

No. 707,570.

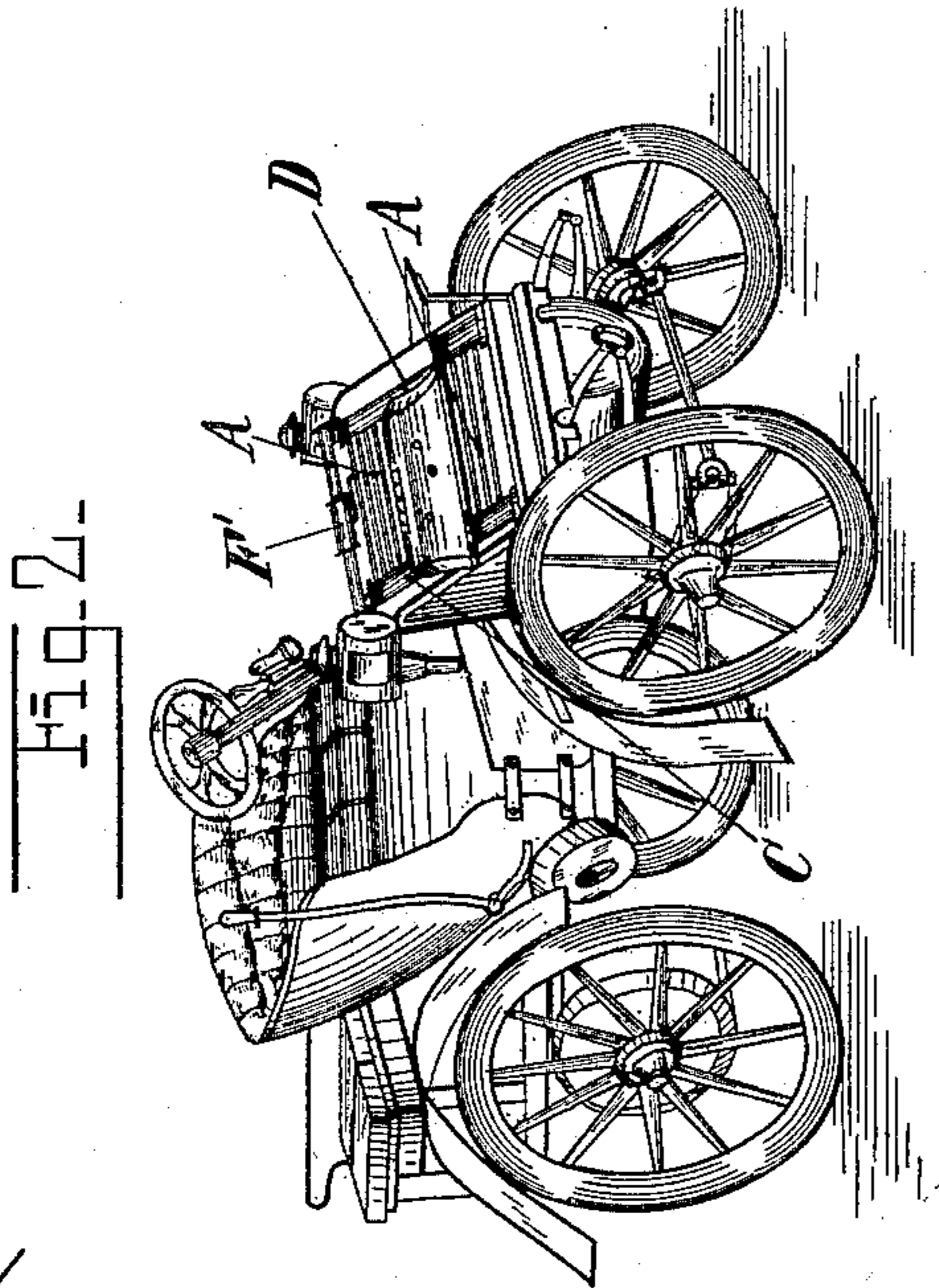
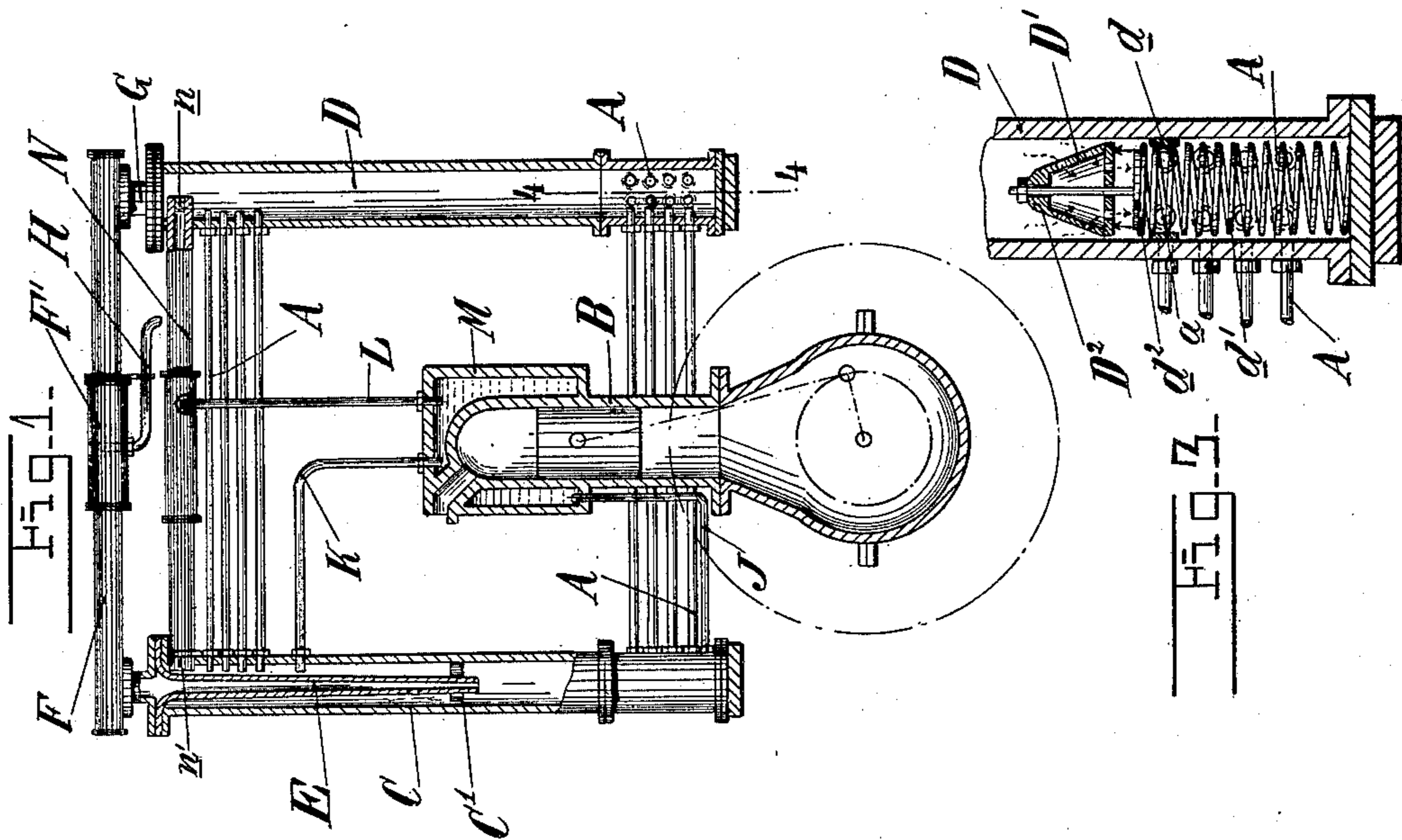
Patented Aug. 26, 1902.

