

March 11, 1952

W. E. W. NICOLLS

2,588,560

STOP

Filed Nov. 28, 1947

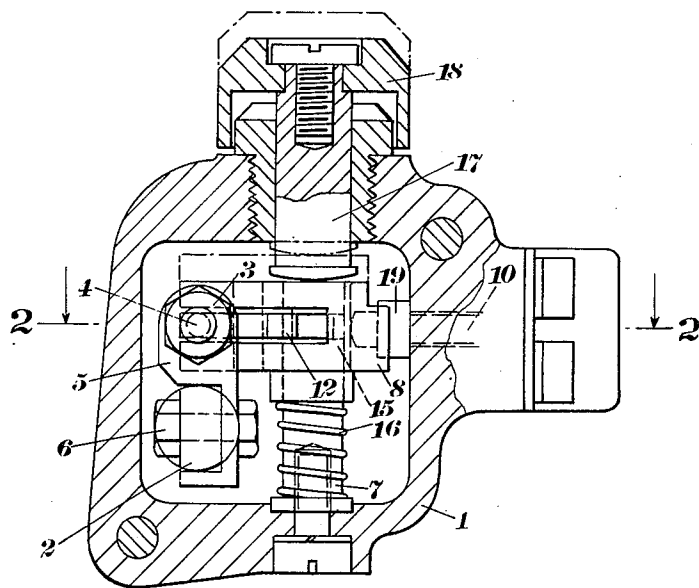


Fig. 1

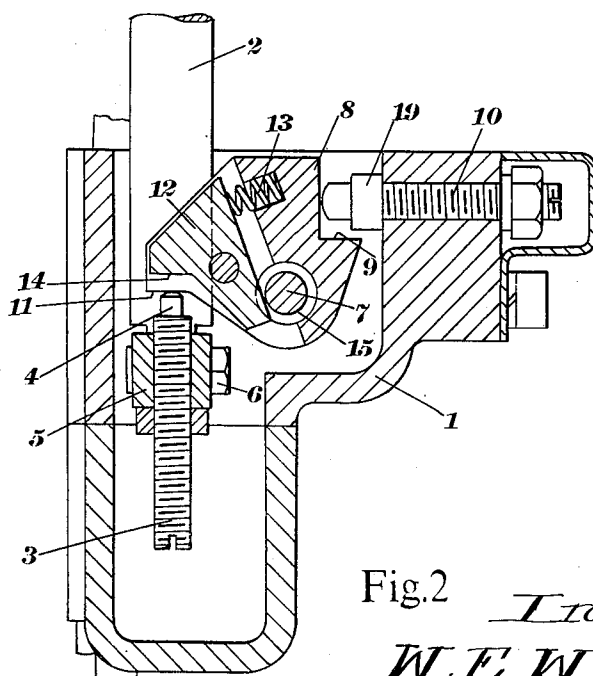


Fig. 2

Inventor
W. E. W. Nicolls
By Glasco & Downing Rees & Co.
Attys.

UNITED STATES PATENT OFFICE

2,588,560

STOP

Wilfrid Edward Walter Nicolls, Pinner, England,
 assignor to C. A. V. Limited, London, England

Application November 28, 1947, Serial No. 788,717
 In Great Britain September 25, 1946

Section 1, Public Law 690, August 8, 1946

Patent expires September 25, 1966

5 Claims. (Cl. 74-526)

1

This invention relates to the reciprocatory plunger pumps used for injecting liquid fuel into internal combustion engines. Such pumps are ordinarily provided with manually operated or governor-operated means for varying the quantity of fuel injected at each discharge to correspond with different load conditions. Also it is usual to provide such pumps with means whereby a quantity of fuel in excess of the normal maximum can be injected for engine starting purposes.

The object of the present invention is to provide improved means for controlling the supply of excess fuel, and for preventing the use of such excess fuel except for the purpose intended.

