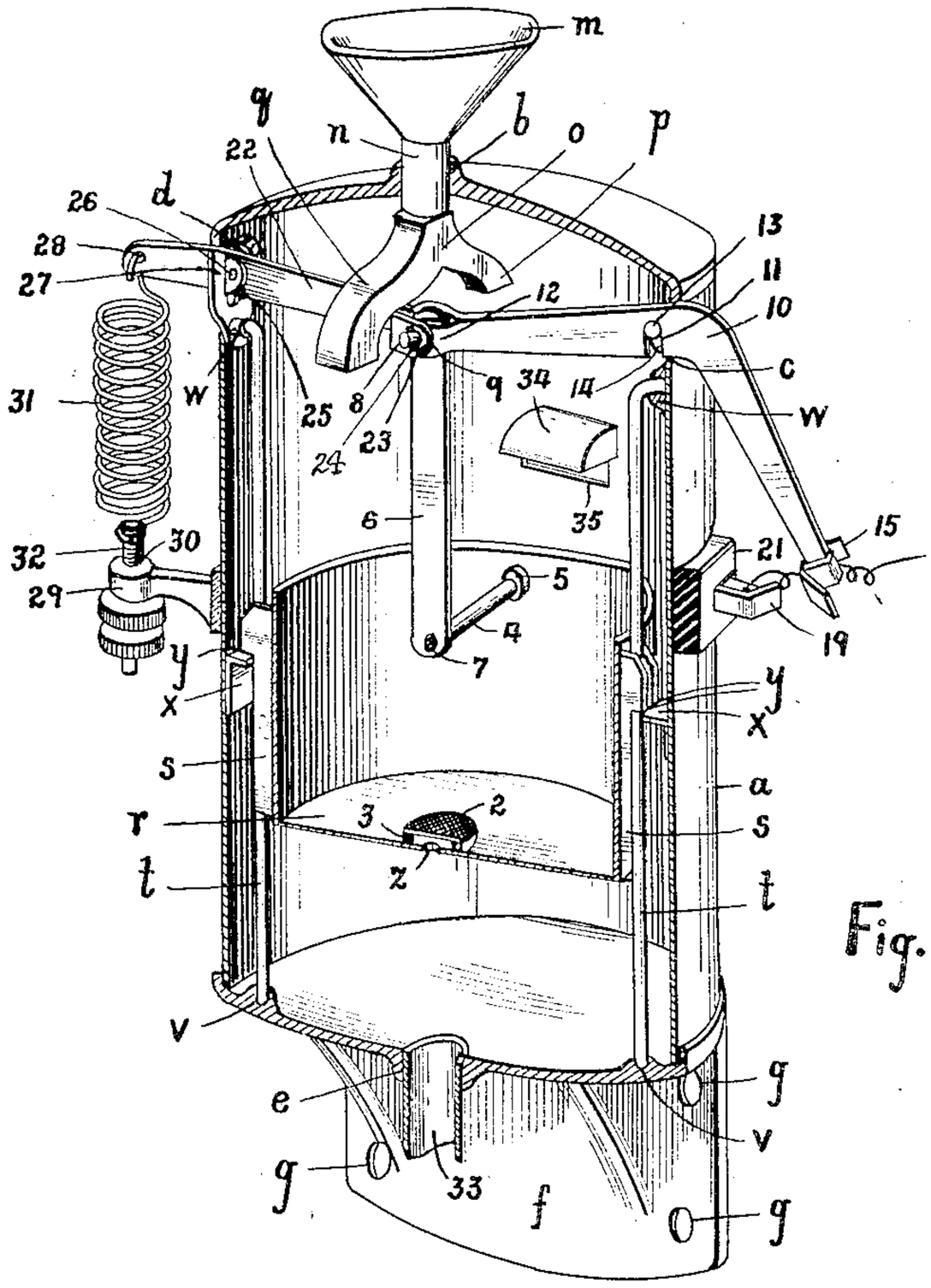

Fig. 4.

