P. HENTSCHKE.

EMERGENCY ENGINE CONTROL.

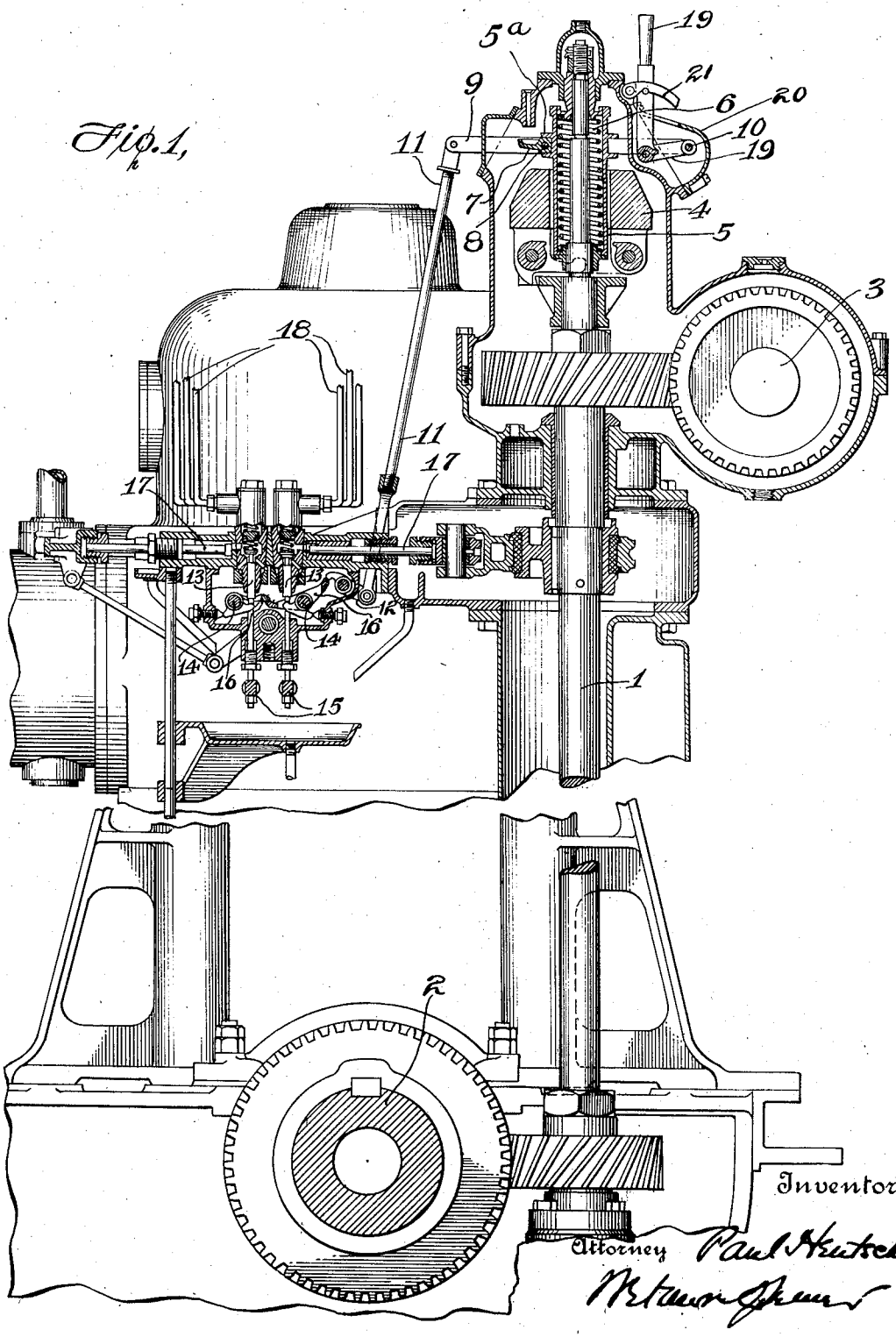
APPLICATION FILED FEB. 14, 1917.