The invention comprises a laterally slidable stop for determining the maximum supply position of the pump regulating means, a spring for moving the stop in one direction and manually operable means for moving it in the opposite direction, the stop consisting of a pair of parts one of which is movable relative to the other, and the arrangement being such that the amount of excess fuel that can be supplied is determined by the relatively movable part of the stop, the normal maximum supply being determined by the other part of the stop, and the said latter part being automatically movable to its operative position by the spring. According to a further feature of the invention the movable part of the stop is spring loaded and is engageable with a groove or shoulder when the stop is moved to the excess fuel supply position, said part being disengaged when the pump regulating means is moved to increase the fuel supply so that when such regulating means is returned to normal position the stop is moved laterally by its spring to a position which limits the maximum supply to normal.

According to a further feature of the invention, the part of the stop which determines the excess fuel supply is pivotally mounted on the other part and is preferably located in a slot therein, the stop being slidable laterally in a direction parallel to the pivotal axis of the said movable part. In the preferred arrangement, the stop is slidably mounted on a post or like member and is also capable of pivotal movement for adjustment purposes, the adjustment being effected by a screw mounted in a fixed casing and bearing against the stop.

According to a further feature of the invention, the adjusting screw has a collar bearing against a part of the casing to prevent adjustment in a direction corresponding to increased fuel supply.

In the accompanying drawings, Figure 1 is a sectional elevation of a device for controlling the delivery of liquid fuel injection pumps as used for internal combustion engines, constructed in accordance with the invention, the parts being

2

shown in a position enabling excess fuel to be supplied;

Figure 2 is a sectional plan view of the device taken on the line 2-2 of Figure 1.

In one manner of carrying the invention into effect as illustrated in the drawings, the stop is arranged within a casing 1 in association with one end of a slidable pump regulating bar 2 which is responsive to the action of manually operative means or a governor in the usual manner. On the end of the bar 2 is provided an abutment in the form of an adjustable screw 3 having a reduced end 4 for co-operating with the stop, the screw being threaded in a bracket 5 secured to the bar by a bolt 6 so that the screw is located at one side of, and with its axis parallel with the axis of the said bar. Adjacent to the said abutment is arranged a fixed guide piece in the form of a short cylindrical post 7, this being located with its axis at right-angles to the axis of the regulating bar 2. On this post is slidably mounted the stop. The main part of the stop consists of an arm 8 of, for example, substantially triangular form, and having a hole near its apex through which the post 7 passes. The arm 8 is angularly movable on the post for adjustment purposes, but after the adjustment has been effected it is only free to slide on the post. One edge of the arm is recessed at 9 and abuts against the inner end of an adjustment screw 10 inserted through the wall of the enclosing housing 1. The opposite edge of the arm is formed with a nose 11 serving to co-operate with the abutment screw 3. Further, this latter edge of the arm is formed with a slot in which is pivotally accommodated the second part 12 of the stop which is loaded by a spring 13 carried by the main stop part 8. This second stop part may be of any convenient shape, such as that shown, and has a nose affording a surface 14 which is set back slightly with respect to the surface of the nose 11 and serves to co-operate with the end 4 of the abutment screw 3.

The post 7 is formed with an annular groove 15 which may be engaged by the rear portion of the pivoted stop part 12 and when so engaged prevents sliding movement of the stop on the post. A spring 16 surrounding the lower end of the post is arranged to push the stop in one direction, and a plunger 17 slidably mounted in the casing 1 and carrying a push button member 18 is provided for pushing the stop member along the post against the force of the spring 16. This plunger may be itself spring loaded if desired, although in the present construction this is unnecessary.

The mode of operation is as follows:

Assuming the engine to be at rest, and that the attendant wishes to set the stop in the position which will give extra fuel for starting, he pushes the stop by means of the push button 18 until the second stop part 12 comes opposite the

3

abutment screw 3 of the pump regulating bar. The stop is temporarily held in this position by the engagement of an edge of the second stop part 12 (under the action of spring 13) with the groove 15. The regulating bar 2 is then moved to bring the end 4 of the abutment screw 3 into contact with the face 14 of the second stop part 12, and the latter is thereby rocked against the action of its spring 13, allowing the bar to take up a position beyond the normal maximum supply position. This rocking of the second stop part 12 releases it from the groove 15 in the post 7 allowing the stop to move a short distance along the post under the action of its spring 16 sufficient to prevent the re-engagement of the second stop part 12 in the groove 15. When the second stop part 12 is released from the groove 15 in the post 7, it is necessary for the stop to be moved slightly along the post by the spring 16 in order to prevent re-engagement of the stop part with the groove when the regulating bar is subsequently moved in the direction for reducing the fuel supply. This slight movement of the stop is permitted by the fact that the diameter of the end 4 of the screw 3 is slightly smaller than the width of the slot in the main part 8 of the stop in which the second stop part is accommodated. Moreover, the above mentioned slight movement of the stop is sufficient to bring the second stop part 12 slightly out of register with the groove 15.

