No Model.)

4 Sheets—Sheet 1.

A. A. LEHMANN.

PNEUMATIC FIRE ALARM.

No. 486,675. Patented Nov. 22, 1892.

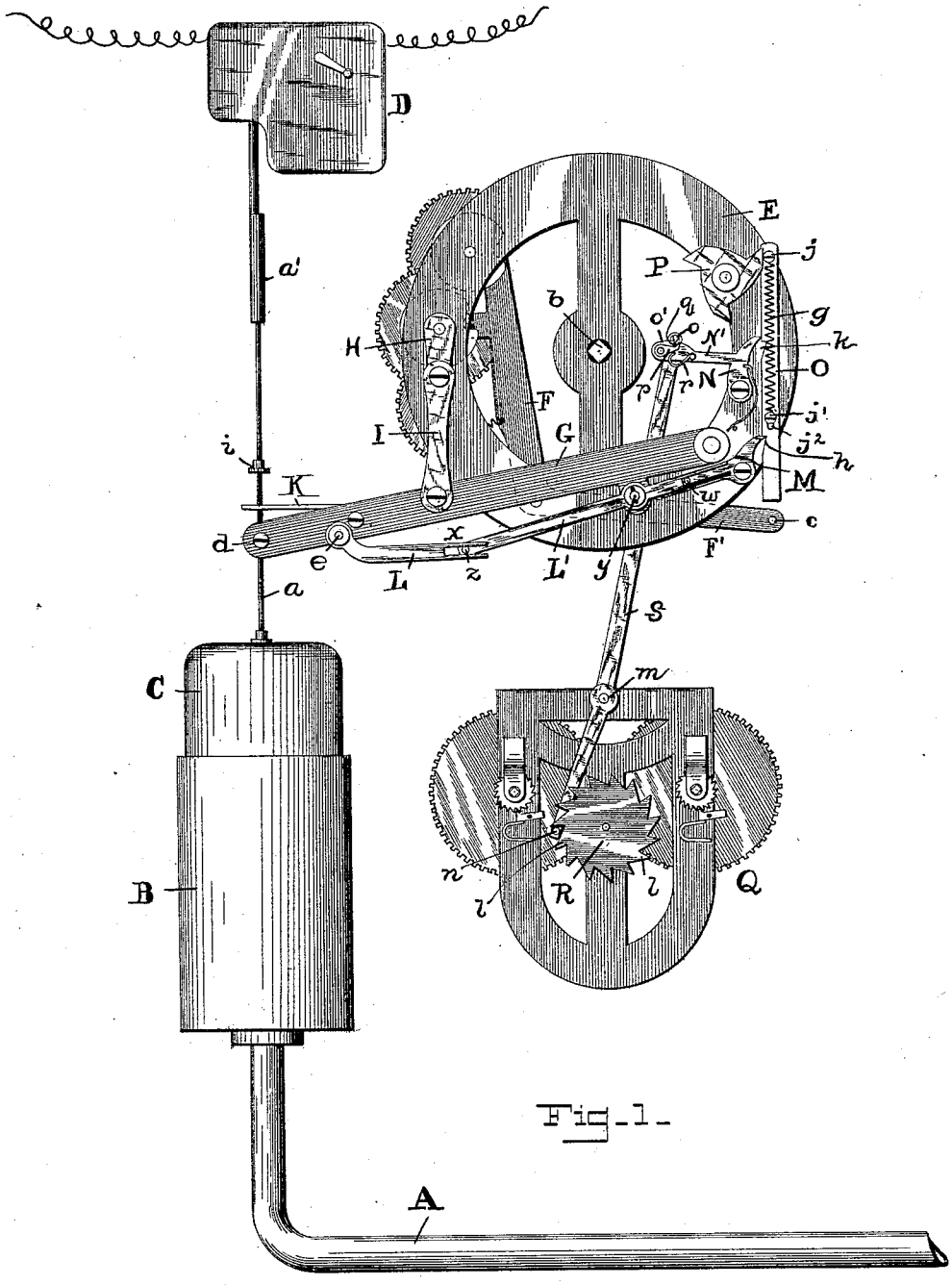

Fig. 1.

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Inventor:
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(No Model.) 4 Sheets—Sheet 2.

