

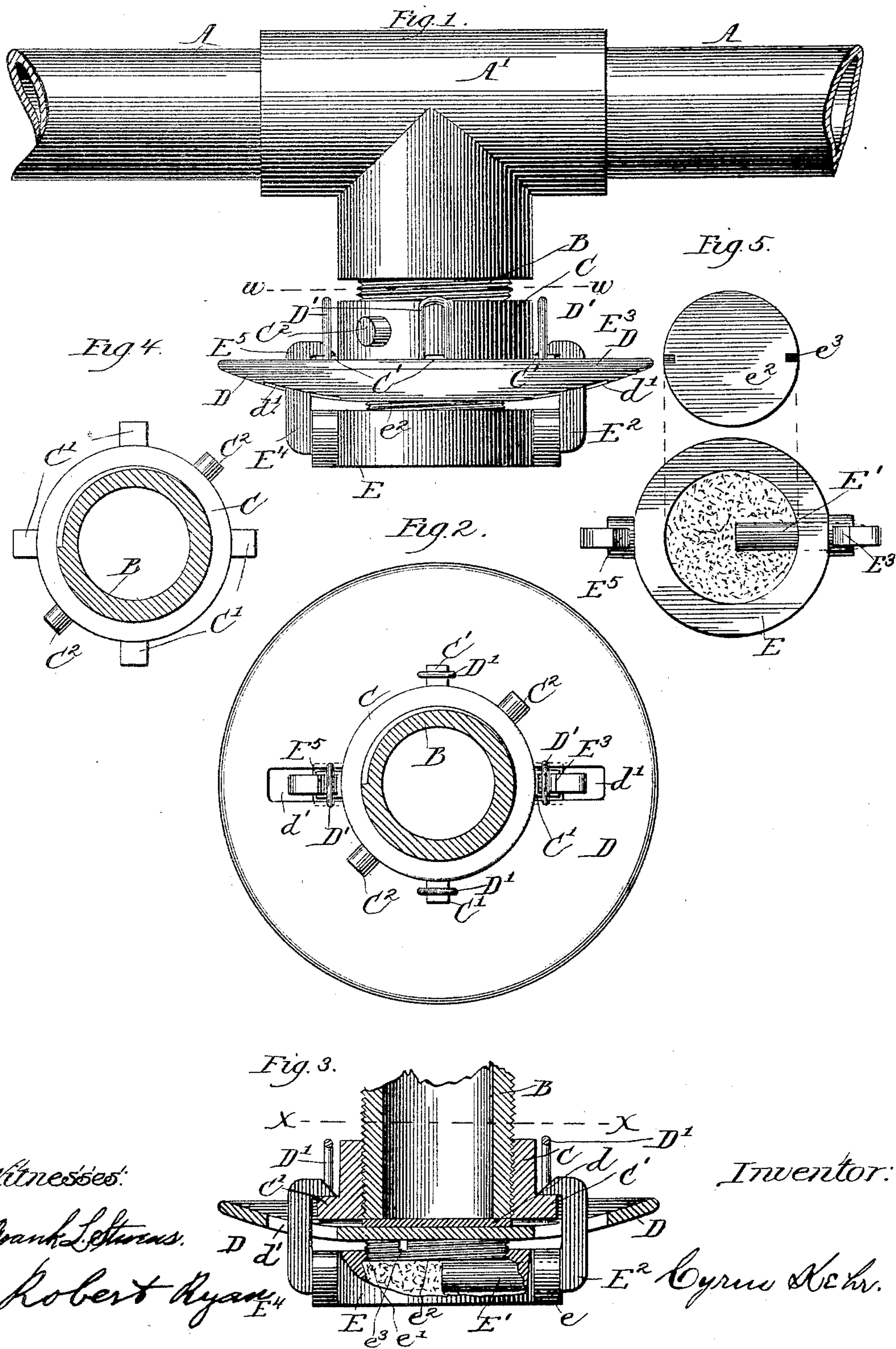
(No Model.)

3 Sheets—Sheet 1.

C. KEHR.  
AUTOMATIC FIRE EXTINGUISHER.

No. 437,846.

Patented Oct. 7, 1890.



