

No. 656,445.

Patented Aug. 21, 1900.

A. EKSTRÖM.  
COOLING BRAKES.

(Application filed Apr. 27, 1898.)

(No Model.)

2 Sheets—Sheet 1.

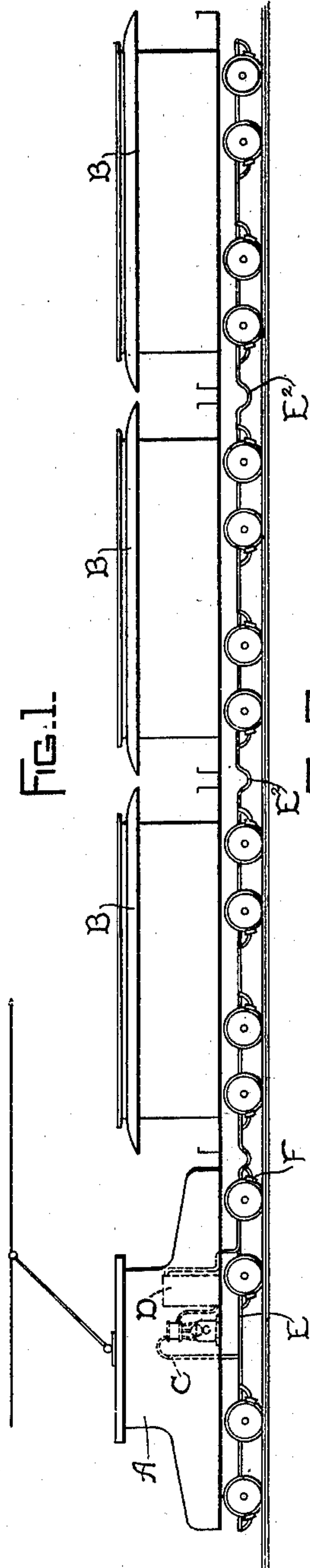


FIG. 1.

FIG. 2.

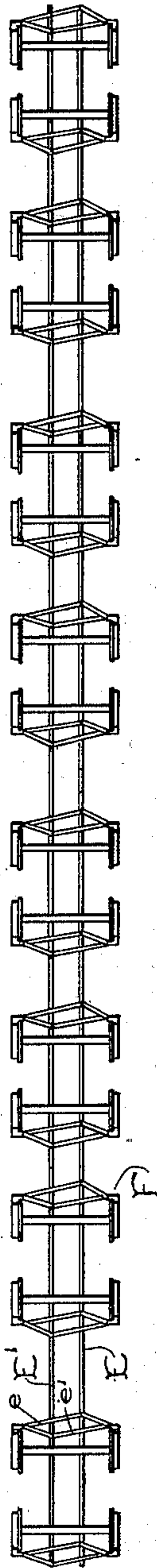


FIG. 3.

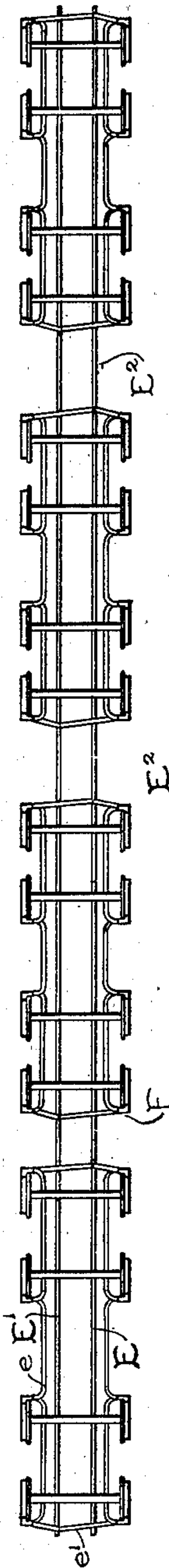
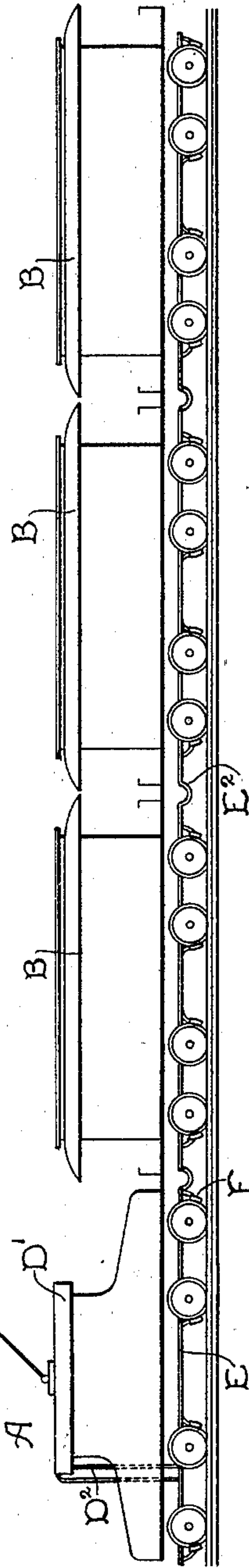