A. A. LEHMANN.

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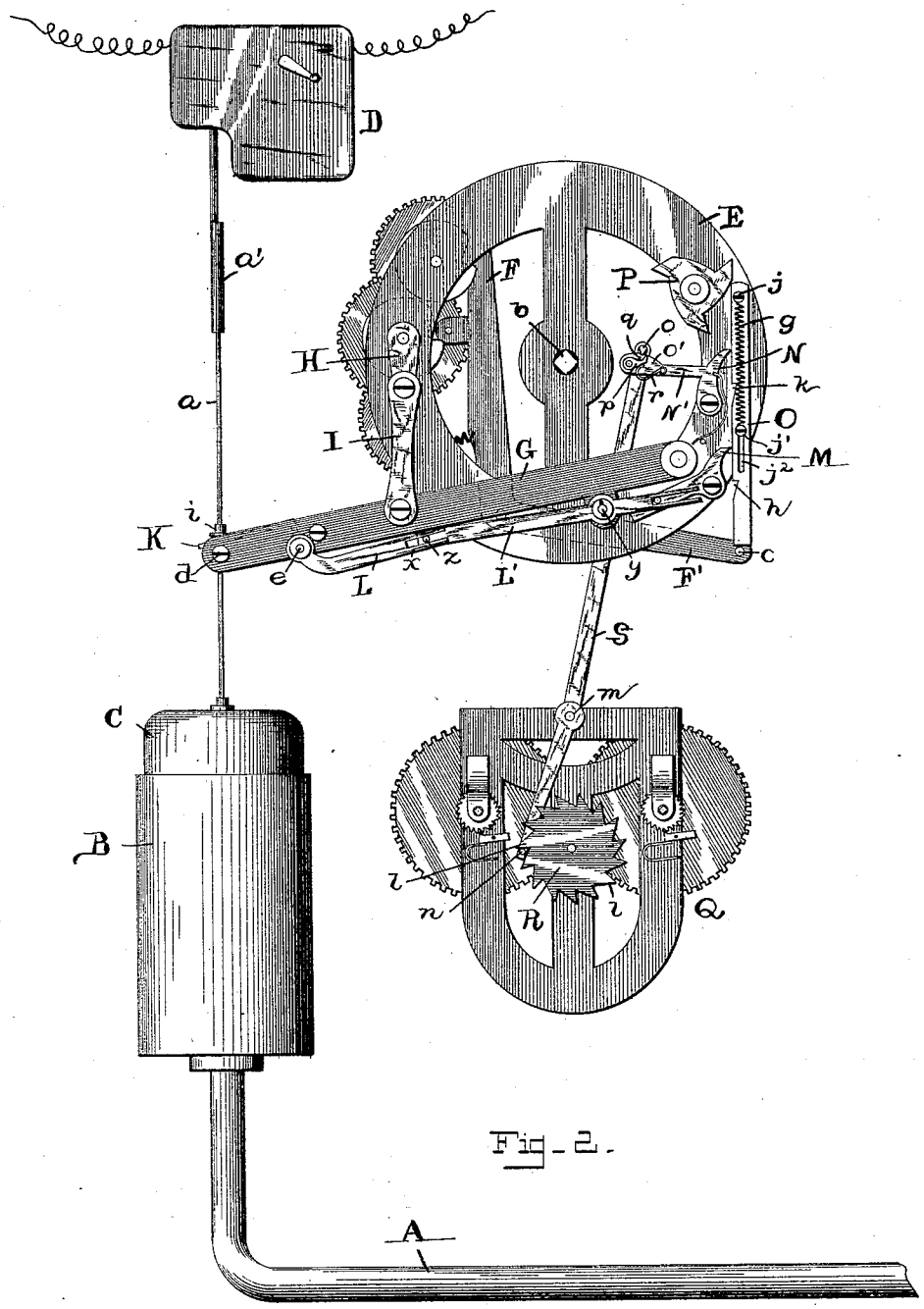

Fig-2.

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PNEUMATIC FIRE ALARM.