E. ESTCOURT.

WATER COOLING AND CIRCULATING APPARATUS FOR EXPLOSION ENGINES.

(Application filed Jan. 22, 1900.)

(No Model.)



Witnesses

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WATER COOLING AND CIRCULATING APPARATUS FOR EXPLOSION-ENGINES.

SPECIFICATION forming part of Letters Patent No. 707,570, dated August 26, 1902.

Application filed January 22, 1900. Serial No. 2,364. (No model.)

To all whom it may concern:

Be it known that I, ERNEST ESTCOURT, a subject of the Queen of England, residing at 23 Compayne Gardens, South Hampstead, in the county of London, England, have invented certain new and useful Improvements Relating to Water Cooling and Circulating Apparatus for Explosion-Engines, Specially Suitable for Use on Motor-Cars; 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.

This invention relates to water-cooling apparatus for explosion-engines of the type having a jacketed cylinder which is kept cool by water circulating therethrough. In such engines as heretofore arranged the water is usually pumped through the circulation pipes and jacket; and the object of this invention is to arrange a system of circulating-pipes in connection with the cylinder in such a way as to produce a more effective circulation and cooling of the water without the aid of pumping machinery and to arrange the cooling-pipes in such a manner that the water is effectively cooled by the atmosphere.

Figure 1 is a sectional elevation taken on two parallel vertical planes, one through the engine-cylinder B' and the other through the conduits C D. Fig. 2 is a perspective view of a motor-carriage, showing applied thereto and on a reduced scale the engine and connections shown in Fig. 1. Fig. 3 is an enlarged section taken on the line 4 4 of Fig. 1.