1,388,859.

Patented Aug. 30, 1921.

2 SHEETS—SHEET 1.

Fig. 1.



Inventor

Attorney

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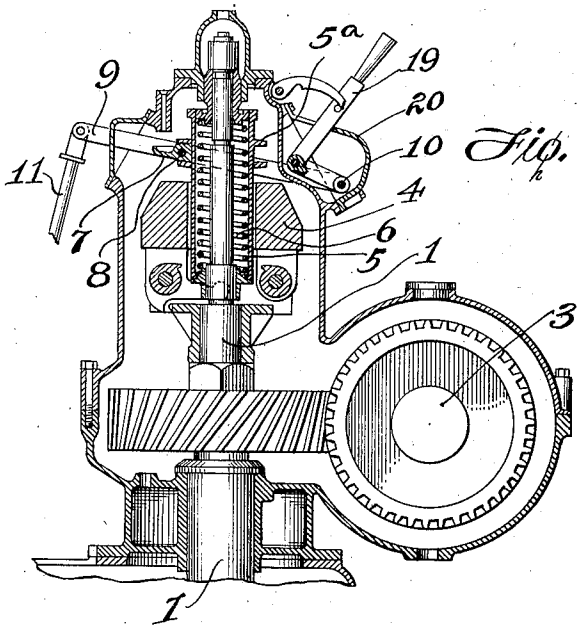


Fig. 2,

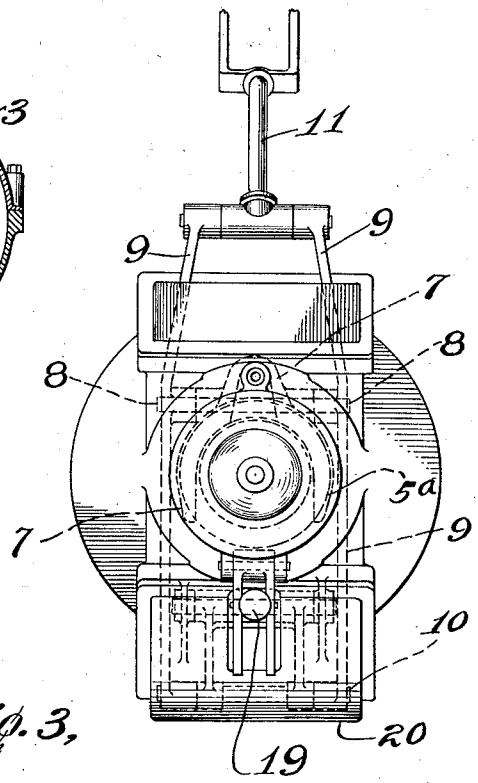


Fig. 4,

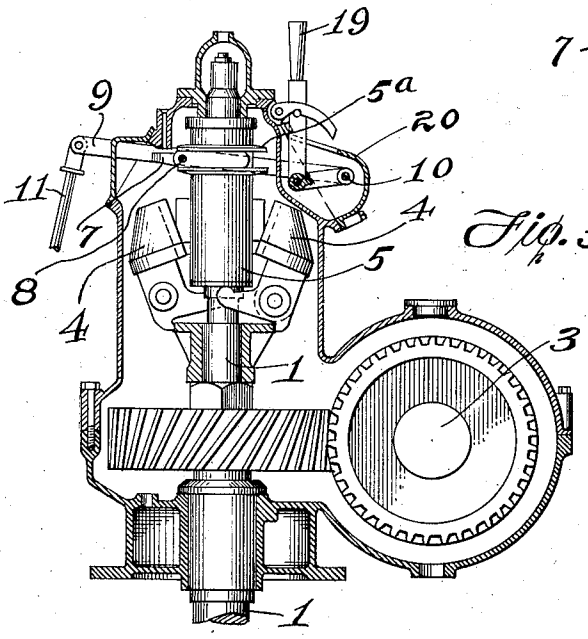


Fig. 3,

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UNITED STATES PATENT OFFICE.