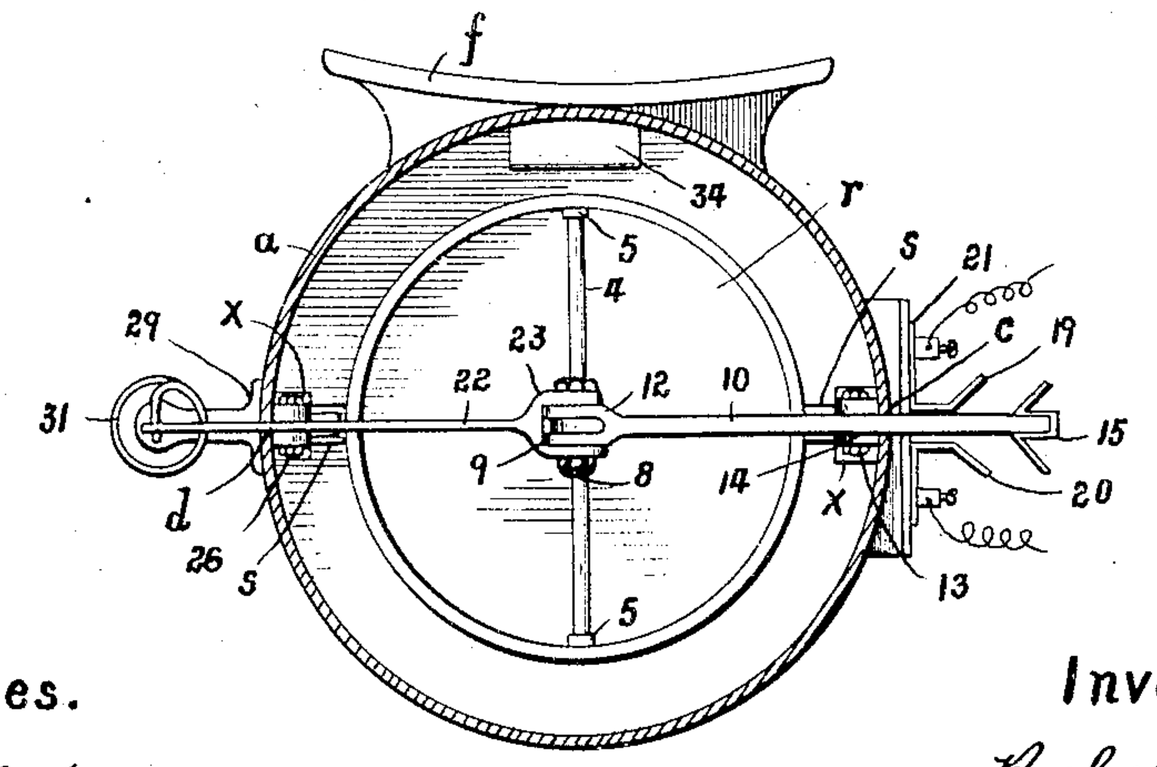

Fig. 5.

Witnesses.

Lloyd Blackmore

D W Colton

Inventor.

R. S. Kelsch

by E. J. Fitzsimmons Atty.

UNITED STATES PATENT OFFICE.

RAYMOND STERLING KELSCH, OF MONTREAL, QUEBEC, CANADA.

LIQUID-FLOW ALARM.

No. 859,816. Specification of Letters Patent. Patented July 9, 1907.

Application filed May 3, 1907. Serial No. 371,690.

To all whom it may concern:

Be it known that I, RAYMOND STERLING KELSCH, a citizen of the United States of America, residing at 305 New York Life Building, in the city and district of Montreal, in the Province of Quebec, in the Dominion of Canada, have invented certain new and useful Improvements in Liquid-Flow Alarms, of which the following is a specification.

My invention relates to improvements in liquid flow alarms, as described in the present specification and illustrated by the accompanying drawings that form part of the same.

The invention consists essentially in devising an arrangement of parts whereby a cup rising and falling within a casing will sound a suitable alarm as explained in detail hereinafter.

The object of the invention is to devise a simple and effective means of notifying an attendant of any interruption in the flow of tempering fluid.

In the drawings, Figure 1 is a perspective view of the invention attached to a transformer. Fig. 2 is an enlarged sectional elevation of the invention showing the cup in its upper position. Fig. 3 is an enlarged sectional elevation of the invention showing the cup in its upper position and submerged. Fig. 4 is an enlarged sectional perspective view of the invention showing the cup in its lower position. Fig. 5 is a cross sectional view immediately beneath the cover of the casing showing a plan of the interior arrangement.

Like letters and numerals of reference indicate corresponding parts in each figure.

Referring to the drawings, *a* is the casing here shown as cylindrical in shape and having the central opening *b* through the cover, the slots *c* and *d* immediately under said cover, and the central opening *e* through the bottom thereof.

f is a bracket secured to or forming part with the casing *a* having the bolt holes *g* through which suitable bolts are inserted to secure the casing to the machine in which the cooling fluid is used.