After the engine has been started, the regulating bar 2 is moved either by hand or by the governor in the direction for reducing the fuel supply. This movement of the regulating bar brings the end 4 of the screw 3 clear of the stop, and allows the latter to be moved by its spring 16 to a position in which an edge of the main stop part 8 is brought opposite the abutment screw 3. Thereafter and so long as the engine is in action, the maximum amount of fuel that can be supplied to the engine is determined by the main stop part 8, this amount being less than that available when the abutment screw was in contact with the second stop part 12. It will be understood that in the position in which the parts are shown in the drawings, the regulating bar may be moved into the excess fuel supply position.

To prevent the attendant from permanently obtaining an excess amount of fuel during normal running of the engine by altering the adjustment of the screw 10 which supports one side of the stop, a collar 19 is formed on the screw and said collar is initially caused to abut against the inner face of the housing 1 as shown, which consequently prevents the screw from being turned to a position that would enable extra fuel to be obtained. The only adjustment of this screw available to the attendant is rotation in the direction for reducing the predetermined maximum fuel supply.

By this invention the required provision for enabling the pump to give an extra fuel supply for engine starting purposes can be effected in a very simple and convenient manner.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A device for limiting motion in one direction of a member capable of movement in two opposite directions, comprising the combination with said member, of a stop composed of two relatively movable parts, a support along which said stop is movable between two service positions in which said parts serve respectively as abutments for said

4

member, manually operable means for moving said stop from one of said service positions to the other, and a spring arranged to oppose movement of said stop by said manually operable means and to return said stop to its initial position.

2. A device for limiting motion in one direction of a member capable of movement in two opposite directions, comprising the combination with said member, of a stop composed of a pair of parts one of which is movable relatively to the other, a support along which said stop is movable between two service positions in which said parts respectively serve as abutments for said member, manually operable means for moving said stop from one of said service positions to that in which the relatively movable stop part serves as the abutment for said member, said relatively movable stop part being engageable with said support to retain said stop in the service position into which it is movable by said manually operable means, and being disengageable from said support by said member, and a spring arranged to oppose movement of said stop by said manually operable means and to return said stop to its initial position after disengagement of said relatively movable stop part from said support.

3. A device for limiting motion in one direction of a member which is slidable in two opposite directions, comprising the combination with said member, of a stop composed of a pair of parts one of which is pivoted on the other, a post which is arranged transversely to said member and along which said stop is movable between two service positions wherein said parts respectively serve as abutments for said member, said post being formed with a circumferential groove adjacent to one of said service positions of said stop, a spring acting on the pivotal stop part in the direction for causing it to engage said groove when said stop occupies the appropriate service position, manually operable means for moving said stop to the latter service position in which said stop is retainable by the engagement of said pivotal stop with said groove, said pivotal stop part being disengageable from said groove by said member, and a second spring arranged to oppose movement of said stop by said manually operable means and to return said stop to its initial position after disengagement of said pivotal stop part from said groove.

4. A device as claimed in claim 3, in which said stop is angularly movable on said post, and has associated with it an adjustable member for effecting angular adjustment of said stop relatively to said post.

5. A device as claimed in claim 4 and having a fixed support carrying said adjustable member, and a collar provided on said adjustable member to cooperate with said support for limiting movement of said adjustable member in one direction.

WILFRID EDWARD WALTER NICOLLS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,268,699	Cotner	Jan. 6, 1942

OTHER REFERENCES

Baierlein, "American Bosch Fuel Injection Equipment for Diesel Engines," 1937, page 39, United American Bosch Corporation, Springfield, Massachusetts.