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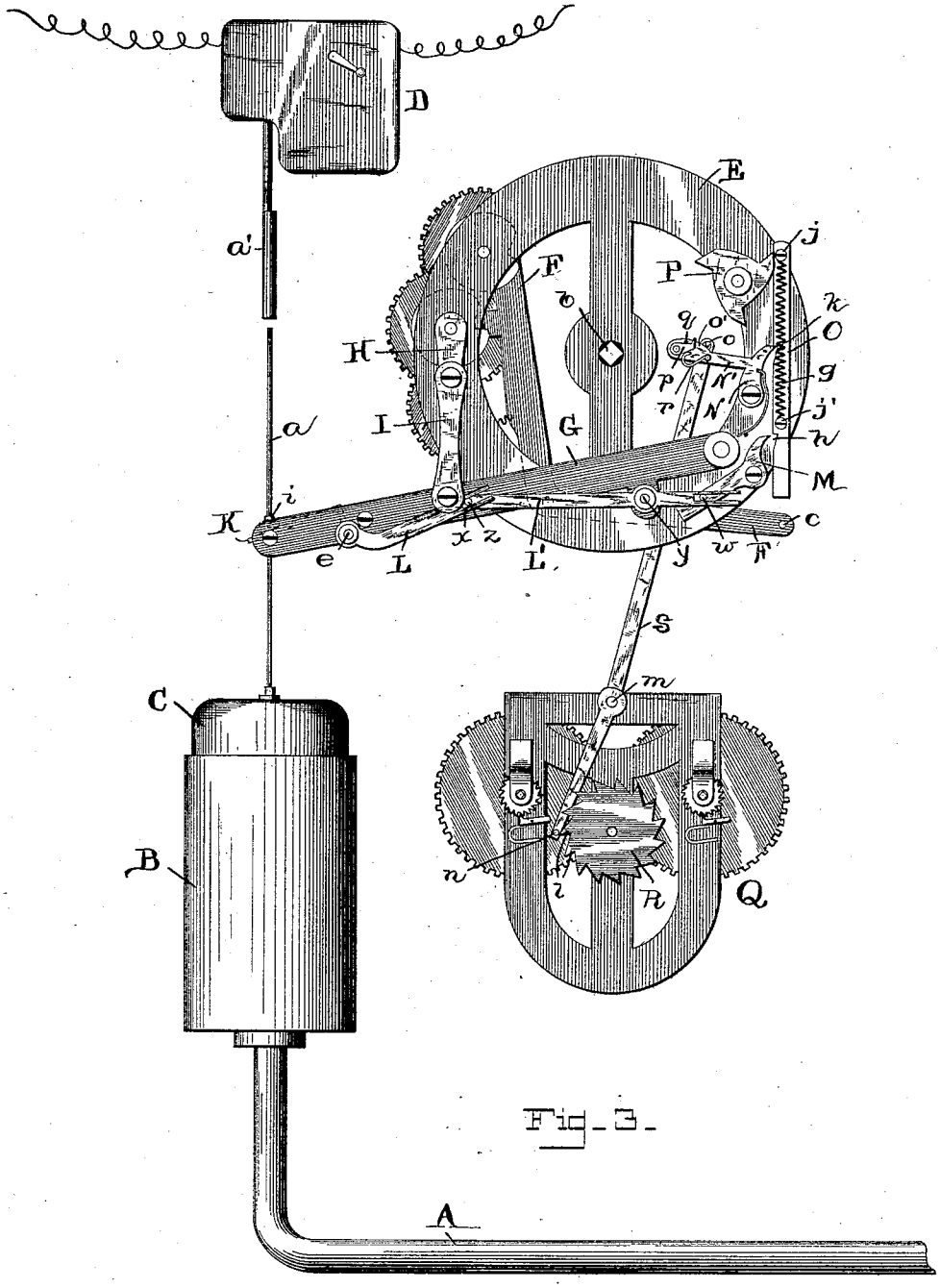

Fig. 3.

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(No Model.) 4 Sheets—Sheet 4.