The applicability of this invention to many different machines will be fully understood from the description herein, but in this specification the transformer *h* having the spiral arrangement of water coils *i* arranged therein will be used to demonstrate more clearly the operation and utility of the apparatus.

j is a feed pipe having the turn cock *k* and leading from a suitable water supply to the water coils *i* and *l* is a pipe leading from the water coils *i* and terminating in an open end immediately over the central opening *b* in the top of the casing *a*.

m is a funnel having its neck *n* firmly secured to the casing *a* surrounding the opening *b*, said neck emptying into the pipe *o* formed in two branches *p* and *q*.

r is a cup rising and falling inside the casing *a* and having ears *s* in pairs extending from the outer face of the wall, said pairs being arranged diametrically opposite one to the other.

t are vertical rods forming guides for the cup through said pairs of ears *s* and fixedly secured at the lower ends in the bosses *v* and at the upper ends elbowed and fixedly secured in the bosses *w*.

x are brackets fixedly secured to the inner wall of the casing *a* and diametrically opposite one to the other, forming stops to limit said cup's downward movement on the rods *t*, the shoulders *y* formed on the ears *s* resting on the said brackets *x*.

z is an orifice in the bottom of the cup *r* and 2 is a screen secured to the ring 3 and attached to the bottom of the cup over the orifice *z*.

4 is a rod extending across the cup towards the upper end thereof and fixedly secured in the bosses 5 attached to the wall of said cup.

6 is a connecting rod having an orifice 7 at the lower end thereof through which the rod 4 is inserted, before being placed in position in the cup, and a suitable orifice at the upper end through which the pin 8 of the toggle-joint 9 is inserted, thus forming the connection between said cup and said toggle-joint.

10 is an elbowed lever having the slot 11 in proximity to the elbow thereof and forming one of the toggle-members to said joint, the toggle-member section having a forked end 12 and pivotally supported in said slot 11 on the pin 13, the said pin being fixedly secured in a bracket 14 attached to the wall of the casing, the said section extending through the slot *c* in the wall of the casing immediately beneath the cover. The other section of said lever 10 extends downwardly from said opening and is preferably arranged at an obtuse angle to the aforesaid section and has at the end thereof the contact 15.

16 is a circuit in which the bell 17 and the battery 18 are included, the leads of said battery being electrically connected to the contacts 19 and 20. The contacts 19 and 20 are mounted on the block 21 formed of suitable non-conducting material and fixedly secured to the outer wall of the casing *a*, and said contacts 19 and 20 flare outwardly to meet the leaves of the contact 15, the latter being suitably insulated from the lever 10 and forming the electrical connection to close the circuit 16, when the lever is sufficiently turned on its pivot to move the downwardly extending section in towards the casing and bring said contact 15 against the contacts 19 and 20.

The other toggle-member is formed by the lever 22, which has a forked end 23 embracing the forked end 12, both of said forked ends having suitable orifices through which the said pin 8 is inserted and held by a cotter pin 24.

The lever 22 has a slot 25 intermediate of its length

and is supported by the pin 26 in said slot, the pin 26 being fixedly secured in the bracket 27 on the inner wall of the casing, adjacent to the slot *d*. A portion of said lever 22 projects through the wall of the casing *a* and at the end thereof has an orifice 28.

29 is a bracket secured to the outer wall of the casing beneath the outwardly extending end of the lever 22 and in vertical alinement therewith. 30 is a threaded orifice through said bracket.

31 is a spiral spring caught at its upper end in the orifice 28 and to the thumb screw 32 at its lower end. The spiral spring 31 thus arranged exerts a constant downward pull on the lever 22 which has the effect of raising the toggle-joint 9 and consequently the cup *r*.

33 is the waste pipe leading from the opening *c* in the bottom of the casing *a* and 34 is a hood protecting the over-flow opening 35 in the side of the casing *a*, below said slots *d* and *c*.

Having described the various parts in detail, I shall now more fully explain the operation thereof.

The invention is shown and described herein as applied to a water cooled transformer, the coils encircling the inner wall of the transformer in proximity to the upper end thereof and by the passage of cold water therethrough cooling the oil within the transformer casing. The water is turned on by means of a suitable turn-cock in the feed pipe and flows through the coils within said transformer casing and on into the pipe emptying over the funnel of the casing *a*. The volume of water flowing through the pipes is regulated to drip through the funnel into the cup *r*. The pipe empties into the funnel and the water flows through the branches of the pipe leading from the neck of the funnel thus avoiding the toggle-joint. The constant drip of this water into the cup *r* fills the said cup, as the inflow into the cup is faster than the outflow through the orifice in the bottom of the cup, consequently the said cup will be retained in its lower position on the brackets by the weight of the water so long as the flow of water through the coils in the transformer is perfectly even and no choke occurs in the waste pipe 33.