FIG. 4.



WITNESSES.

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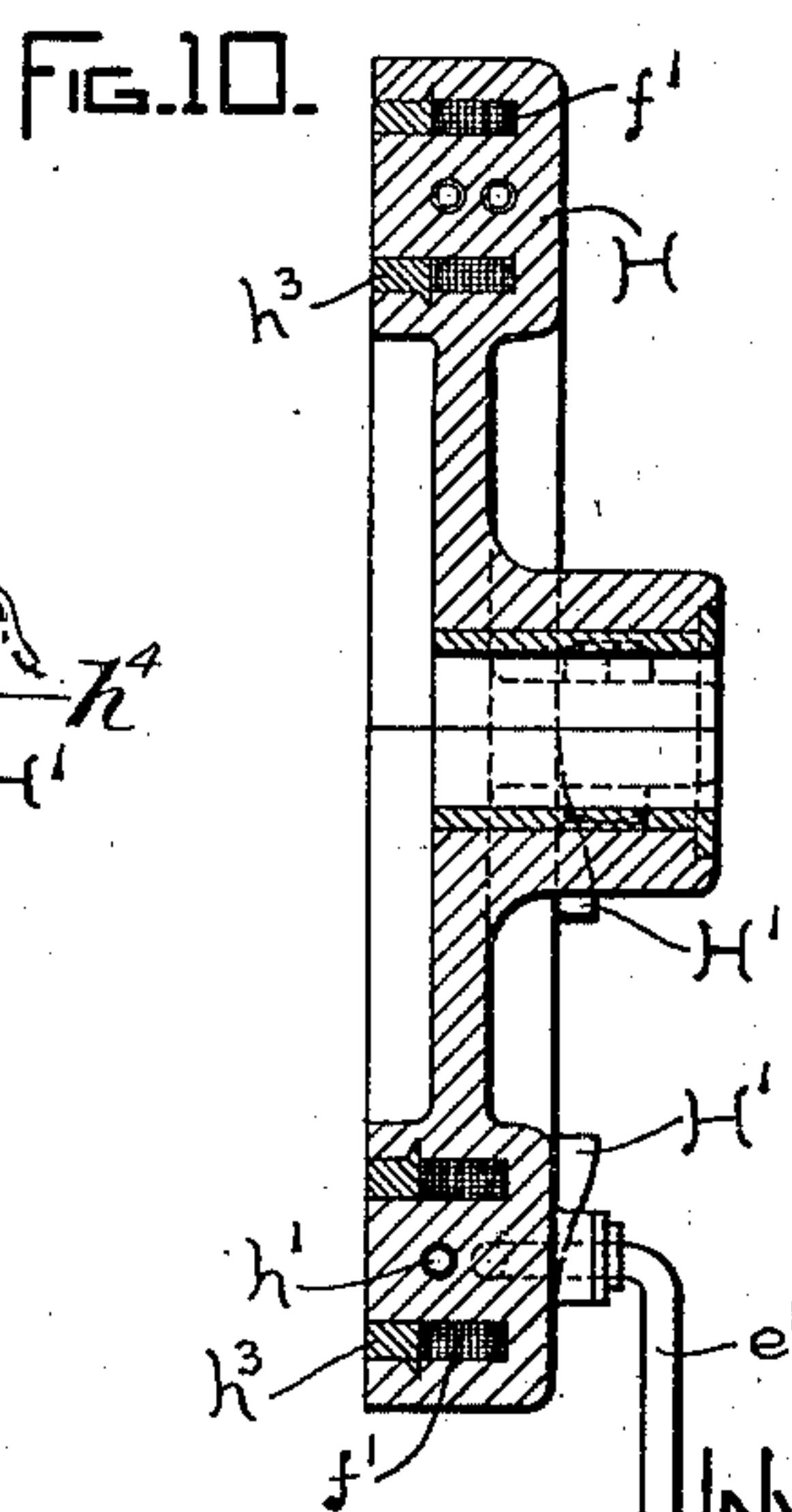
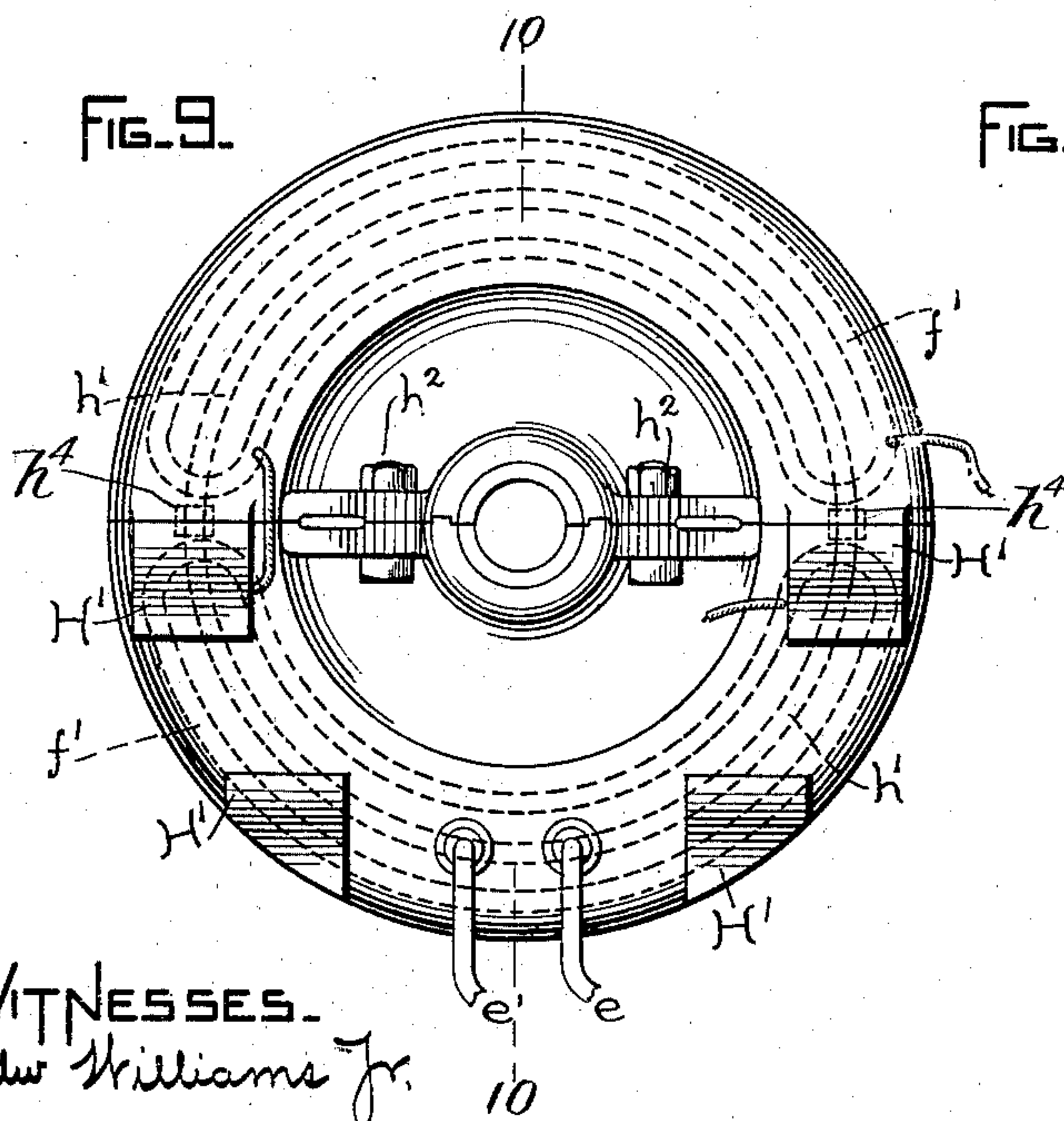
