J. J. RIPPER & J. BORNANDER.

AUTOMATIC ENGINE CONTROL.

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1.037,661.

Patented Sept. 3, 1912.

Fig. 1.

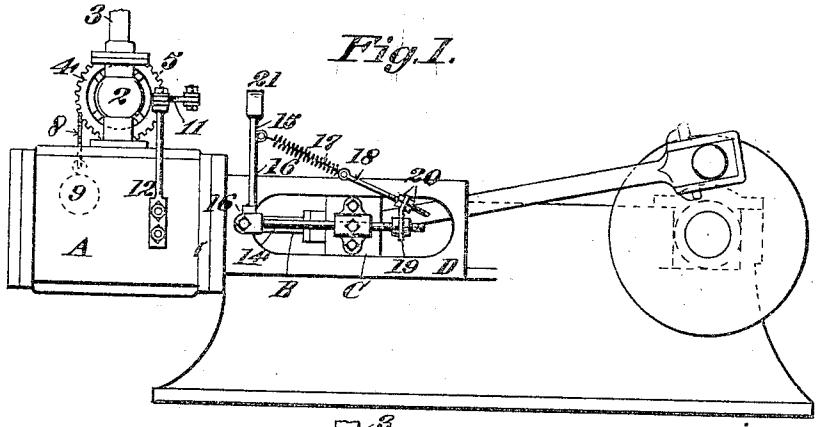


Fig. 2.

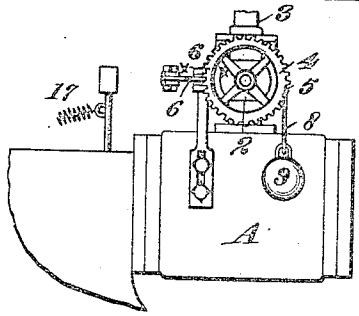


Fig. 3

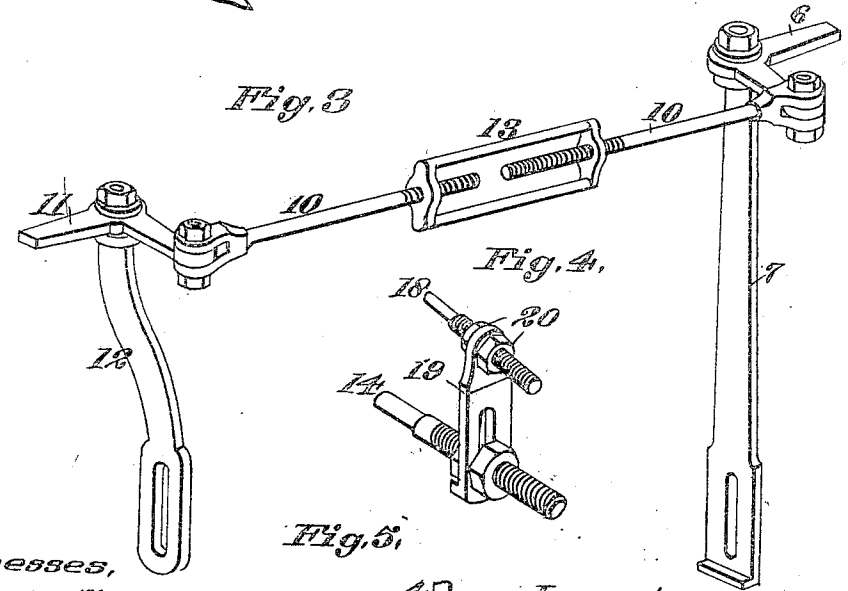
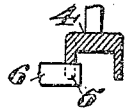


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC ENGINE CONTROL.

1,037,661. Specification of Letters Patent. Patented Sept. 3, 1912.

Application filed April 27, 1912. Serial No. 693,723.

To all whom it may concern:

Be it known that we, JOHN J. RIPPER and JOHN BORNANDER, both citizens of the United States, residing at Fellows, in the county of Kern and State of California, have invented new and useful Improvements in Automatic Engine Control, of which the following is a specification.

This invention relates to an apparatus for automatically controlling reciprocating engines.

It is the object of this invention to provide an attachment for engines of the reciprocating type, by means of which the driving power may be automatically shut off when the engine begins to race from any cause, thereby doing away with the necessity of an attendant.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a steam engine of the reciprocating type, showing the invention as applied. Fig. 2 is a detail in elevation of the throttle valve and its connections. Fig. 3 is a detail in perspective of the trip mechanism. Fig. 4 is a detail in perspective of a tension adjustment. Fig. 5 is a detail section on the line X—X, Fig. 2.

In the drawings, A represents the engine cylinder of a steam engine, in which a piston-rod B is reciprocably mounted in the usual manner, and which piston-rod is connected to a cross-head C slidably mounted in guides D. A throttle valve 2, of any suitable description, is mounted on a feed pipe 3, through which steam is delivered to the engine cylinder A in the usual manner; the throttle valve 2 preferably being the ordinary cut-off valve, the stem of which is provided with a hand-wheel 4. The periphery of the hand-wheel 4 is formed with a series of notches or teeth 5, which are designed to be engaged by a catch 6, which catch is in the form of a bell-crank lever and is mounted to swing horizontally on a vertical standard 7, rigidly mounted in the cylinder A.

