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K. G. JOHNSTON.

CARBURETER.

APPLICATION FILED AUG. 12, 1907.

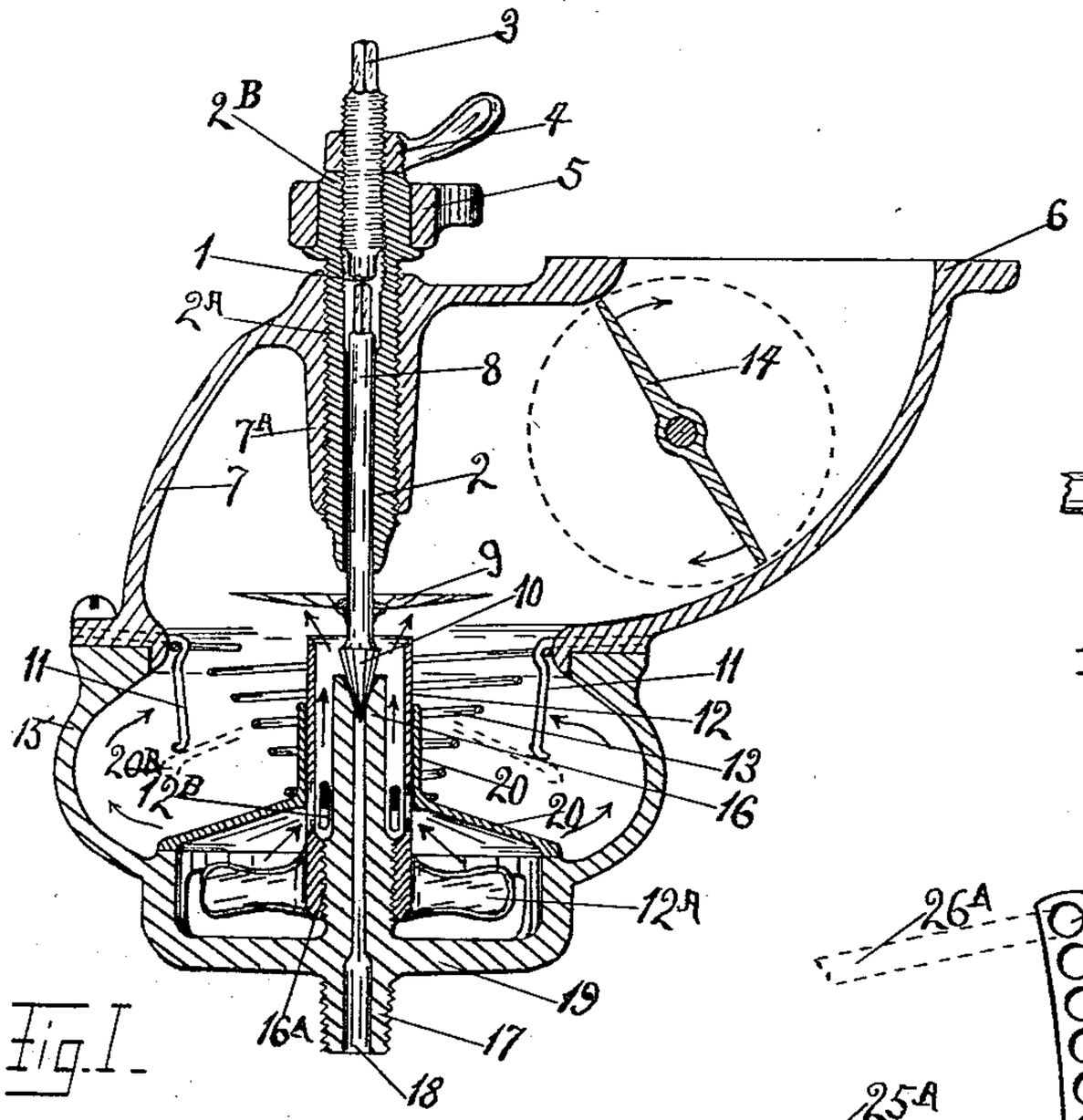

Fig. 1.