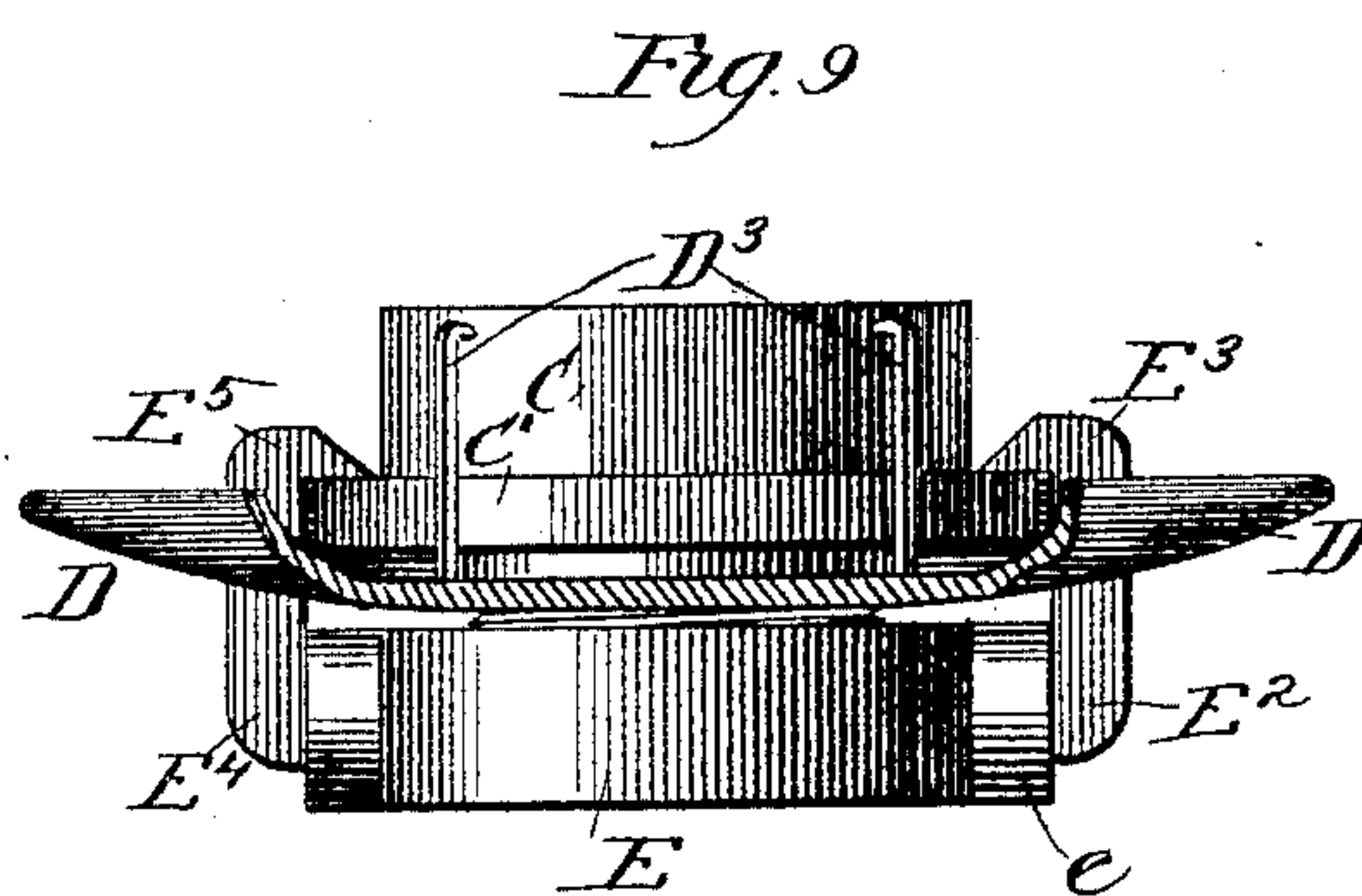
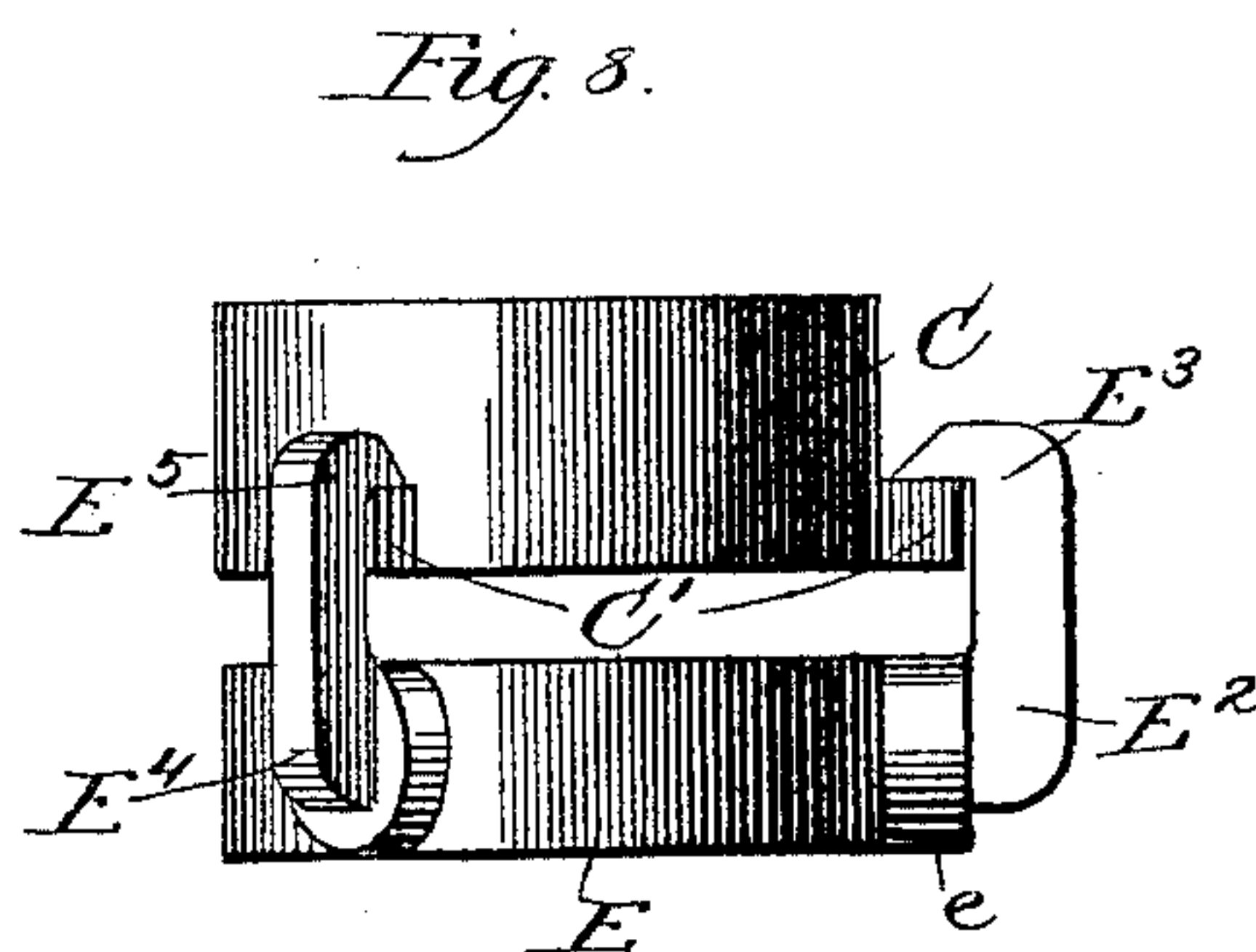