PAUL HENTSCHKE, OF ST. LOUIS, MISSOURI, ASSIGNOR TO BUSCH-SULZER BROS.-DIESEL ENGINE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

EMERGENCY ENGINE CONTROL.

1,388,859. Specification of Letters Patent. Patented Aug. 30, 1921.

Application filed February 14, 1917. Serial No. 148,664.

To all whom it may concern:

Be it known that I, PAUL HENTSCHKE, a citizen of Germany, residing in St. Louis, Missouri, have invented the following described Improvements in Emergency Engine Controls.

The invention consists in the combination with an engine emergency governor, of manual means for carrying out the governor's function independently of the governor and enabling the operator to stop the engine instantly on any emergency. Large size combustion engines such as multi-cylinder marine Diesel engines require an automatic safety control operating through their fuel pump mechanisms and which will automatically cut off the fuel supply on the increase of the engine speed to some predetermined limit regarded as maximum for safe operation. Such control involves a centrifugal governor which is spring-loaded so as to operate only on the attainment of the maximum speed and which cuts out the whole delivery from the fuel pump when it operates, and the present invention combines with such a control an auxiliary manual control whereby the fuel delivery can be interrupted independently of the governor and without requiring the governor spring to be compressed or its weights to be moved, and thereby the operator is provided with means capable of easy and instant operation for stopping the engine when anything goes wrong or on emergency call from the bridge. The particular object of the invention is to provide a combined manual and automatic control mechanism, which shall be simple, compact and readily operable and which shall involve little complication or enlargement over the ordinary governor mechanism employed in these engines.

In the accompanying drawings:

Figure 1 illustrates the new combination showing the fuel pump mechanism and certain other related parts of the engine installation;

Fig. 2 illustrates the emergency governor mechanism in vertical section showing the manual control in operation;

Fig. 3 illustrates similar mechanism with the automatic control by the governor in operation and

Fig. 4 is a top plan of Figs. 1 or 3.

In Fig. 1 the upright shaft 1 is driven by a crank shaft 2 and drives the cam shaft 3 of a multi-cylinder Diesel type marine engine, and is the driving element for the emergency fuel cut-out governor which is mounted on the upper end of said shaft. The governor consists essentially of a pair of pivoted weights 4 rotated by the shaft 1 and provided with bell crank arms adapted to thrust, axially of their rotation, upon the lower end of a spring-pressed sleeve 5 when the weights swing outward at some predetermined relatively high speed. The governor spring 6, within the sleeve, normally exerts pressure thereon which is so related to the mass of the weights and their radial positions on the shaft 1, that the weights remain closed or upright during the range of normal engine speed and fly outward by the effect of centrifugal force aided by their own gravity, when the normal range is exceeded. The detail of the weights mounting and spring and sleeve construction is relatively inconsequential and will be plain from the drawings. The spring sleeve carries the governor collar 5^a and a fork 7 in the groove of this collar carries a bearing 8 of a transverse yoke-form governor lever 9, which extends beyond opposite sides of the governor shaft and governor. Another point of bearing for this lever 9 is formed by the pivot 10 presently described, at one side of the governor, and the free end of the lever 9, at the opposite side, is joined by a connecting link 11 to a primary control device 12 of the fuel pump.

The particular form of fuel pump shown in Fig. 1, is not the subject of the invention herein claimed and it may therefore be assumed to be representative of any suitable fuel pump mechanism of which several are known and available. The type best suited to this invention however and constituting an important part of the combination herein claimed, is that in which the control of the fuel charge is effected by control of the suction valves of the pump, the same being closed earlier or later in the pumping stroke as the charge delivered to the engine is required to be large or small. The mechanism shown is of this type comprising a number of pump cylinders corresponding to the number of combustion cylinders and each provided with a suction valve 13 subject to control as stated in respect to their time of

closing. The controlling means include a pair of cross-rocker shafts 14 carrying lever arms engaging the end of the suction valve stems and a pair of push rods 15 also active upon said stems, but these need not be described further than to note that the overlapping levers 16 are under the dominating control of the primary lever 12 above referred to and that when said primary lever 12 is actuated, as by an upward pull on the governor link 11, both these overlapping levers are thereby actuated to lift both or all the suction valves well above their seats, no matter what may be the adjustment, at the time, of the other controlling elements. Thereby the continued reciprocation of the pumping plungers 17 is ineffectual to deliver fuel through the outlet valves and fuel pipes 18 and cessation of fuel delivery of course results in immediate stoppage of the engine.