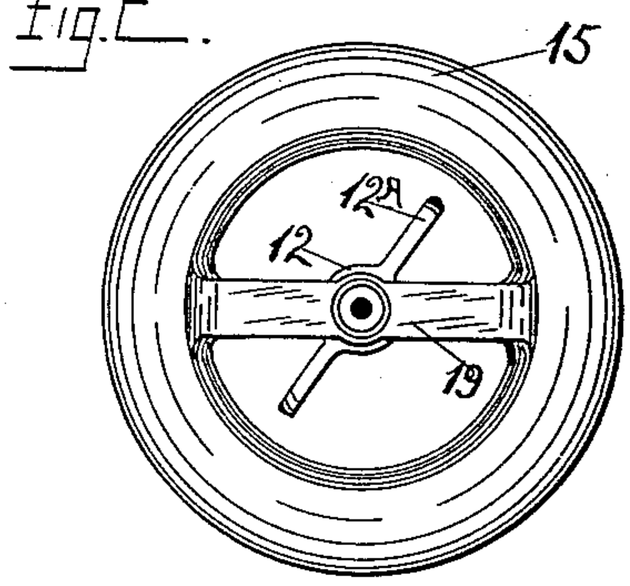

Fig. 2.

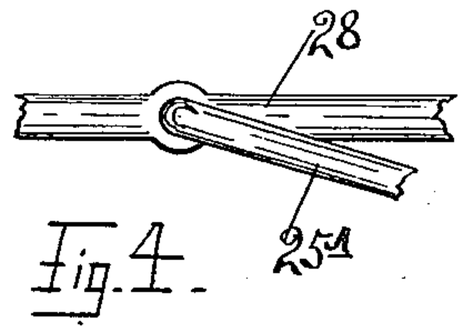

Fig. 4.

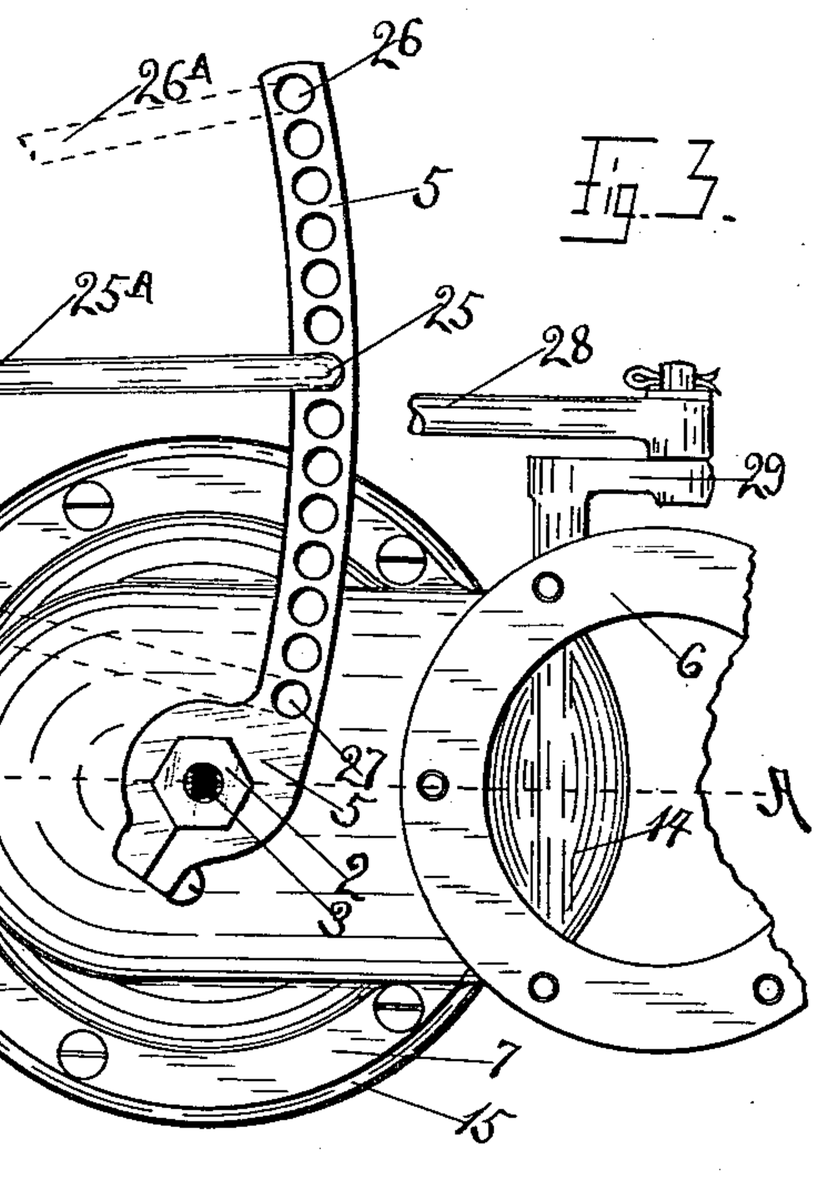

Fig. 3.