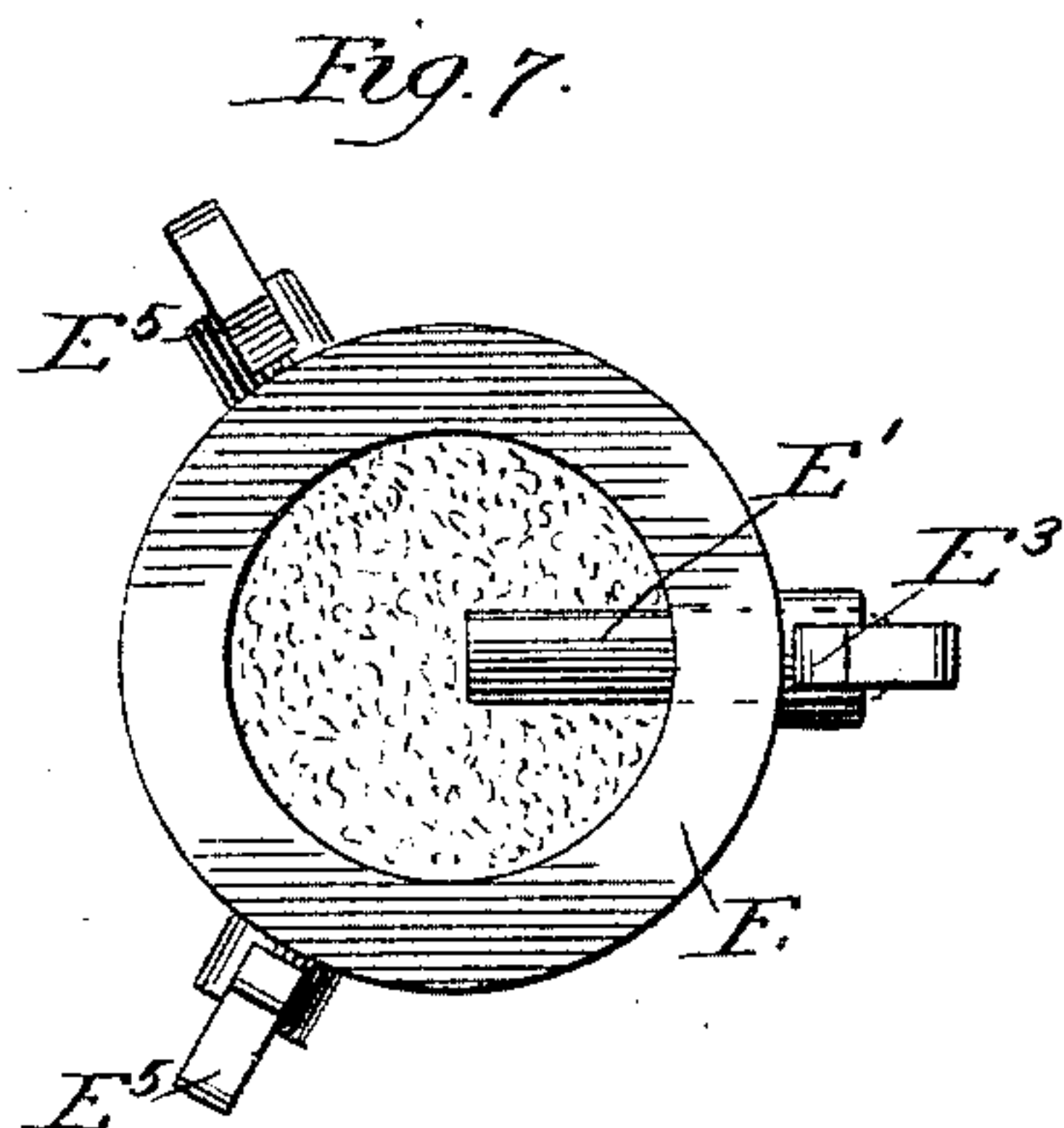
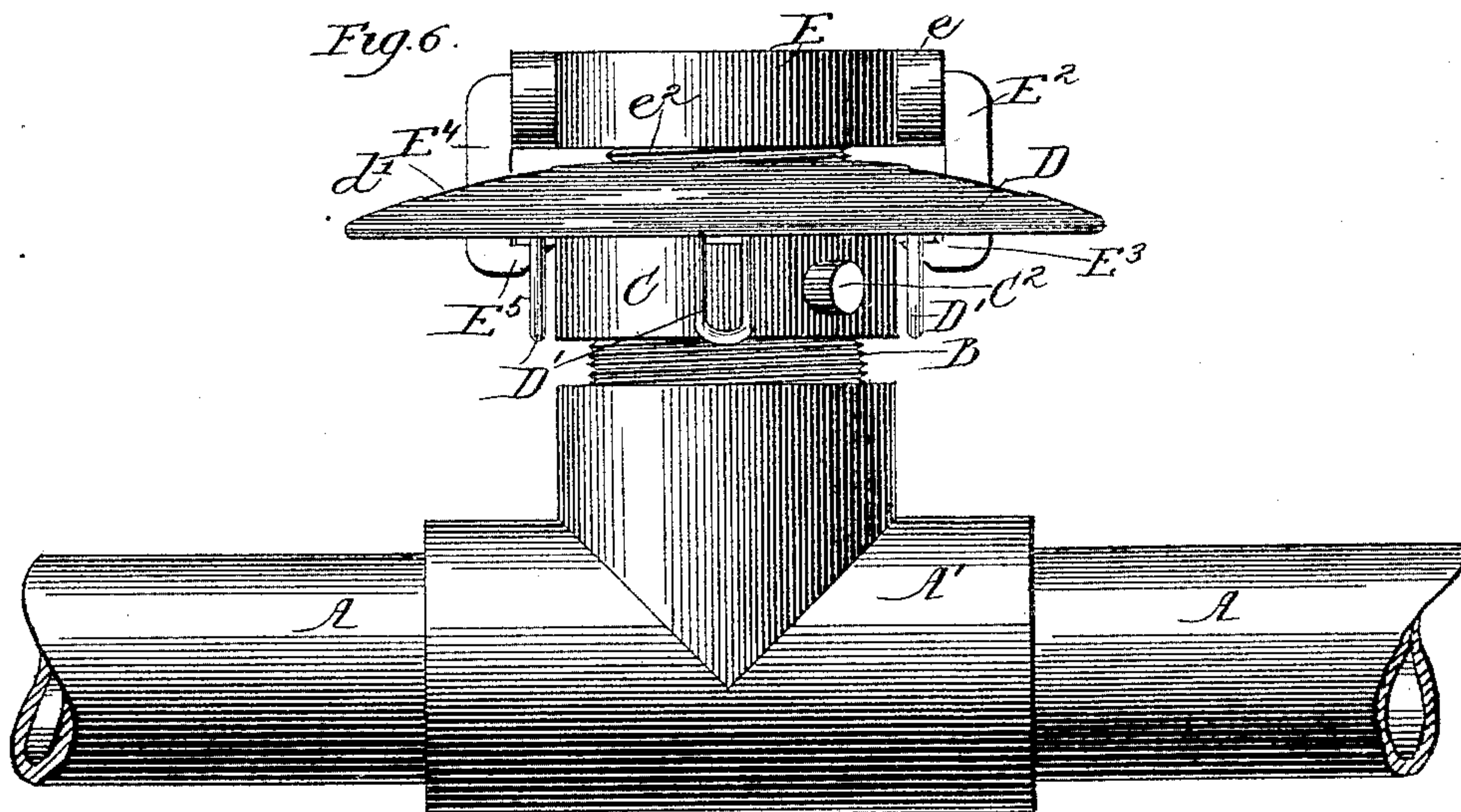
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3 Sheets—Sheet 2.