According to this invention the engine is fitted with a number of water-circulating pipes A above and below the cylinder B and opening into upright conduits C D at each end. One of these conduits (in the drawings the conduit C) is blocked at about its center by a partition C'. In the upper part of this blocked conduit C is a funnel-shaped pipe E, the lower end of which opens in the lower part of the blocked conduit just below the partition C', the upper end being connected to the under side of an upper transverse conduit F, the other end of which conduit F is, by means of a short pipe G, in open communication with the other upright conduit D. By this arrangement any water carried through the system by the steam generated

therein will be trapped in the upper transverse conduit F and carried by the funnel E to and deposited below the partition C' in the upright conduit C. The steam will meanwhile be collected in the central enlargement or dome F' of the conduit F, into the upper part of which opens one end of a pipe H, whose lower end discharges outside the apparatus, thus allowing of the overflow of water or the escape of steam into the atmosphere.

In the lower part of the upright conduit D is a weighted plunger D', loosely fitting the interior of the conduit D and supported on a spiral or other spring d', so as to be always above the level of the uppermost opening a of the lower series of water-circulating pipes A. (See Fig. 3.)

d is a flange or projection on the interior of the conduit D to form a seat to receive the weighted plunger D' in the event of the supporting-spring d' breaking or compressing, so that in no case can the plunger D' block up the openings of the adjacent ends of the pipes A. This plunger D' is made conical or tapering at its upper part D² and has a way or ways therethrough for the passage of water and is fitted with a valve d³, opening downward. The plunger is fitted fairly loosely in the interior of the conduit D and is free to move up and down therein by the vibration set up either by the working parts of the motor or by the jolting of the vehicle, if fitted to one, when traveling over rough roads. As the plunger moves upward the water above it will be displaced with little friction by the conical or tapering top D², and the valve d³ will open downward, allowing the displaced water to pass to the under side of the plunger D'. As the plunger moves downward the valve will close and the plunger will then act on the surface of the water, forcing it downward to the open ends of the pipes A. In this way I utilize the vibration inherent in every explosion-engine to assist in promoting the circulation of water in the pipes.

Three pipes J, K, and L connect the system with the cylinder-jacket M. One pipe, J, leads from the lowest part of the system into the lowest part of the cylinder-jacket M, the second pipe, K, leads from the top of the cylinder-jacket into the upper part of the blocked upright conduit C, and the third

pipe, L, leads from the opposite side of the top of the cylinder-jacket into a lower horizontal conduit N, the ends of which pass through the sides of the upright conduits C and D, the end *n* inside the conduit D being closed while the other end *n'* is open.

The circulation of the water in the apparatus will now be understood. The water becoming heated will flow through the pipes K and L into the conduit C above the partition C', thence through the upper series of water-pipes A to the upright conduit D and down through the latter to the lower series of water-pipes A, thence into the lower part of upright conduit C, and through the pipe J back to the cylinder-jacket M.

To more particularly point out the function of the pipe H and the nozzle E, hereinabove referred to, it will be seen that the pipe H only allows the contents of the enlargement F' to be drawn off from the upper part thereof. In practice very little steam passes off through pipe H. The upper pipe F receives nothing except steam which may rise from the vertical conduit D and which steam may carry atoms of water with it. When the steam reaches the pipe F, it is there condensed and passes off as water down the funnel-tube E into the lower part of the conduit C. This condensed steam replenishes the system and passes up to the water-jacket M through the pipe J. In Fig. 2 the pipe F is quite outside the apparatus, and the whole of its surface is exposed to the atmosphere, whereby a very rapid interchange of heat takes place, and the pipe F consequently acts as a condenser. The small pipe H may therefore be regarded

in the nature of a safety-pipe, allowing the steam which may not be condensed in the tube F to pass off into the atmosphere, and the quantity so passing off is very minute. Consequently the loss, if any, by the evaporation passing off through the pipe H is very small and practically inappreciable. The structure shown in Fig. 2 merely shows how the apparatus is applicable to a working motor-car and also shows that the pipe F is quite outside the apparatus, so as to act as a condenser.

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

Water-circulating apparatus for explosion-engines, comprising a series of water-circulating pipes above and below the cylinder-jacket opening into upright conduits one of which is blocked, a transverse conduit connecting the upper ends of said upright conduits and having a funnel-tube on one end passing into the lower part of the blocked upright conduit, with means for allowing the escape of surplus water and generated steam and for trapping the water carried by the steam, and pipes connecting the cylinder-jacket to the water-circulating system, all arranged substantially in the manner and for the purpose hereinbefore described and illustrated in the accompanying drawings.

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

ERNEST ESTCOURT.

Witnesses:

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