In the event of the flow through the coils in the transformer becoming less than the required volume of water, the position of the cup is affected within the casing *a*, as the weight of water within the cup becomes also less through the exhaust of water therefrom, as explained. Just so soon as the cup loses the weight of water, the spiral spring comes into play and pulls on the outer end of the lever, thus raising the toggle-joint and consequently changing the position of the elbowed lever and bringing the contact at the lower end of the elbow lever against the contacts 19 and 20 connecting the leads from the battery. In this manner the bell circuit is closed and the bell rings, which notifies the attendant of the lack of proper cooling fluid, passing through the transformer.

In the event of the waste pipe 33 becoming choked up, the water will rise within the casing *a* and submerge the cup bringing the spring into action and raising the toggle-joint, thus altering the position of the elbowed lever and closing the bell circuit and ringing the bell, and as long as the said cup is submerged, the spring will, of course, continue to keep the toggle-joint in its upward position as the weight of the cup sunk in the water is not sufficient to counteract the pull of the spring, in fact it is practically the same, as if the cup were empty.

The over-flow opening 26 is provided in the casing *a* to prevent the water from rising up to the openings through which the levers extend and thus avoid the wetting of the contacts.

The lowering of the cup through the proper flow of the water in and out of the casing *a* will effect the opening of the circuit and stop the alarm.

The advantages of this invention are that a safe and sure alarm is provided to call attention to any interruption in the proper flow of water, either while passing through the waste pipe after it leaves the transformer or in the choking of the water going from the machine, in other words, the attendant is warned of the lack of volume of cooling fluid coming towards the machine and of any stoppage in the cooling fluid going from the machine.

The construction of this device may be changed from time to time to apply to existing conditions, as it is not necessarily confined to any one use, such as an alarm signal for water cooled transformers.

What I claim as my invention is:

1. In automatic liquid flow alarms, the combination with a fluid device attached to a machine, of a casing having suitable inlet and exhaust openings, a cup rising and falling within said casing and having an exhaust opening in the bottom thereof, brackets secured to the inner wall of said casing and supporting said cup above the bottom of said casing, said cup filling from said inlet opening, means for raising said cup on the release of the weight of said fluid, and means for sounding an alarm on the raising of said cup, as and for the purpose specified.

2. In automatic liquid flow alarms, the combination with a fluid device attached to a machine, of a casing having suitable inlet and exhaust openings, a cup rising and falling within said casing and filling from said inlet opening and having an exhaust opening in the bottom thereof, brackets supporting said cup above the bottom of said casing, an electric bell circuit, means for raising said cup on the release of the weight of said fluid, and means for closing said circuit on the raising of said cup, as and for the purpose specified.

3. In automatic liquid flow alarms the combination with a fluid device attached to a machine, of a casing having suitable inlet and exhaust openings, vertical guide rods secured to the inner walls of said casing, a cup rising and falling within said casing means for removing the fluid from said cup ears in pairs secured to said cup and projecting outwardly therefrom and embracing said guide rods and shoulders formed intermediate of their length; brackets secured to the inner wall of said casing and supporting said cup under said shoulders, means for raising said cup on the release of the weight of said fluid, and means for sounding an alarm on the raising of said cup, as and for the purpose specified.

4. In automatic liquid flow alarms, the combination with a fluid device attached to a machine, of a casing having inlet and exhaust openings, a cup rising and falling within said casing having an exhaust opening in the bottom thereof, a toggle-joint having its toggle members extending through the side of the casing at the upper end thereof and pivoted, a connecting rod joining said cup and toggle-joint, means for raising said toggle-joint and consequently said cup, and means connected to the end of one of said toggle members for sounding an alarm; as and for the purpose specified.

5. In automatic liquid flow alarms, the combination with a fluid device attached to a machine, of a casing having suitable inlet and exhaust openings, a cup rising and falling within said casing means for removing the fluid from said cup, a plurality of levers extending through said casing at the upper end thereof and pivoted and forming in the middle of said casing a toggle-joint, a connecting

rod joining said cup and toggle-joint, means for raising said cup on the release of the weight of fluid therefrom connected to the extending end of one of said levers, and means for sounding an alarm connected to the extending end of another of said levers, as and for the purpose specified.