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Witnesses:

Frank L. Starnes.  
Robert Ryan

Inventor:

Cyrus Kehr.



(No Model.)

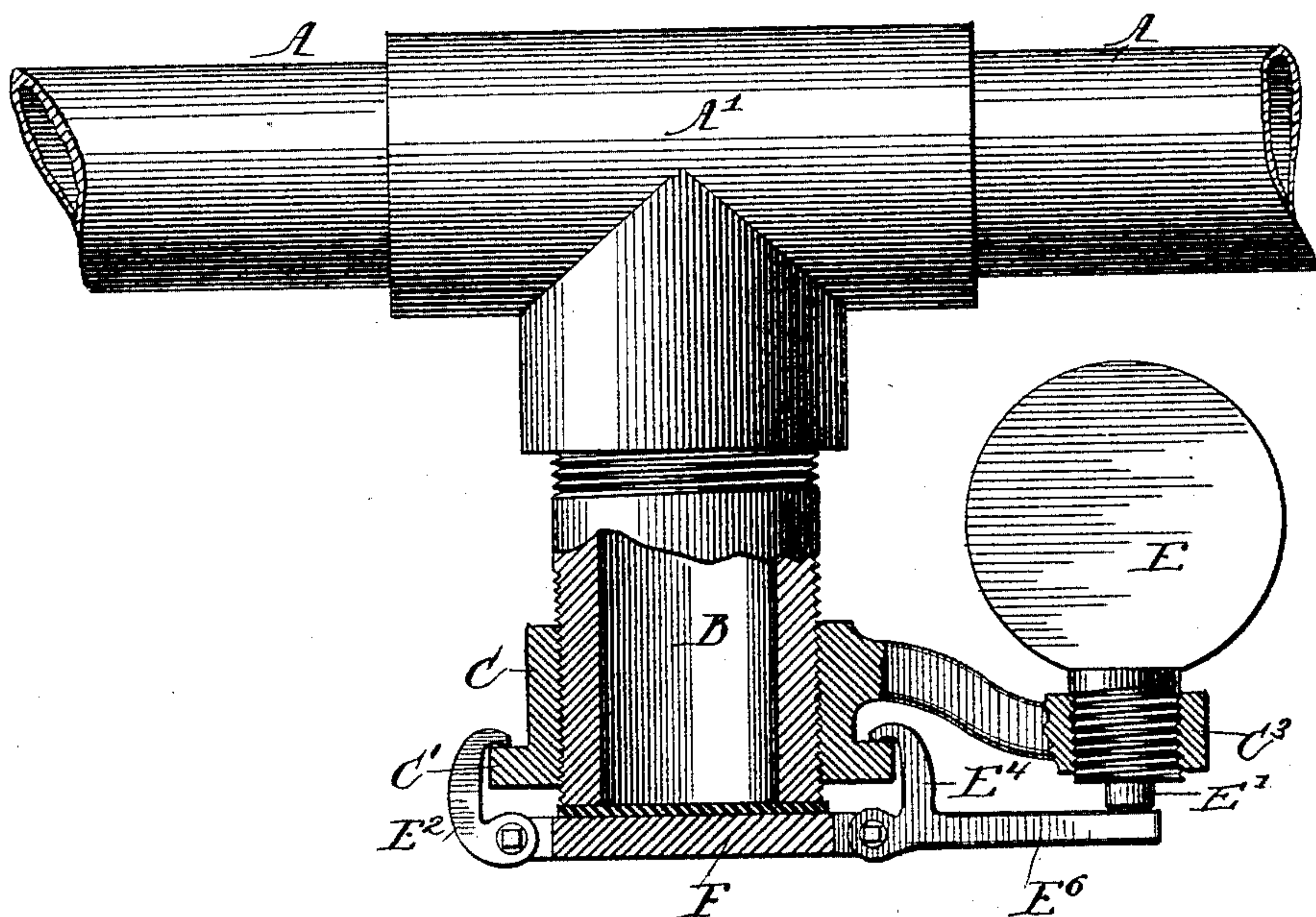
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*Fig. 10.*



