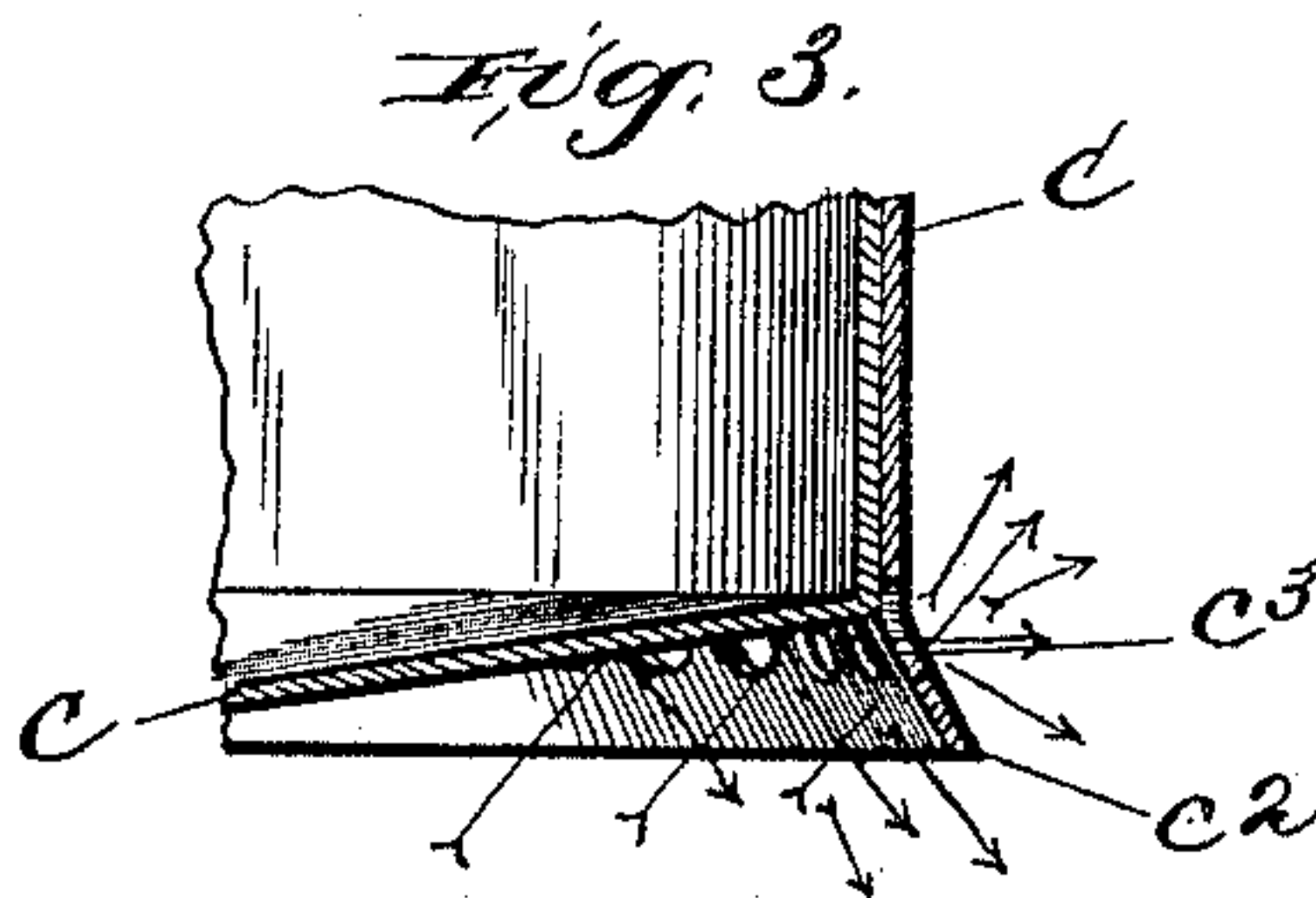