6. In automatic liquid flow alarms, the combination with a fluid device attached to a machine, of a casing having suitable inlet and exhaust openings, a cup having an exhaust opening in the bottom thereof rising and falling within said casing and suitably suspended therein, a plurality of levers extending through the wall of said casing at the upper end thereof and pivoted and forming in the center of said casing a toggle-joint, a connecting rod joining said cup and said toggle-joint, means for raising said cup on the release of the weight of the fluid therefrom connected to the end of one of said levers, an electric bell circuit, and means connected to the end of another of said levers for closing said circuit, as and for the purpose specified.

7. In automatic liquid flow alarms, the combination with a fluid device attached to a machine, of a casing having an inlet through the top thereof and an outlet through the bottom thereof, a cup rising and falling within said casing and having an exhaust opening in the bottom thereof and suspended within said casing, a plurality of levers extending through the wall of said casing at the upper end thereof and pivoted and forming in the center of said casing a toggle-joint, a connecting rod joining the said cup and said toggle-joint, an electric bell circuit, means for raising said cup on the release of the weight of said fluid and connected to the end of one of said levers, contacts secured to the wall of said machine and to the leads from said bell circuit, and a contact secured to the end of another of said levers and connecting the aforesaid contacts, as and for the purpose specified.

8. In automatic liquid flow alarms the combination with a fluid device attached to a machine, of a casing having an inlet opening through the top thereof and an outlet opening through the bottom thereof, a funnel having the neck thereof secured to said casing surrounding said inlet opening, a cup rising and falling within said casing having an exhaust opening in the bottom thereof and suspended above the bottom of said casing, an elbowed lever extending through the wall of said casing and having an inner forked end and pivoted, a straight lever having an inner forked end pivotally joined to the aforesaid inner forked end, and extending through the wall of the casing and pivoted, a connecting rod joining the pivoted joint on said levers to said cup, means for raising said cup on the release of the weight of said fluid secured to the outer end of said straight lever, an electric bell circuit, contacts supported from the wall of said casing and insulated therefrom and connected to the leads from said circuit, and a contact at the outer end of said elbow lever, as and for the purpose specified.

9. In automatic liquid flow alarms the combination with a fluid device attached to a machine, of a casing having a central inlet opening through the top thereof and an exhaust opening through the bottom thereof, a funnel having the neck thereof inserted through said inlet opening and secured to the casing therearound and having a branch pipe leading therefrom, a cup suspended above the bottom of said casing and rising and falling therewith in and having a screen exhaust opening through the bottom thereof, an elbowed lever and a straight lever forming a toggle-joint in the center of said casing and pivoted at the wall of said casing diametrically opposite one to the other, said levers extending through said casing and therebeyond, a bracket secured to the wall of said casing beneath said outwardly extending portion of the straight lever and having a threaded orifice, a spiral spring caught on to the end of said straight lever and to said thumb screw and exerting a continuous pull on said lever, an electric bell circuit, contacts connected with the leads from said circuit supported on the wall of said casing, and a contact secured to the outer and lower end of said elbowed lever, as and for the purpose specified.

10. In automatic liquid flow alarms the combination with a fluid device attached to a machine, of a casing having a removable cover and a central opening therethrough, slots in the edge of the wall thereof, an outlet opening in the bottom thereof and an overflow opening in the side thereof below the aforesaid slots, a funnel having its neck inserted through said central opening, a cup rising and falling within said casing and suspended above the bottom thereof and having a screened exhaust opening in its bottom, a toggle-joint having toggle members extending through the slots in said casing, said members having slots intermediate of their length and turning on pivot pins adjacent to said slots and an elbowed section from one of said toggle members extending downwardly, an electric bell circuit, contacts supported on the wall of said casing and connected with the leads from said circuit, a contact secured to said downwardly extending portion of the toggle member, a bracket secured to the wall of said casing beneath the upwardly extending portion of the other toggle member having a threaded orifice therethrough, a thumb screw inserted in said threaded orifice, and a spiral spring joining said thumb screw and the outwardly extending portion of the toggle member and exerting a pull thereon, as and for the purpose specified.

Signed at the city and district of Montreal, in the Province of Quebec, in the Dominion of Canada, this 25th day of April, 1907.

RAYMOND STERLING KELSCH.

Witnesses:
GRACE H. TRESIDDER,
D. W. COTTON.