Witnesses:

Frank S. Stearns

Robert Ryan

Inventor:

Cyrus Kehr



# UNITED STATES PATENT OFFICE.

CYRUS KEHR, OF LAKESIDE, ILLINOIS.

## AUTOMATIC FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 437,846, dated October 7, 1890.

Application filed August 30, 1889. Serial No. 322,399. (No model.)

*To all whom it may concern:*

Be it known that I, CYRUS KEHR, a citizen of the United States, residing at Lakeside, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Fire-Extinguishers; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to such systems of automatic fire-extinguishing apparatus as embody a series of pipes suitably supplied with water under pressure and led along the ceilings of rooms to be protected, such pipes being provided at intervals with "sprinkler-heads." These sprinkler-heads are some form of device designed to automatically open the pipes for the admission of water to the room, and usually embody some special means for spreading or distributing the water issuing from the pipes. Said sprinkler-heads are applied beneath or above or at the side of the pipes extending horizontally along the ceilings. My improved sprinkler-head is shown in a portion of the drawings as applied beneath said horizontal pipes, and in a portion of the drawings as being applied above said pipes.

The object of this invention is to provide an apparatus having parts which are small in number and simple in form.

Figure 1 is a side view of one of the sprinkler-heads applied beneath the horizontal pipe. Fig. 2 is a plan of the sprinkler-head shown in Fig. 1, a section being taken in line *w w*. Fig. 3 is a vertical sectional view of the head shown in Fig. 1. Fig. 4 is a section taken in line *x x* of Fig. 3, all the parts being removed excepting the sleeve, which is screwed upon the end of the branch pipe. Fig. 5 is a detail view of the expansion device. Fig. 6 is a side view of the sprinkler-head applied above the horizontal pipe. Figs. 7 and 8 show the expansion device engaging the sleeve at three points instead of two. Fig. 9 illustrates a modification. Fig. 10 illustrates a modification.

A is a horizontal pipe extending along the ceiling.

B is a branch pipe standing at right angles to the pipe A and joined thereto by a T-coupling A', or said branch pipe may be one of the arms of the T-coupling.

The pipe A may be of any suitable size to convey a sufficient volume of water to a desired number of sprinkler-heads, and the branch pipe B may be of proper size to deliver into the room the volume of water desired in that portion of the room. Said pipe B is threaded exteriorly to receive the interiorly-threaded sleeve C. The sleeve C has at its lower portion the outwardly-projecting lugs C' to engage the hooks of the expansion device and the yokes of the deflector, as will be hereinafter described. Said sleeve is also to be provided with lugs C<sup>2</sup>, to be engaged by a spanner-wrench, or said sleeve may be provided with suitable faces or notches to be engaged by a wrench when turning said sleeve upon the branch pipe B.

D is the deflector. This is preferably of circular form and somewhat concave. It is applied over the lower end of the branch pipe to seal the latter. Suitable packing *d* may be inserted between the pipe and said deflector for the purpose of aiding in forming a seal between said pipe and the deflector. The deflector is held against said pipe by means of the chamber E of the expansion device. Said expansion device consists of a horizontal and preferably flattened chamber E, having a piston E' entering one of its sides, the interior of the chamber being filled with any suitable material, which will expand under abnormal heat and drive said piston outward. The outer end of said piston is extended upward into an arm E<sup>2</sup> through a slot *d'* in the deflector D, and is provided at its upper end with a hook E<sup>3</sup>, which rests, when the piston is within the chamber E to its farthest limit upon the upper face of one of the lugs C'. From the opposite end of the chamber E an arm E<sup>4</sup>, similar to the arm E<sup>2</sup>, rises through another slot *d'* and the deflector D, and has at its end a hook E<sup>5</sup>, similar to the hook E<sup>3</sup>, extending over another of the lugs C'. By means of these arms and hooks the chamber E is held suspended from said sleeve C. If



said sleeve be now turned up on the branch pipe B, said expansion device will also be raised and will press the deflector and the packing, if the same is used, firmly against the end of the branch pipe B, thus sealing the mouth of said pipe. Yokes D' rise from the upper side of the deflector D and surround the lugs C', the height of such yokes being sufficient to allow the deflector to fall a short distance when it is freed and there hold the same to spread or distribute the water.