WITNESSES.

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CARBURETER.

No. 896,388. Specification of Letters Patent. Patented Aug. 18, 1908.

Application filed August 12, 1907. Serial No. 388,151.

To all whom it may concern:

Be it known that I, KIRK G. JOHNSTON, a citizen of the United States, residing at No. 61 East Twenty-fifth street, in the city of New York, county of New York, and State of New York, have invented a new and useful Carbureter, of which the following is a specification.

This invention relates to improvements in devices for the carburization of liquid fuels for the use of internal combustion engines and the objects of this invention are, first, to provide a proper mixture of fuel and air under all speed and load conditions of the engine, second, to provide such mixture positively at all times by positive mechanical action without dependence on the tension of springs or other automatic devices, third, to provide such mixture to the engine as freely as possible to the end that only slight vacuum tendency is created, fourth, to provide a thoroughly reliable carbureter that may be quickly and intelligently adjusted to all requirements of said internal combustion engines. These objects are attained by the mechanism illustrated in the accompanying drawing which is made part of this specification and in which—

Figure 1 is a sectional view of the carbureter substantially on the line A—A of Fig. 3; Fig. 2 is a bottom view of the carbureter (reduced); Fig. 3 is a top view of the carbureter and Fig. 4 a view of the connection of the pull rods for the control of the carbureter. The arrows show the direction of the flow of air through the carbureter.

Similar numerals refer to similar parts throughout the several figures of the drawing.

In the drawing 15 is the main casting of the carbureter, 16 being a fuel stand pipe, 17 the connection for the fuel conductor and 19 the supporting bar for the fuel stand pipe—these parts are cast in one piece.

7 is the cap portion of the carbureter, 7^A being the arbor portion through which is threaded the guide 2 for the needle stem 8 as shown at the point marked 2^A. Threaded into the head 2^B of the guide 2 and locked by means of the lock nut 4 is the adjustable stop 3 for the needle stem 8. A disk 9 is rigidly attached to the stem 8 of the needle 10, its purpose being to lift the needle 10 during the inrush of air attending the suction stroke of the engine. The needle stem 8 is squared at its end to facilitate, by means of a key, the grinding-in of the needle 10.

Around the fuel stand pipe 16 is an adjustable air pipe 12 having in its lower shell a number of elongated apertures 12^B for the admission of air and provided at its base with an internal thread shown at 16^A and thumb holds 12^A for its adjustment on the base of the fuel stand pipe 16.

Guided on the air pipe 12 is a foot valve 20 which is held in position, but in no case adjusted, by a light tension spring 13 and is stopped in its rise, when in a position shown by the dotted lines at 20^B, by the stops 11 which also serve to secure the upper part of the spring 13. The cylindrical stem portion of this foot valve 20 partly closes the aperture 12^B in the air pipe 12, thus permitting the adjustment of the quantity of air entering said air pipe 12 through the apertures 12^B and permitting full and excessive flow of air into the air pipe 12 when the foot valve 20 is lifted.

Firmly attached to the head of the threaded guide 2^B is a lever 5 adapted to turn said guide on its thread and thereby raise the said guide 2 and the needle stop 3; this lever 5 conforms in shape to an arc of a circle, of which the length of the pull rod 25^A is the radius, and is of such length as to provide for the shifting of said pull rod 25^A a sufficient distance to cause appreciable variation in the rise of the threaded guide 2.

In the drawing the arc-shaped lever 5 is provided with circular openings drilled along its length into which the bent end of the pull rod 25^A may be placed; it is obvious, however, that other means of holding said pull rod in proper position on the said arc-shaped lever 5 may be employed without departing from the spirit of this invention.

A throttle 14 operated by a lever 29 and a pull rod 28 is provided, but in case the engines have other means of being throttled, is unnecessary.

Fig. 4 shows a simple way of connecting the pull rods of the throttle and carbureter-needle so that they will work in unison: these connections may, however, be made in

a variety of ways in accordance with the conditions in each case.

While the essential and characteristic features and the preferred embodiment of the invention are illustrated in the accompanying drawing, it is obvious that the parts are susceptible of modification without departing from the spirit and intention of this invention, and particularly, that for heavy duty a carbureter embodying this invention could be constructed having a plurality of stand pipes with the movable guides geared to move in unison.