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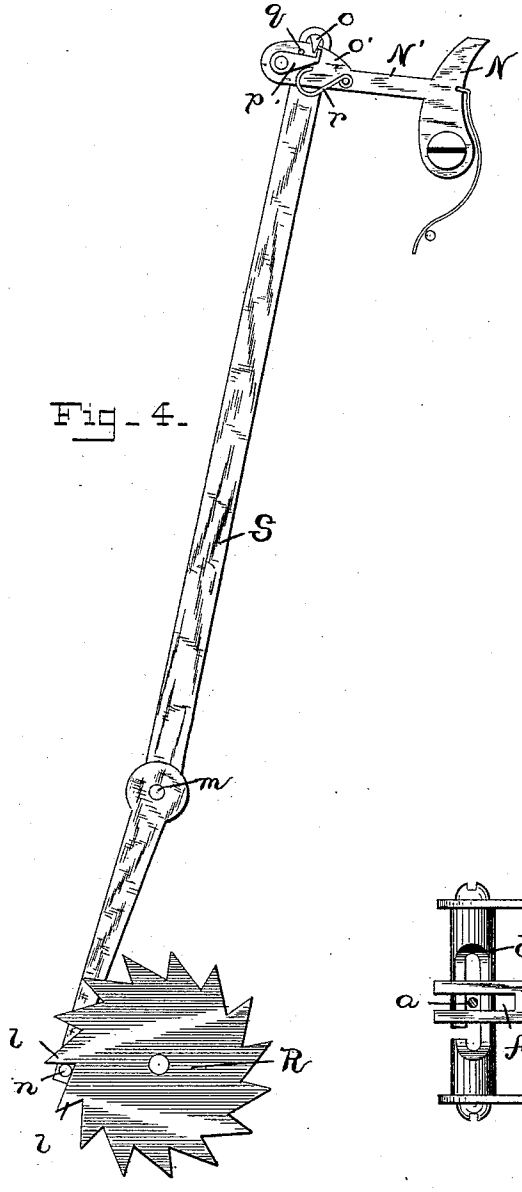

Fig. 4.

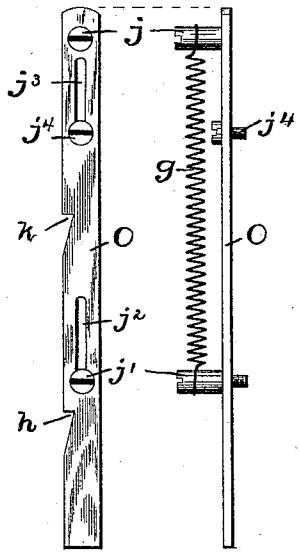

Fig. 5.

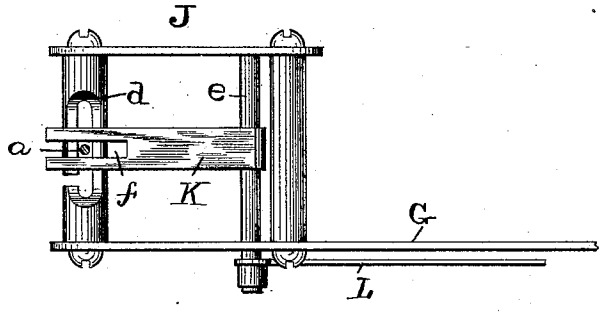

Fig. 6.

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UNITED STATES PATENT OFFICE.

ANTHONY A. LEHMANN, OF BALTIMORE, MARYLAND.

PNEUMATIC FIRE-ALARM.

SPECIFICATION forming part of Letters Patent No. 486,675, dated November 22, 1892.

Application filed February 1, 1892. Serial No. 419,865. (No model.)

To all whom it may concern:

Be it known that I, ANTHONY A. LEHMANN, a citizen of the United States, residing at Baltimore city, in the State of Maryland, have invented certain new and useful Improvements in Pneumatic Fire-Alarm-Transmitting Mechanisms, of which the following is a specification.

This invention relates to an improvement in pneumatic fire-alarm-transmitting apparatus.

The object of the present invention is to provide mechanism whereby the lowering of an air-cup (which is inverted in a liquid) caused by a leak in a pipe which communicates with said air-cup will automatically trip a spring motor or movement for lifting the inverted cup to recharge it with air, at the same time making provision for the sending in of an alarm when the leakage is caused by the opening of a pipe in case of fire.

With this end in view the invention may be said to consist in the novel features of construction and combinations of parts hereinafter described and claimed.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 shows the mechanism set to be tripped by the lowering of the inverted air-cup. Fig. 2 shows the lifting movement tripped and about to raise the inverted cup out of the liquid. Fig. 3 shows the position of the parts immediately after the cup is lowered again, and also illustrates the action in case of fire. This view also shows the clock-movement about to trip the upper latch which is engaging the slide. Fig. 4 is a detail of the mechanism connecting the lifting-movement with a clock-movement, showing the position of the parts immediately after the latch has been tripped; Fig. 5, details of a slide for tripping the lifting-movement, one showing a front view with the actuating-spring removed and the other a side or edge view with the said spring attached. Both views show the screws by which the slide is held in place. Fig. 6 is a detail top view of the outer end of the lifting-lever.