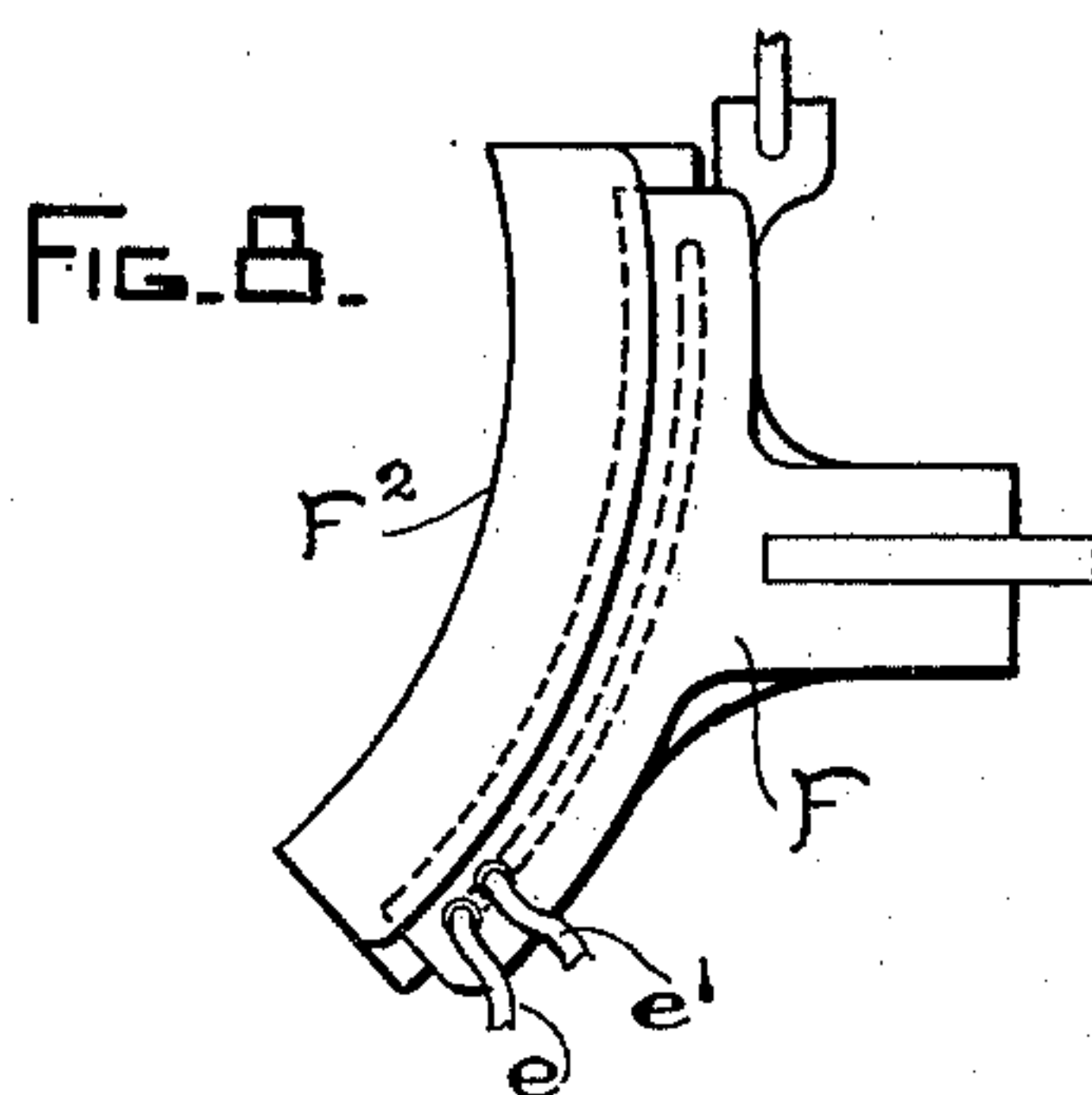
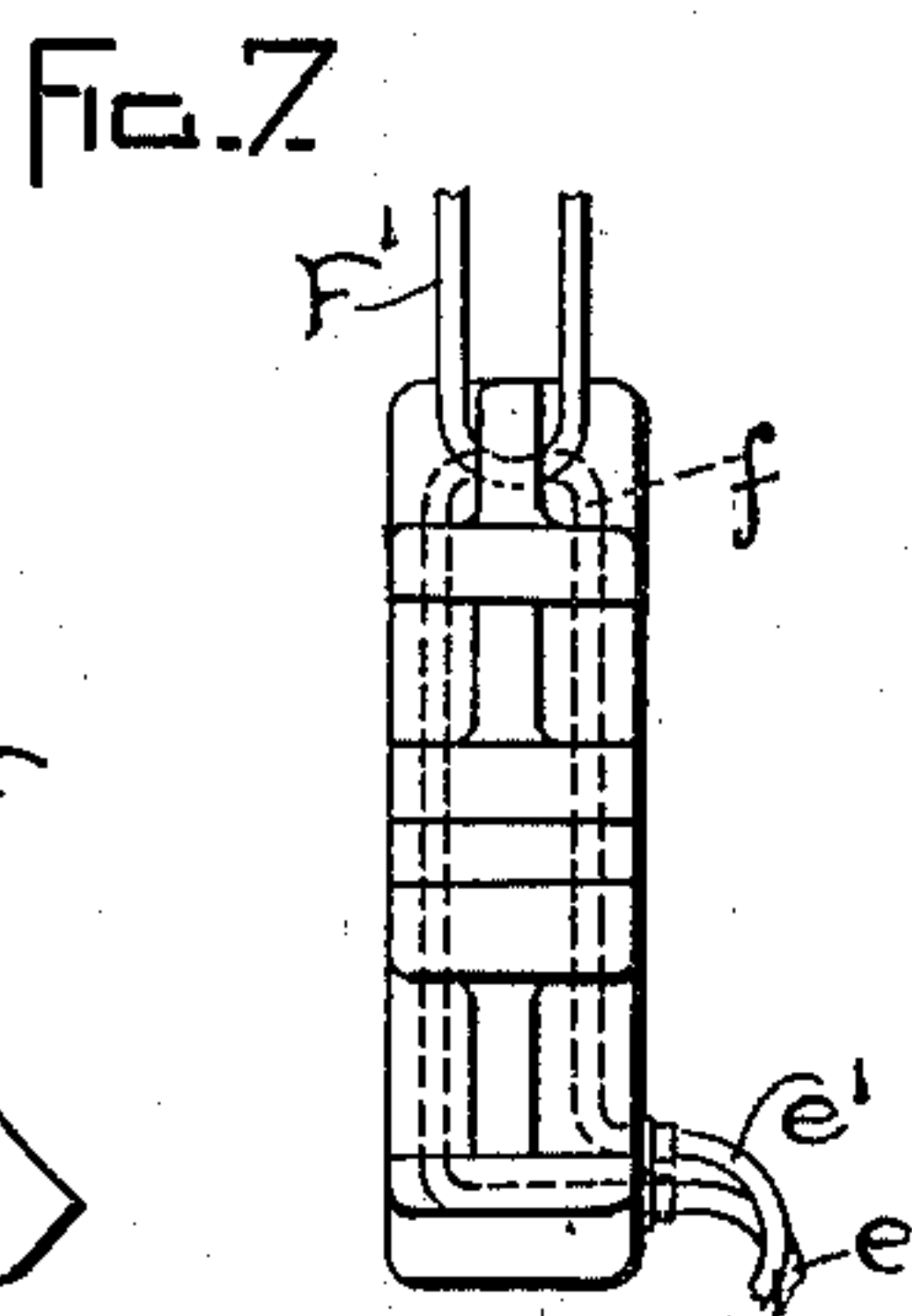