In operation a fuel tank somewhat higher than the carbureter or having the fuel under slight air pressure is connected to the carbureter at 17 and a connection made to the engine from the opening 6. For the first adjustment the throttle is nearly closed, with the pull rod 25[A] in a comparatively central position on the arc-shaped lever 5; the adjustment of the carbureter for lowest speed and light load is then made by the manipulation of the air pipe 12 up or down on the fuel stand pipe 16 by turning on the thumb holds 12[A] (see Fig. 2) to regulate the amount of air permitted to enter through the apertures 12[B] and the manipulation of the needle-stem stop 3 regulating the lift permitted to the needle 10 and the flow of fuel through the stand pipe 16. This adjustment for low speed and light load being made the throttle is fully opened, the spark advanced and other conditions for high speed and full load complied with. Opening the throttle has also lifted the threaded guide 2 and the stop 3 of the needle 10 thus permitting the flow of more fuel into the carbureter but the resulting mixture of more air and more fuel is not necessarily the best for complete combustion, therefore a further adjustment for high speed and full load is required. Said further adjustment is made by shifting the pull rod 25[A] along the lever 5 and thus regulating the flow of fuel past the needle 10. On account of the curvature of the lever 5 the shifting of the pull rod 25[A] along its length may be done without disturbing the original adjustment of the carbureter for low speed and light load. When both adjustments have been made according to these directions the throttle may be opened and closed to any extent with the assurance that a proper mixture of fuel and air is always available.

In further explanation—in a carbureter of the dimensions shown, with the pull rod 25[A] in the lever opening 25 as shown, and with a pull of three-fourths of one inch for said pull rod, the movement of the lever 5 would be through an arc of 25 degrees of a circle and the lift of the needle stop would be about .009 of an inch; with the same conditions and the pull rod in the lever opening 27 the lever would be moved through an arc of 90° and the lift of the stop would be about .017 of an inch; with the same conditions and the pull rod in the lever opening 26 the lever would be moved through an arc of 18 degrees only and the lift of the stop would be only about .003 of an inch. In all cases upon returning the throttle and the lever 5 to the position for low speed and light load, the adjustment would be exactly the same as originally made.

Although the figures given in the explanation would be excellent practice it does not follow that they are necessary to this invention, but are used to show the variations of adjustment.

Being aware that carbureters are now in use that employ foot valves, with spring adjustments and air lifted needles with spring stops, I do not claim those features broadly but do claim as new, novel and useful and desire to secure by Letters Patent—

1. In a carbureter,—an air lifted needle valve, a longitudinally movable guide for said needle-valve stem, an adjustable stop for said needle-valve stem in the said guide, and a lever attached to said movable guide and adapted to move same longitudinally varying amounts as and for the purpose set forth.

2. In a carbureter, the combination of an air liftable needle-valve; a guide, for the stem of said valve, movable vertically on a thread; an adjustable stop for said needle-valve stem in the said threaded guide; a projection or arbor, from the shell of the carbureter, into which the said movable guide is threaded and a lever firmly fixed to said movable guide and adapted to turn same on its thread thus raising said guide and stop vertically, as and for the purpose set forth.

3. In a carbureter; the combination of an air lifted needle valve, a fuel stand pipe, an adjustable air pipe with apertures near its base around said fuel stand pipe, a foot valve guided on said air pipe and partly covering said apertures, an adjustable and movable stop for said needle valve and a lever fixed to the said stop and adapted to raise same varying amounts according to the position of a pull rod which may be shifted along the length of said lever, substantially as and for the purposes set forth.

4. In a carbureter, the combination of an air liftable needle-valve; a threaded vertically movable guide for the stem of said needle-valve; an adjustable stop, for the stem of said needle-valve, in said threaded guide; a lever, firmly attached to said threaded guide, adapted to raise same on its thread; a projection or arbor, from the shell of the carbureter, through which the said guide is threaded; a fuel stand pipe projecting from the base of

the carbureter and forming the female member of said air liftable needle-valve; an adjustable air pipe, with apertures in its base portion, surrounding and threaded to the base of said fuel stand pipe; a foot valve guided on said air pipe and the shell inclosing the said parts as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of the two subscribing witnesses.

KIRK G. JOHNSTON.

Witnesses:
E. P. McGEEVOCK,
RUFUS HOWARD.