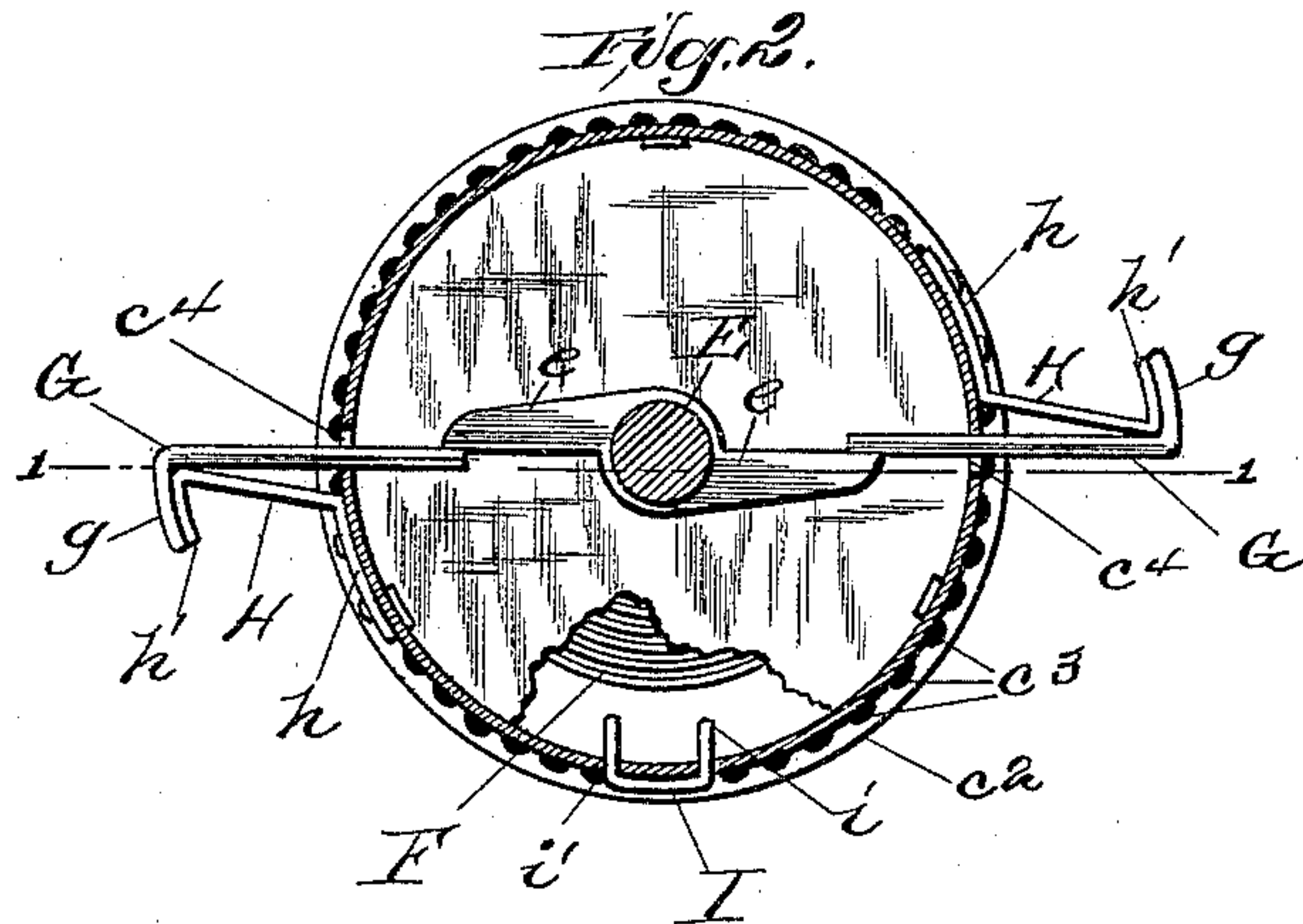