The fulcrum bearing 10 of the governor lever 9 is carried on one arm of a bell crank 19 fulcrumed in the governor casing with its upper end upstanding through an auxiliary casing 20 and in easy reach of the operator on the engine stand. The latch 21 holds this bell crank in the normal running position shown in Figs. 1 and 3 and in such position the governor lever 9 occupies its normal position so long as the governor is inactive, that is to say, so long as the weights remain in the position indicated in Fig. 1. When however the governor weights fly outward and downward the collar 5^a and pivot bearing 8 are forced upward (Fig. 3) and the resulting pull on the governor link 11 cuts out the fuel supply through the described mechanism. In such operation the bearing 10 constitutes the fulcrum of the governor lever 9, the latter acting as a lever of the third class. When the governor is in its normal position and it is desired to cut out the fuel delivery, the hand lever 19 is pulled down as shown in Fig. 2 and thereby the cross pin 8 becomes the fulcrum of the lever 9—now a lever of the first class—and the resulting pull on the link 11 stops the fuel and the engine. In such operation the fulcrum 8 is rigidly mounted inasmuch as the spring sleeve 5 is at its lowest position, and the connection between the hand control lever and the pump is a non-yielding one, that is to say, without the interposition of springs, adapted to transmit non-yielding movement to the pump mechanism absolutely assuring the cutting off of the fuel.

Thus in the illustrated and preferred form of this invention, the manual control is accomplished by shifting the position of the normal fulcrum of a governor-actuated lever thereby converting another point of bearing into a temporary fulcrum for said lever and resulting in tension on the link 11 but without compressing the governor spring or imparting movement to the governor weights and by applying the fulcrum-shifting member to the lever 9 the control handle is conspicuously located at a high point on the engine and very accessible to the operator on the engine stand.

Having described my invention, the same is claimed as follows:

1. In a combustion engine having an emergency governor remaining inoperative within the range of normal engine speed and operating on an increase of speed to some predetermined limit to cut off the fuel supply, and having also a fuel pump, said governor comprising pivoted weights, a slidable member controlled thereby and a spring opposing the movement of the weights, the combination therewith of a manual emergency control lever, a governor lever pivotally related to both said slidable member and said control lever whereby when the governor lever is operated by the governor it utilizes its pivotal connection with control lever as its fulcrum and when it is operated by the control lever the governor lever utilizes its pivotal connection with the sliding member as its fulcrum, and a connection between said governor lever and said fuel pump whereby operation of the governor lever either by said governor or by said control lever cuts out the delivery of fuel from said pump.

2. In a combustion engine having an emergency governor remaining inoperative within the range of normal engine speed and operating on an increase of speed to some predetermined limit to cut off the fuel supply, and having also a fuel pump, said governor comprising pivoted weights, a slidable member controlled thereby and a spring opposing the movement of the weights, the combination therewith of a manual emergency control lever and non-yielding operating connections between said control lever and pump adapted to transmit non-yielding movement to the pump mechanism, said connections including a governor lever pivotally related to both said slidable member and said control lever whereby when the governor lever is operated by the governor it utilizes its pivotal connection with the control lever as its fulcrum and when it is operated by the control lever the governor lever utilizes its pivotal connection with the sliding member as its fulcrum, and a connecting link between said governor lever and said fuel pump whereby operation of the governor lever either by said governor or by said control lever cuts out the delivery of fuel from said pump.

In testimony whereof, I have signed this specification.

PAUL HENTSCHKE.