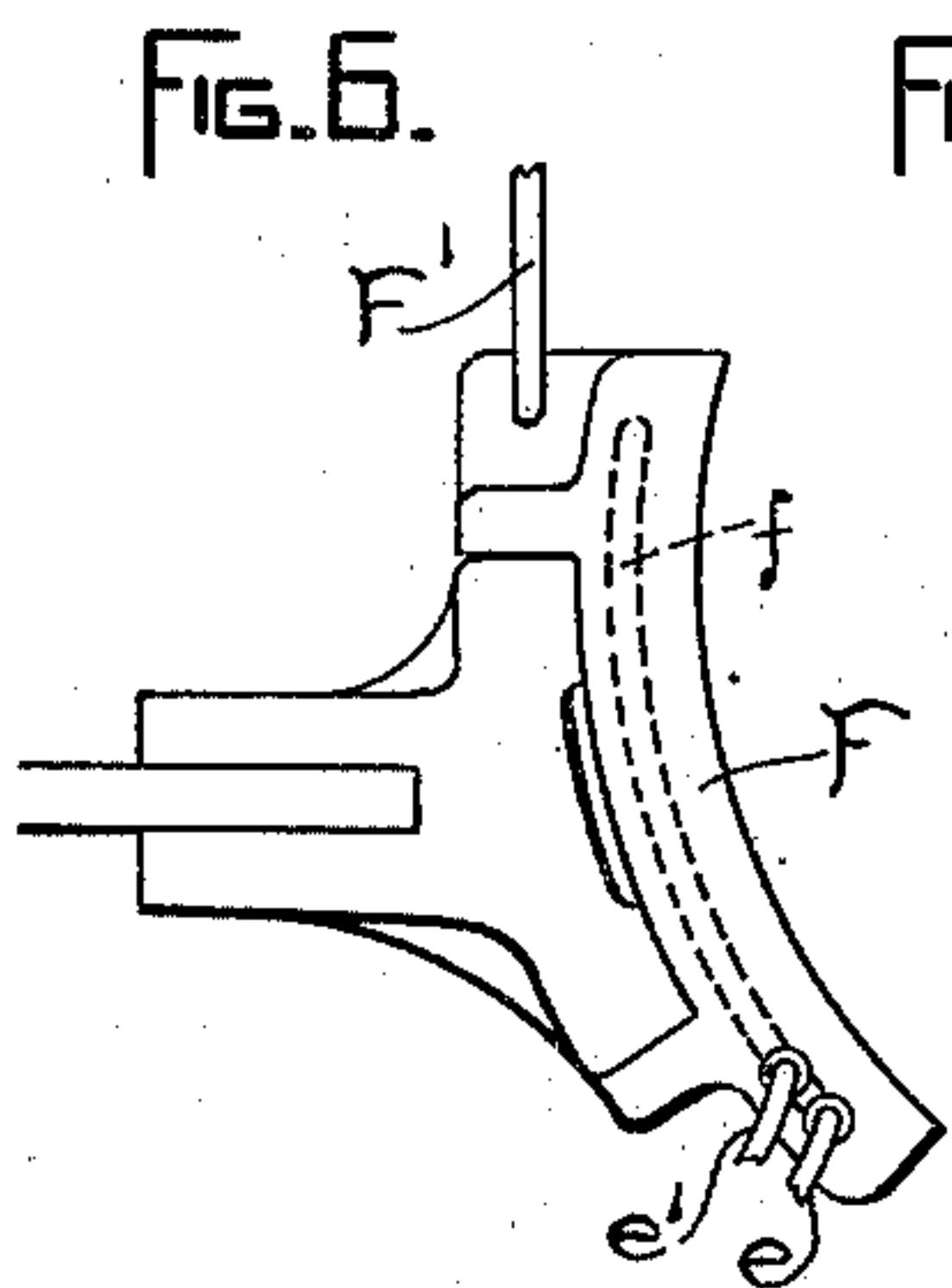
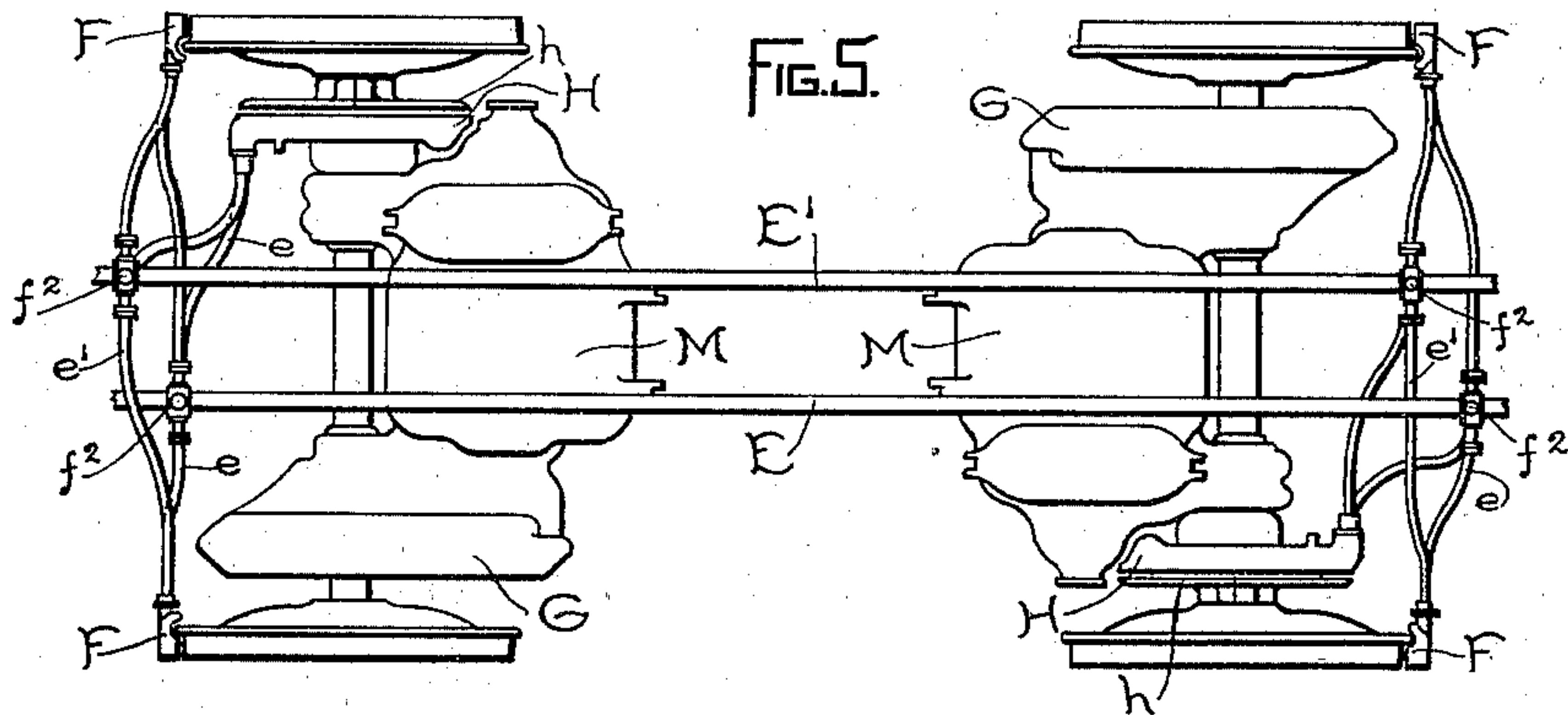
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# UNITED STATES PATENT OFFICE.