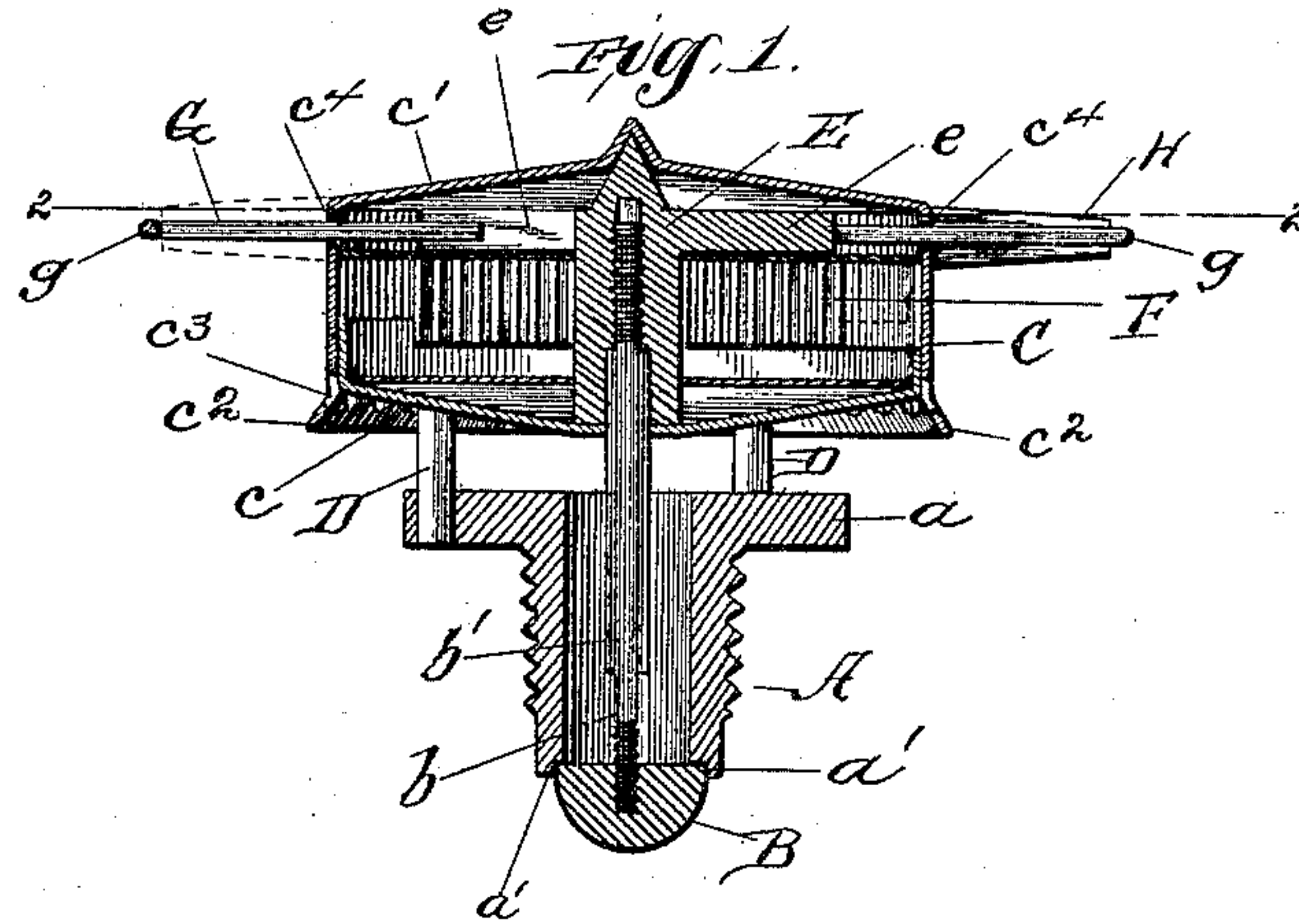