The letter A designates an air-pipe which runs through the building in which the apparatus is located; B, a cylinder into which said pipe opens and which contains a suitable liquid; C, an air-cup inverted over said stand-pipe and suspended in said liquid; *a*, an upward-extending stem on said air-cup; D, a call-box having a tubular pallet-tail *a'* in which the stem *a* engages loosely to hold said call-box in check; E, the frame of a spring motor or movement (not shown) which is normally held in check and operates when released to raise the inverted air-cup for the purpose of recharging it with air. A crank H on a shaft of said motor or movement connects by a link I with a lever G, which engages the stem of the inverted cup in the manner hereinafter described.

The letter F designates a hinged arm for releasing the lifting movement. In the present instance said arm is bent and pivoted at the bend, one arm F' extending laterally and having an outward projecting pin *c* at the end.

The outer end of the lever G comprises a frame J, having a slotted cross-bar *d*, through which the stem *a* passes. A plate K is fastened on a cross-shaft *e*, journaled in said frame, and the stem *a* passes through a slot *f* in said plate, extending at right angles to the slot in the cross-bar *d*. It will be seen the stem *a*, passing through these two slots, is properly held and guided. The shaft *e* projects through the lever G, and an arm L is fastened on the projecting part and has a slotted or bifurcated outer end *x*. A lever L' is pivoted at a point *y*, near its middle, to the lifting-lever G and has a pin *z* at one end, which engages the slotted end of the arm L and is itself similarly slotted or bifurcated at the opposite end to receive a pin *w* on an arm of a latch or trigger M, pivoted to the frame E. A vertical slide O is arranged on the frame E and is actuated downward by a spring *g*, fastened at one end to a post *j* on the upper part of the slide and at its opposite end to a post *j'* on the frame E and extending through a slot j^2 in the slide. The latter has another guide-slot j^3 at the upper end engaged by a screw j^4 on the frame E. The slide has also a notch *h* in one edge, which is engaged by the latch M. The connections L L' are so arranged that their weight between the pivotal point *y* and the shaft *e* will hold the catch M against the slide.

Should the inverted air-cup lower by reason

of a leak in the pipe A, a shoulder *i*, provided at a suitable point on the stem *a*, will bear down on the plate K and depress it, which, through the connections L L', releases the latch M from the notch *h*, whereupon the spring *g* pulls down the slide O, which then acts as a hammer and strikes the pin *c* on the arm F', depressing the latter. This releases the lifting-movement by throwing out the arm F, which has been holding it in check, and the cup is raised out of the liquid in the cylinder to take a fresh supply of air and lowered again by the turning of the crank H, which is revolved once by the spring-movement, and then said movement is stopped by the arm F. While the lifting operation takes place the shoulder *i* rests on the plate K and said plate on the cross-bar *d*. The cup in lowering trips the latch N before its stem *a* can leave the pallet-tail *a'* of the call-box, as illustrated in Fig. 2, and hence an alarm of fire will not be sent in by reason of a leak.