The operation of the device, after being applied as shown in Figs. 1 and 3, is as follows: The parts remain as shown unless there is undue heat in the room. If a fire produces such undue heat, the material within the chamber E expands under the influence of such heat and drives the piston E' outward, carrying with it the arm E<sup>2</sup> and the hook E<sup>3</sup>, so that the latter is forced from its seat upon the lugs C'. Thus the expansion device is released and falls. Upon the yielding of the expansion device the deflector D is without support and falls by reason of its own gravity and the pressure of the water or air within the pipe. In falling it descends until the yokes D' are engaged by the lugs C', whereupon the deflector is held stationary at the proper distance from the end of the pipe B. The slots d' may be of sufficient length to allow the hooks E<sup>3</sup> and E<sup>5</sup> to pass through the deflector, so that the expansion device will fall to the floor, or said slots may be so short as to allow the said hooks to be engaged by the deflector, thus holding the expansion device suspended from the deflector. When the fire ceases, the sleeve D' may be run down upon the pipe B and the hooks E<sup>3</sup> and E<sup>5</sup> again placed over the lugs C', the piston E' returned to its farthest limit into the chamber E, and the sleeve C again run up on the pipe B, to form the seal, as before.

In Fig. 4 the sleeve C is shown as provided with four lugs C', and a portion of the drawings show the expansion device as having a hook E<sup>3</sup> and one hook E<sup>5</sup>. It is to be noted, however, that the sleeve may be provided with three lugs and the expansion device with two hooks E<sup>5</sup>, one of each to rest upon a lug C', while the hook E<sup>3</sup> rests upon a third lug C'. In this case the deflector D would have three yokes D', each extending over one of the three lugs C'. This is illustrated in Figs. 7 and 8. It is also to be noted that in lieu of separate lugs C' a continuous flange C' may extend around the sleeve C for the engagement of the hooks E<sup>3</sup> and E<sup>5</sup>. When such continuous flange is used, posts D<sup>2</sup>, having inwardly-directed hooks D<sup>3</sup> at their upper ends, may rise from the deflector D near the said flange, so that said hooks will engage said flange when the deflector is allowed to fall by the disengagement of the hooks of the expansion device. This is illustrated in Fig. 9. It will be seen that the flange C' extending continuously around the sleeve C is virtually a lug C', extending entirely around said sleeve. It

will be seen, also, that the expansion device applied as shown in Figs. 1, 3, 6, and 9 virtually performs the office of a valve closing the mouth of the pipe B, and that such valve has parts extending from it into engagement with parts on said pipe.

In Fig. 10 the valve and the expansion device are resolved into distinct parts. In said figure, B is again the pipe. C is the sleeve having the flange or lug C'. F is the valve. E is a part rising from one side of said valve into engagement with one of the lugs C', and E<sup>4</sup> is the opposite part rising from said valve into engagement with a lug C'. The parts E<sup>2</sup> and E<sup>4</sup> are hinged or joined in other suitable manner to the valve F. The part E<sup>4</sup> has the laterally-directed arm E<sup>6</sup>. From the sleeve C an arm C<sup>3</sup> extends laterally over the arm E<sup>6</sup>, and the expansion device E is threaded through or otherwise joined to said arm C<sup>3</sup>, with the piston E' directed toward the arm E<sup>6</sup>. Upon the expansion of the expansion device the piston E' is driven forward so as to depress the arm E<sup>6</sup> and throw the upper end of the part E<sup>4</sup> away from and out of engagement with the lug C'. The valve F is then free to fall.

The chamber E of the expansion device may be of any suitable shape, and may be constructed in a variety of ways. In Figs. 3 and 5 it is shown in the form of a hollow disk having a neck e at one end to receive the piston E', and having a threaded opening e' in its upper side to receive the threaded plug e<sup>2</sup>. Said threaded plug e<sup>2</sup> should be provided with notches e<sup>3</sup> or other suitable means for forming engagement with a wrench or other tool for turning said plug in the opening e'.

I do not claim constructions in which the arms supporting the valve are attached to the frame of the sprinkler.

I claim as my invention—

1. In an automatic fire-extinguishing apparatus, the combination, with the branch pipe B, having parts fitted to be engaged by parts extending from the valve, of a valve applied over the opening of said pipe and held against the latter by hooks or equivalent parts extending from said valve to said pipe or some part supported by the latter, which hooks are arranged to be disengaged by the movable part of an expansion device, substantially as shown and described.