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## COOLING BRAKES.

SPECIFICATION forming part of Letters Patent No. 656,445, dated August 21, 1900.

Application filed April 27, 1898. Serial No. 678,922. (No model.)

*To all whom it may concern:*

Be it known that I, AXEL EKSTRÖM, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Cooling Brakes, (Case No. 766,) of which the following is a specification.

My invention relates particularly to the operation of railroad-trains where the brakes must be frequently used under such circumstances that no opportunity is given for the shoes to cool. In modern railway equipments using electric brakes this may become a serious difficulty, because the coils in the shoe as the current passes through them add to the heat generated by friction. These coils are usually held in place by a filling of fusible metal, and on a long run the heat may become so great as to melt the filling and leave the coil loose in the shoe, which might be productive of accident to the brake. Under ordinary circumstances this is not likely to arise; but in some installations, actual and proposed, with which I am familiar, very long and very steep grades are employed. Under such circumstances my invention becomes particularly useful. I have therefore provided a system of cooling brake-shoes which may be applied to any device ordinarily used, as well as to the electric brake, although for the causes mentioned above it necessarily finds its best application in the latter. The system, in brief, consists of a set of pipes with which conducting-channels in the shoes are connected and a pump or other equivalent apparatus for driving through the pipes cooling fluid, such as air, oil, or water. These pipes are provided with ordinary couplings between the cars, and in operation, whenever a long grade is encountered, as soon as the brakes are set the pump is started and the fluid kept circulating through the shoes, so that their temperature will not rise too high. Of course in many cases air would furnish sufficient cooling; but in those cases in which the grade is heavy and long it is better to use a liquid.