Wound on a drum carried by the hand-wheel 4 is a cable or cord 8, one end of which is attached to the drum; a weight 9 being secured to and suspended from the other end of the cord 8 in such manner as to operate to rotate the hand-wheel 4 and normally retain the throttle valve in its closed position. The catch 6 is designed to be engaged with the notches 5 in the hand-wheel 4 to securely hold the latter against movement and thereby retain the throttle valve in an open position; the extent of opening of the throttle valve 2 being adjusted to any desired degree by engaging the hand-wheel 4 with the catch 6 at any suitable point on its periphery. The catch 6 acts to hold the hand-wheel 4 of the throttle in a fixed or locked position in opposition to the rotating action of the weight 9.

Connected to the outer end of the catch 6 is a link rod 10 which extends horizontally over the engine cylinder A and is connected at its outer end to a bell-crank lever 11, mounted to rock horizontally on a standard 12 rigidly attached to the engine cylinder A. The link rod 10 is provided with a turn-buckle 13, by means of which its length may be adjusted in the usual manner.

The bell-crank lever 11 constitutes a trip which is designed to be actuated, as will be later described, to operate the catch 6 and the connecting-rod 10 to throw the catch 6 out of engagement with the hand-wheel 4. The means for operating the trip 11 is carried by the cross-head C, and is here shown as consisting of a horizontally extending rod 14 adjustably mounted on the cross-head C, on the outer end of which is carried an arm 15 pivotally connected therewith and which normally extends in a vertical position, as shown in Fig. 1. A shoulder 16 formed on the arm 15 adjacent to its pivotal connection with the rod 14 is engaged by the latter to limit the movement of the arm 15 in one direction, so that it will be normally retained in a vertical position by means of a helical spring 17. The spring 17 is connected to the arm 15 adjacent to its upper end and is connected to a rod 18, which rod is adjustably mounted on a plate 19 carried on the rod 14; the rod 18 being threaded at its lower end and fitted with jam-nuts 20 on each side of the plate 19, so that it may be adjusted to regulate the tension of the spring 17. The outer end of the lever 15 is provided with a weight 21, which is here shown as formed by enlarging the outer end of the arm.

In the operation of the invention, the throttle valve 2 is set in the desired open position, with the catch 6 engaging the hand-

wheel 4. The engine in operating reciprocates the cross-head C in the well known manner, carrying the rod 14 therewith. The cross-head C and the rod 14 in moving on their rearward stroke, act to impel the weighted end of the arm 15 at the end of the stroke by reason of its acquired momentum, so that the upper end of the arm 15 will continue to move a short distance in the direction of the back stroke of the cross-head C at the termination of the stroke; the arm 15 rocking on its pivotal mounting on the rod 14 in opposition to the spring 17. The spring 17 is tensioned by means of the jam-nuts 20 on the rod 18, so as to limit the forward impelled movement of the arm 15; the distance of the impelled travel of the arm 15 in any case being governed by the speed of travel of the cross-head C and the consequent impetus given the weighted arm thereby. The outer arm of the trip 11 is positioned in alinement with the path of travel of the weight 21 on the upper end of the arm 15 in such a manner that when the speed of the cross-head C is increased beyond the normal, the weight 21 will be impelled sufficiently far to throw it forcibly into contact with the trip 11, thereby rocking the latter on its pivot so as to actuate the catch 6 through the rod 10 and disengage it from the hand-wheel 4. This being done the weight 9 acts through the cord 8 to rotate the hand-wheel 4 in such a direction as to operate the throttle valve 2, and thereby cut off the supply of steam to the engine cylinder A to bring the engine to a stop.

By the use of this apparatus racing of the engine will be obviated, thereby doing away with the need of an attendant; the arm 15 acting, when the engine reaches a certain predetermined speed, to operate the shut-off or throttle valve 2 and thereby shut down the engine.

Having thus described our invention, what we claim and desire to secure by Letters Patent is—

1. The combination with a cut-off valve, of a reciprocating engine, means for normally holding the valve in its closed position, and means operated by a reciprocating part of the engine for releasing said valve opening means to close the valve, said last-named means comprising an impulse arm carried by a reciprocating part of the engine, a pivotally mounted trip having an arm disposed in the path of said reciprocating part, a pivotally mounted lever and means connecting the same with another arm of said trip, and a notched member fixed to the valve and adapted to be engaged by an arm of said lever to thereby hold the valve in its open position in opposition to the closing means.

2. The combination with a cut-off valve, of a reciprocating engine, means for normally holding the valve in its closed position, means operated by a reciprocating part of the engine for releasing said valve opening means to close the valve, consisting of an impulse arm carried by the engine cross-head, a trip disposed to be actuated by said arm, and connections between the trip and the valve opening means, said connections comprising a bell-crank lever having one arm connected to an arm of the trip, said valve having a notched member into engagement with which the other arm of the bell-crank lever is moved to hold the valve in its open position in opposition to the closing means.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

JOHN J. RIPPER.
JOHN BORNANDER.

Witnesses:
C. M. Craghill,
T. J. Black.