(No Model.)

A. F. NAGLE.
AUTOMATIC SPRINKLER.

No. 432,166.

Patented July 15, 1890.



Witnesses
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UNITED STATES PATENT OFFICE.

AUGUSTUS F. NAGLE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE NAGLE
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AUTOMATIC SPRINKLER.

SPECIFICATION forming part of Letters Patent No. 432,166, dated July 15, 1890.

Application filed April 16, 1890. Serial No. 348,189. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS F. NAGLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Sprinklers, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a vertical section of a sprinkler embodying my invention, taken on the line 1 1 of Fig. 2; Fig. 2, a plan section of the same, taken on the line 2 2 of Fig. 1; and Fig. 3, a detail vertical section at the edge of the deflector on an enlarged scale.

My invention relates to the device which is applied to the extremities of the distributing-pipes in automatic fire-extinguishing apparatus, through which the water is discharged into the room in which the pipes are located and which is generally known as the "sprinkler" or "sprinkler-head."

The invention consists in certain improvements in particular parts of a sprinkler of the same general type shown and described in my Patent No. 419,705, dated January 21, 1890, and my application, Serial No. 325,167.

I will proceed to describe in detail the construction and operation of a sprinkler embodying my present improvements in one practical form, and will then point out more definitely in claims the special improvements which I believe to be new and wish to protect by Letters Patent. Those parts of the sprinkler which are the same as in my prior patent and application mentioned above will be merely referred to briefly in the present case, reference being made to said patent for fuller explanation of such parts.

In the drawings, A represents the nozzle or stem of the sprinkler, which is threaded, so as to be fitted to the extremities of the distributing-pipes, and at its outer end is provided with a wide flange *a*, preferably of polygonal shape, for convenience in turning, and at its inner end with a slight recess to form a seat *a'* for the cap. The cap B is seated on the inner end of the nozzle, and is provided with a stem *b*, which passes outward through the outlet of the sprinkler, so as to provide

for forcing the cap from its seat. The cap, when seated on the stem of the sprinkler, as shown in the drawings, forms a stopper to the outlet; but in order to make the joint perfectly air and water tight it is sealed or cemented by asphaltum, or any other similar material which will completely seal the joint and at the same time is fragile.

The cap is intended to be forced from its seat automatically by any suitable exterior device, which is released and set in operation by the rise in temperature in case of a fire in the room in which the sprinklers are located. For this purpose a circular case C is mounted on the flange *a* by means of short posts D. The bottom *c* of the case is convex, and the top *c'* may also be similarly shaped, though this form is not so important for the top as for the bottom. The case is also provided with a narrow depending flange or curtain *c²*, located at the outer edge of the bottom of the case and flaring outward somewhat, as seen in Figs. 1 and 3 of the drawings. A series of perforations *c³* are made in this flaring flange, extending entirely around it, as shown in the drawings.

In the construction illustrated by the drawings the top and bottom of the case are made separately and so that one will fit within the other, in this instance the bottom being fitted within the top, which has a wide depending flange extending over and inclosing the upwardly-extending flange of the former. The flaring curtain or flange *c²* is also shown as one piece with the top, being simply an extension of the depending portion or side of the latter. These are simply matters of detail in construction, however, which are not essential and may be modified in various ways, the object being simply to provide a circular case with this perforated flange or curtain at its bottom edge, and preferably a convex bottom in connection therewith. In the bottom of the case there is also a central angular opening, through which the cap-stem *b* passes, being provided with an angular section *b'*, corresponding to the shape of the opening, in which it may slide back and forth. A nut E is secured to the outer end of the cap-stem within the case C, as shown and de-

scribed in my above-mentioned patent. This nut is provided with two or more short radial arms e , which extend outward toward the wall of the case, but much shorter than the distance between the center of the nut and the case-wall. Short slots c^4 are cut in the side or wall of the case near the top thereof, which correspond in number and have the same relative arrangement as the arms on the nut. A spring F is arranged in the case and below or inside of the arms on the nut, being fastened at its inner end to the hub of the nut and at its outer end to the inside of the case-wall. It is evident that when the nut is turned in the proper direction the spring will be coiled around it, and that when so coiled, if the nut is released the spring will operate to rotate the latter, thereby causing it to turn on the threaded end of the cap-stem and so drive the latter inward, the stem being held from rotation by its angular bearing in the bottom of the case. The spring must be strong enough to rotate the nut under these circumstances against the pressure on the cap and fastening thereof, so as to force it from its seat and so open the nozzle of the sprinkler.

To provide for securing the nut in position with the spring coiled up and to release it automatically in case of a fire, so as to secure the automatic opening of the sprinklers required in this class of fire-extinguishers, stop-pins G are provided. These pins have a long straight body with a hook or bend g at one end. The straight ends are inserted in the side slots c^4 of the case, and are long enough to reach in and just lap by the ends of the radial arms on the nut, so as to stand in front of the latter and thereby form stops to prevent the movement of the nut when the pins are fastened in place.

On the outside of the case and close to the slots there are small brackets H , having a base h , by which they are secured to the outside of the case and extending outward some little distance, and provided with a curved end or hook h' at their outer extremities corresponding to the hooks on the ends of the stop-pins. When the stop-pins are put in position to stop the nut, as already described, the hooks on their outer ends are brought up over the corresponding hooks on the brackets, as seen in Fig. 2 of the drawings, and are secured in this position by soldering these bent ends together. This adjustment and arrangement of the parts may be made before the two pieces of the case are put together, and then the two portions of the sprinkler are applied by turning the nut on the threaded end of the cap-stem projecting from the bottom and fastening the two parts of the case together. The sprinklers being applied to the ends of the pipes, whenever a fire occurs the solder which fastens the stop-pins to the brackets is melted, the nut is thereby released, and the spring immediately rotates the latter in a direction to drive the cap-stem

inward, and thereby force the cap from its seat, thus opening the nozzle and permitting the escape of water.