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

Figure 1 is a diagram in side elevation of a

train equipped with my invention. Figs. 2 and 3 show different arrangements of the circulating-pipes. Fig. 4 is another diagrammatic side elevation of a train having the invention in a modified form. Fig. 5 is a plan view of a truck equipped with two motors having the invention applied to it. Figs. 6, 7, and 8 are details of ordinary brake-shoes. Figs. 9 and 10 are respectively a side elevation and section of an electric brake-shoe, the section being taken along the line 10 10 of Fig. 9.

In Fig. 1, A B B, &c., are the cars of the train, A being the electric locomotive.

C is a pump upon the locomotive, and D a reservoir.

E is one of the circulating-pipes.

F F are the brake-shoes.

The arrangement of the system of piping may be either that shown in Fig. 2 or in Fig. 3. In these figures E E' are the main longitudinal pipes of the train, provided with couplings E<sup>2</sup>. These pipes are connected to the brake-shoes by cross-pipes e e'. The connection of these pipes will be better understood from the subsequent figures.

In Fig. 4 I show that a tank D' may take the place of the pump C. This would be connected with the pipes E E' by a stand-pipe D<sup>2</sup>, one side of which connects with the bottom of the tank D', and the other connects with its side, higher up. With this arrangement, as will be understood, the currents of convection in the liquid which I prefer to employ would ordinarily be sufficient to keep the brakes cool and the pump may be dispensed with. This is not under all circumstances as good an arrangement as that shown in Fig. 1; but it may sometimes be employed.

In Fig. 5 is illustrated the connection of the side pipes with brake-shoes of the electric type and with auxiliary brake-shoes of any other convenient type. In this figure M M are the motors, provided with gear-cases G G. H H are the electric brake-shoes, and h the disks against which they bear. Suitable angle-valves f<sup>2</sup> f<sup>2</sup> cut off the supply of oil or other liquid when it is desired to couple the pipes E E', the couplings not being shown, but being of any ordinary form. Pipes e e' connect with the electric brake-shoes H.

A suitable form of brake-shoe for my in-



vention is illustrated in Figs. 6 and 7 in side and end elevation, respectively. In these the pipes  $e e'$  are shown connected by a pipe  $f$ , embedded in the tread of the shoe. In a  
 5 modified form, such as that shown in side elevation in Fig. 8, this pipe may be embedded in the back of the shoe, leaving the tread  $F^2$  of common form, so that it may be renewed as often as desired.

10 In Figs. 9 and 10 the electric brake-shoe is illustrated. The shoe is supported in the ordinary way now well understood in the art by lugs  $H'$  and carries a coiled pipe  $h'$ , connecting the pipes  $e e'$ . The arrangement is  
 15 best understood from the section in Fig. 10, in which the coils  $f'$  are shown as retained in place by the filling  $h^3$  of fusible metal. As shown in Fig. 9, the shoe is divided, so as to be conveniently clamped around the axle by  
 20 the bolts  $h^2 h^2$ . In order to make a tight joint between the ends of the pipes  $h'$ , which is by preference cast into the metal of the shoe, gaskets of some suitable form of packing are provided, as shown in dotted lines  
 25 at  $h^4$ .

My invention therefore comprises a system of ready application to existing or new equip-

ments of efficient form and one easy to manipulate.

What I claim as new, and desire to secure 30 by Letters Patent of the United States, is—

1. In a braking system for an electrically-propelled car or train, the combination of electric brake-shoes and devices for applying them, magnetic coils controlling said shoes, 35 a system of main pipes running through the train, auxiliary pipes connected therewith for cooling each shoe, and means for circulating a cooling fluid through the pipes.

2. In a car-braking system, the combina- 40 tion of brake-shoes and means for applying them, with a system of pipes for absorbing the heat of the shoes, extending to the end of the car and provided with fluid-tight coupling devices, and means for circulating a cool- 45 ing fluid from a reservoir or pump through the pipes at desired times.

In witness whereof I have hereunto set my hand this 22d day of April, 1898.

AXEL EKSTRÖM.

Witnesses:

THEO. P. BAILEY,  
 A. J. GIFFORD.