2. In an automatic fire-extinguishing apparatus, the combination, with the branch pipe B, having lugs fitted to be engaged by parts extending from the expansion device, of an expansion device embodying or carrying a valve applied over the opening of said pipe and held against the latter by engagement of arms extending from said expansion device with said pipe, which arms are arranged to be disengaged by the expansion of the expansion device, substantially as shown and described.

3. In an automatic fire-extinguishing apparatus, the combination, with the branch pipe



B, having lugs fitted to be engaged by parts extending from the expansion device, of an expansion device embodying or carrying a valve applied over the opening of said pipe and held against the latter by engagement of arms extending from said expansion device with said pipe, which arms are arranged to be disengaged by the expansion of the expansion device, and a deflector interposed between said expansion device and the end of said branch pipe and arranged to move a short distance from said end and be held from said branch pipe, substantially as shown and described.

4. In an automatic fire-extinguishing apparatus, the combination, with the branch pipe B, of a sleeve C, threaded upon said pipe, an expansion device embodying or carrying a valve applied over the opening of said pipe and held against the latter by engagement of arms extending from said expansion device with said sleeve, which arms are arranged to be disengaged by the expansion of the expansion device, and a deflector interposed between said expansion device and the end of said branch pipe, and arranged to move a short distance from said end and held from said branch pipe, substantially as shown and described.

5. In a fire-extinguishing apparatus, the combination, with the branch pipe B, of an expansion device embodying or carrying a valve applied over the opening of said pipe, said expansion device consisting of a chamber E, filled with suitable expansive material, a piston E' extending outward from said chamber at right angles to said opening and thence at right angles into engagement with the pipe B or some part supported thereby, and one or more hooks E<sup>5</sup>, supported from other portions of said chamber and engaging the pipe B or some part connected therewith, substantially as shown and described.

6. In a fire-extinguishing apparatus, the combination, with the branch pipe B, of an expansion device embodying or carrying a valve applied over the opening of said pipe, said expansion device consisting of a chamber E, filled with suitable expansive material, a piston E', extending outward from said chamber at right angles to said opening and thence at right angles into engagement with the pipe B or some part supported thereby, one or more hooks E<sup>5</sup>, supported from other portions of said chamber and engaging the pipe B or some part connected therewith, and a deflector interposed between said expansion device and the end of said branch pipe and arranged to move a short distance and be held from said branch pipe when said expansion device is disengaged from said branch pipe, substantially as shown and described.

7. In an automatic fire-extinguishing apparatus, the combination, with the pipe B, of a sleeve C, applied adjustably around the end of said pipe, a chamber E, filled with suitable expansive material and embodying or carrying a valve and applied over one end of said pipe, a piston E', extending into said chamber E, an arm E<sup>2</sup>, extending at right angles from said piston and engaging said sleeve, and an arm E<sup>4</sup>, extending from said chamber and engaging said sleeve, substantially as shown and described.

8. In an automatic fire-extinguishing apparatus, the combination, with the pipe B, of a sleeve C, applied adjustably around the end of said pipe, a chamber E, filled with suitable expansive material embodying and carrying a valve and applied over one end of said pipe, a piston E', extending into said chamber E, an arm E<sup>2</sup>, rising from said piston and engaging said sleeve, an arm E<sup>4</sup>, rising from said chamber and engaging said sleeve, and a deflector inserted between said chamber and the end of said pipe and having parts rising therefrom to engage said sleeve when said deflector has moved a short distance, substantially as shown and described.

9. In an automatic fire-extinguishing apparatus, the combination, with the branch pipe B, of a sleeve C, surrounding said pipe adjustably, and a deflector D, applied over the end of said pipe, said deflector having yokes D' or equivalent devices for engaging said sleeve, and having slots d' and an expansion device applied over said deflector, an arm E<sup>2</sup>, rising from one side of said expansion device through one of the slots d' and arranged to be driven outward by said expansion device, and one or more arms E<sup>4</sup>, extending from said expansion device through a slot or slots d' and engaging said sleeve, substantially as shown and described.

10. In an automatic fire-extinguishing apparatus, the combination, with the pipe B, of a sleeve C, threaded upon said pipe, a chamber E, embodying or carrying a valve applied over the end of said pipe and being filled with suitable expansive material, a plug e<sup>2</sup>, seated in the side of said chamber, a piston E', extending outward through said chamber at right angles to said pipe, an arm E<sup>2</sup>, rising from said piston and engaging said sleeve, and an arm E<sup>4</sup>, rising from said chamber and engaging said sleeve, substantially as shown and described.

In testimony whereof I affix my signature, in presence of two witnesses, this 20th day of August, 1889.

CYRUS KEHR.

Witnesses:

AMBROSE RISDON,  
FRANK L. STEVENS.