To provide for sending in an alarm in case of fire, I arrange a second latch N, located above the latch M and spring-actuated against the slide, as shown. A notch *k* is made in the slide for this latch N to engage, and this notch is so located that when said latch engages it the lower latch M is relieved of the slide. The lifting-movement on raising the cup, as previously explained, also puts in revolution a triple cam P, an arm of which as it revolves engages under the post *j* on the slide O and lifts the latter against the action of the spring *g*, whereupon the latch N is thrown into the notch *k* by its spring and supports the said slide, leaving the lower notch M free, as in Fig. 3. Now if the lowering of the cup was brought about by the opening of a pipe caused by fire, when there would be a large opening, the air-cup will immediately lower again and the shoulder *i* will push the plate K all the way down without setting off the lifting-movement, which action draws the stem *a* out of the pallet-tail *a'*, releasing the call-box D, which sends in the alarm, as illustrated in Fig. 3. To again set the lifting-movement, so that it will be ready to act when the air-cup again lowers by reason of the leak, I provide the following mechanism: An ordinary clock-movement Q is provided, which has a disk R with a number of teeth *l*. A lever S is pivoted to the frame of the clock-movement at *m*, and its lower end has a pin *n*, which is held by a spring (not shown) against the periphery of the disk R. The upper end of said lever S has a pin *o*, which extends over a rearward-projecting arm N' of the latch N. Said arm has a raised part *o'* at its outer end and a catch *p*, pivoted to one side and projecting above said raised part *o'*. This catch is held up against a pin *q* by a spring *r*. The disk R is so timed that one of its teeth *l* will pass under the pin *n*, say, every five minutes. Immediately after the movement has lifted the air-cup the latch N takes the slide O and holds it, as previously explained; but as soon as the disk R turns sufficiently to allow the pin *n* to drop behind one of its teeth *l* the pin *o* at the upper end of the lever flies back against the projecting end of the catch *p*, thereby throwing the latch N out of the notch *k* and allowing the slide O to drop and be taken and held by the latch M ready to be released by the lowering of the stem *a*. The downward movement of the latch-arm N' on its pivot brings the pin *o* on the outer side of the catch *p*, (see Figs. 1, 2, and 4,) so that it will not obstruct the latch N in returning immediately to engagement with the slide. As the disk R continues to revolve the pin *n* is pushed outward by riding over the inclined edge of the following tooth, as illustrated in Fig. 3. This moves the pin *o* at the upper end back over the catch *p*, which it pushes out of its path against the spring *r*, so that it may again fly back against the catch and release the latch N when the pin *n* at the lower end drops behind the tooth of the time-disk.

It will be seen that with my mechanism, as above described, the lifting-movement will always be tripped if the pipe is opened, and if this opening is simply a leak no alarm will be sent in, but the cup will be raised out of the liquid and resupplied with air, whereas if the opening is caused by a fire and is consequently a large opening an alarm will be sent in.

It is obvious that the construction and arrangement of parts here shown is susceptible of numerous changes, and hence I am not confined to such construction and arrangement, but consider myself entitled to all variations which come within the scope of the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In pneumatic fire-alarm-transmitting mechanism, the combination of an air-cup inverted in a suitable liquid, an air-conduit communicating with said air-cup, a call-box governed by said air-cup, a movement for lifting said cup out of the liquid to recharge it with air, and means for automatically tripping said movement by the lowering of the air-cup.

2. In pneumatic fire-alarm-transmitting mechanism, the combination of an air-cup inverted in a suitable liquid, an air-conduit communicating with said air-cup, a call-box governed by said air-cup, a movement for lifting said cup out of the liquid to recharge it with air, a hammer to trip the said movement, a trigger checking said hammer, and means whereby the lowering of the air-cup operates said trigger to release the movement.

3. In pneumatic fire-alarm transmitting mechanism, the combination of an air-cup inverted in a suitable liquid, an air-conduit communicating with said air-cup, a call-box governed by said air-cup, a movement for lifting said cup out of the liquid to recharge it with air, a hammer to trip the said movement, a trigger checking said hammer, a pivoted

plate adapted to be depressed as the cup lowers, and suitable connection between said plate and the trigger, whereby the depression of the former causes the release of the latter.

4. In pneumatic fire-alarm-transmitting mechanism, the combination of an air-cup inverted in a suitable liquid and having a suitable stem, an air-conduit communicating with said air-cup, a call-box governed by said air-cup, a movement for operating a lever which raises the air-cup out of the liquid to recharge it with air, a hammer to trip the said movement, a trigger checking said hammer, a plate pivoted to the lever of the lifting movement and adapted to be engaged by a shoulder on the stem of the air-cup, whereby it is depressed, and suitable connections between said plate and the releasing-trigger, whereby the depression of the former causes the release of the said trigger.

5. In pneumatic fire-alarm-transmitting mechanism, the combination of an air-cup inverted in a suitable liquid and having a suitable stem, an air-conduit communicating with said air-cup, a call-box governed by said air-cup, a movement for operating a lever which raises the air-cup out of the liquid to recharge it with air, said lever comprising a frame with a slotted cross-bar through which the stem of the air-cup passes, a hammer to trip the said movement, a trigger checking the said hammer, a plate on a shaft journaled in the frame of the lifting-lever, said plate slotted to receive the stem of the air-cup, which stem has a shoulder above the plate, and suitable connections between the said plate and the trigger, whereby the latter is released by the depression of the plate.