It is intended to practically seal the case C hermetically by dipping in shellac, asphaltum, or any like liquid which will subsequently harden and form an impervious covering for the entire case. It is possible that a coiled tempered steel spring of the best manufacture, even if it has been thoroughly tested before application to the sprinkler, as above described, may still have some defect, so that there is a bare chance of its breaking or unfastening after it is put in place within this air-tight chamber, especially with the lapse of long time after such application without the occurrence of a fire or any other accident, which will set the sprinklers in operation and so compel a readjustment. If the spring is broken or become deranged, the sprinkler will of course be inoperative in case of a fire, for the nut will not then be turned to open the nozzle. In order to detect any derangement of this nature, I provide a little tell-tale which will surely indicate the displacement of the spring. This device consists of a small staple I , the ends i of which are inserted in holes i' in the side of the case and opposite the coiled spring. The ends of the staple are made sufficiently long to extend into the interior of the case well up toward the spring-coil, as seen in Fig. 2 of the drawings, so that if the latter is released a very slight uncoiling movement will cause it to strike against the ends of the staple, and thereby throw it out of the case. The staple is lightly fastened in place by asphaltum or other like fragile substance, so that little resistance is offered to the outward movement of the staple. If the sprinklers are provided with this tell-tale device, an inspection at suitable intervals will always determine with certainty whether the sprinklers are in working order, for the absence of the device from any one sprinkler will show at once that the spring is deranged.

The perforated curtain at the bottom edge of the case is quite an important improvement in the practical operation of the sprinkler. The case itself is the distributor, as the water issuing from the nozzle strikes directly against the bottom of the case, and is thereby dissipated and distributed outwardly from the sprinkler. In order to facilitate this operation, the bottom of the case is made convex, as already described; but with this form the tendency of the water leaving the sprinkler will be mostly upward. It is desirable, however, to throw the water-spray in all directions, outward, upward, and downward, and in order to give a downward direction this flaring curtain is provided; but if the curtain were entire obviously all the water would be directed downward. In order to obviate this undesirable result, the curtain is perforated, as described, thereby permitting part of the water to escape through the perforations in an outward and upward direc-

tion, while another part will be thrown downward and outward by the flaring of the curtain, and so a very general distribution of the water will be effected throughout a room suitably provided with these sprinklers. Something the same result may be obtained if the bottom is flat, but not to the same satisfactory degree as if it is convex, as described.

The particular device for fastening the nut in position is intended to make the sprinkler sensitive. It will be noticed that the solder is applied at one point only of the several stops, so that the release is quick and not gradual. Then the arms on the nut stop considerably short of the case, and the pin-brackets on the outside of the case are comparatively long, so that there is very considerable leverage between the soldered ends of the pins and their inner ends in contact with the said arms, which tends to break away the pins quickly. The hooks on the pins and brackets make a convenient form for the application of the necessary amount of solder at this outer point only for the purposes already explained, so that with this combination of devices the sprinkler becomes very sensitive, which is a feature very desirable.

The cap device for closing the nozzle herein shown and described is no part of the present invention. It constitutes the subject-matter of my prior application, already referred to.

The special devices for fastening the nut, which are here shown and claimed, are also shown and described in my said prior application, but are distinctly disclaimed therein. 35

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

1. In automatic sprinklers for fire-extinguishers, the operative nut E, which opens the nozzle, in combination with the nut-actuating spring F, the case C, inclosing said nut and spring, and the tell-tale I, inserted in the side of the case opposite to the spring-coil, substantially as and for the purposes specified. 45

2. In automatic sprinklers for fire-extinguishers, the operative nut E for opening the nozzle, provided with radial arms e, in combination with its actuating-spring F, the inclosing-case C, provided with side slots c⁴, the long straight pins G, provided with hooks g at their outer ends, and the brackets H, projecting out from the case and having the outer ends of the pins secured thereto by solder, substantially as and for the purposes specified. 55

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