6. In pneumatic fire-alarm-transmitting mechanism, the combination of an air-cup inverted in a suitable liquid, an air-conduit communicating with said air-cup, a call-box governed by said air-cup, a movement for lifting said cup out of the liquid to recharge it with air, a spring-actuated slide serving as a hammer to trip the said movement, a pivoted latch to engage and hold said slide, a plate adapted to be depressed as the air-cup lowers, levers connecting said plate, and the pivoted latch to cause the release of the latter, and means actuated by the lifting movement for returning the slide after it has tripped the movement.

7. In pneumatic fire-alarm-transmitting mechanism, the combination of an air-cup inverted in a suitable liquid, an air-conduit communicating with said air-cup, a call-box governed by said air-cup, a movement for lifting said cup out of the liquid to recharge it with air, a spring-actuated slide serving as a hammer to trip the said movement, a pivoted latch to engage and hold said slide, a plate adapted to be depressed as the air-cup lowers, levers connecting said plate and the pivoted latch to cause the release of the latter, and an arm on a shaft in gear with the lifting movement, said arm to engage a post projecting from the slide, and thereby return the slide after it has tripped the movement.

8. In pneumatic fire-alarm-transmitting mechanism, the combination of an air-cup inverted in a suitable liquid, an air-conduit communicating with said air-cup, a call-box governed by said air-cup, a movement for lifting said cup out of the liquid to recharge it with air, means for tripping said movement by the lowering of the air-cup, and time mechanism for holding the movement directly after it has acted to permit an alarm of fire to be transmitted.

9. In pneumatic fire-alarm-transmitting mechanism, the combination of an air-cup inverted in a suitable liquid, an air-conduit communicating with said air-cup, a call-box governed by said air-cup, a movement for lifting said cup out of the liquid to recharge it with air, a spring-actuated slide serving as a hammer to trip the said movement, a pivoted latch to engage and hold said slide and be released by the lowering of the air-cup, means for returning said slide after it has tripped the movement, a second latch to take the slide when it is thus returned and hold it, and time mechanism for throwing out said second latch and allowing the other latch to take the slide.

10. In pneumatic fire-alarm-transmitting mechanism, the combination of an air-cup inverted in a suitable liquid, an air-conduit communicating with said air-cup, a call-box governed by said air-cup, a movement for lifting said cup out of the liquid to recharge it with air, a spring-actuated slide serving as a hammer to trip the said movement, a pivoted latch to engage and hold said slide and be released by the lowering of the air-cup, means for returning said slide after it has tripped the movement, a second latch to take the slide when it is thus returned and hold it, a clock-movement having a toothed time-disk, and a lever engaging said disk at one end and the said second latch at the opposite end, whereby as the disk revolves said lever is actuated to release said latch from the slide.

11. In pneumatic fire-alarm-transmitting mechanism, the combination of an air-cup inverted in a suitable liquid, an air-conduit communicating with said air-cup, a call-box governed by said air-cup, a movement for lifting said cup out of the liquid to recharge it with air, a spring-actuated slide serving as a hammer to trip the said movement, a pivoted latch to engage and hold said slide and be released by the lowering of the air-cup, means for returning said slide after it has tripped the movement, a second latch to take the slide when it is thus returned and hold it, a clock-movement having a toothed time-disk, and a spring-actuated lever having a pin at one end engaging the periphery of the time-disk and a pin at the opposite end extending over an arm of the said second latch and adapted to strike a projection on said arm and release

the latch when the pin at the opposite end of the lever drops behind a tooth of the time-disk, substantially as described.

12. In pneumatic fire-alarm-transmitting mechanism, the combination of an air-cup inverted in a suitable liquid, an air-conduit communicating with said air-cup, a call-box governed by said air-cup, a movement for lifting said cup out of the liquid to recharge it with air, a spring-actuated slide serving as a hammer to trip the said movement, a pivoted latch to engage and hold said slide and be released by the lowering of the air-cup, means for returning said slide after it has tripped the movement, a second latch to take the slide when it is thus returned and hold it, a clock-movement having a toothed time-disk, and a spring-actuated lever having a pin at one end engaging the periphery of the time-disk and a pin at the opposite end extending over an arm of the said second latch and adapted to strike a projection in the form of a spring-held catch pivoted to the said arm, and thereby release the latch when the pin at the opposite end of the lever drops behind a tooth of the time-disk, the said pivoted projection moving out of the path of the lever on the return movement of the latter.

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

ANTHONY A. LEHMANN.

Witnesses:

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