

No. 813,043.

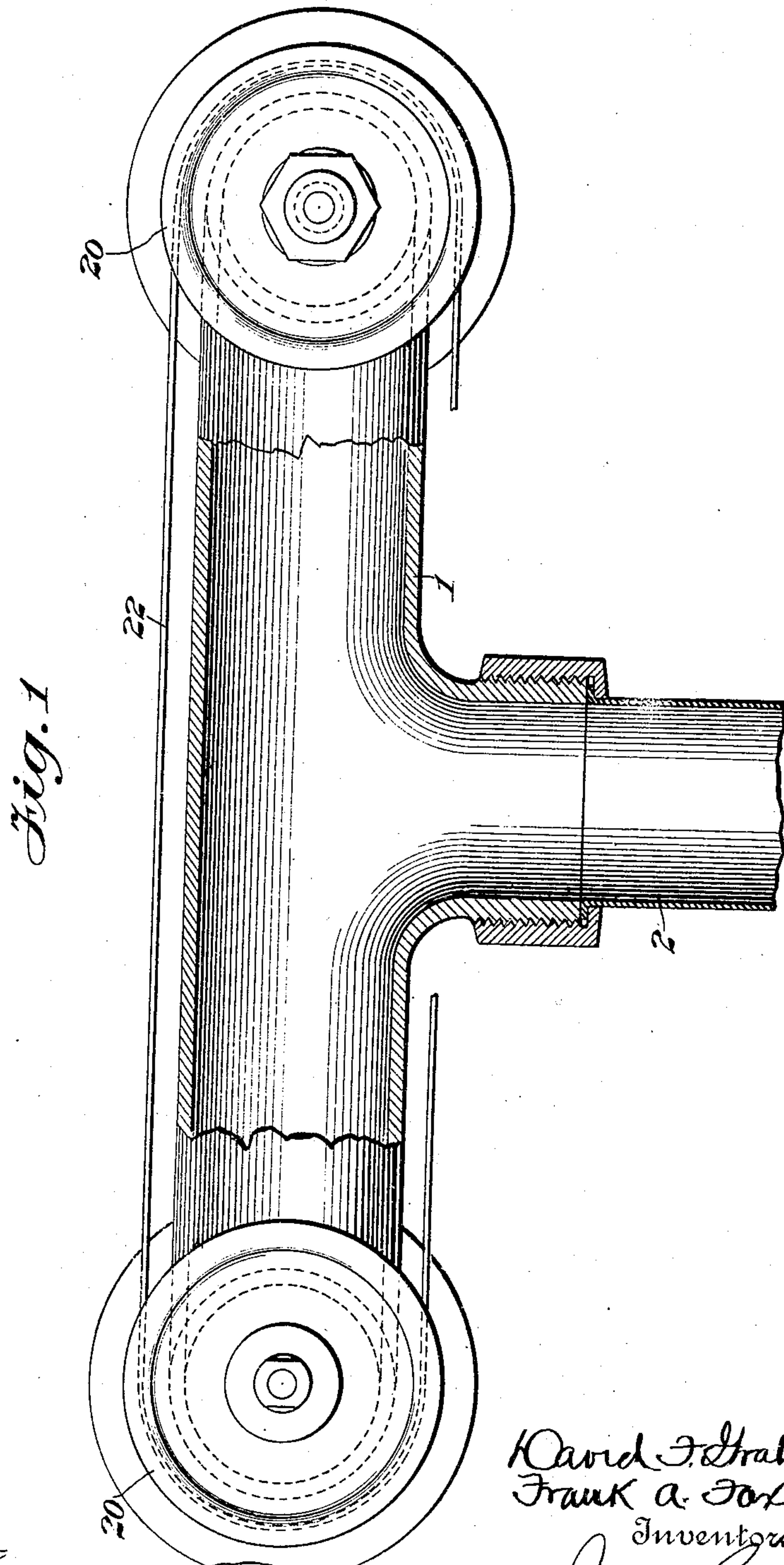
PATENTED FEB. 20, 1906.

D. F. GRAHAM & F. A. FOX.

VALVE CONTROLLING MECHANISM FOR EXPLOSIVE ENGINES.

APPLICATION FILED MAR. 11, 1903.

2 SHEETS—SHEET 1.



Witnesses
Chas. J. Clagett
J. W. Lybas

By Their Attorney,

David F. Graham,
Frank A. Fox,
Inventors
J. R. Little

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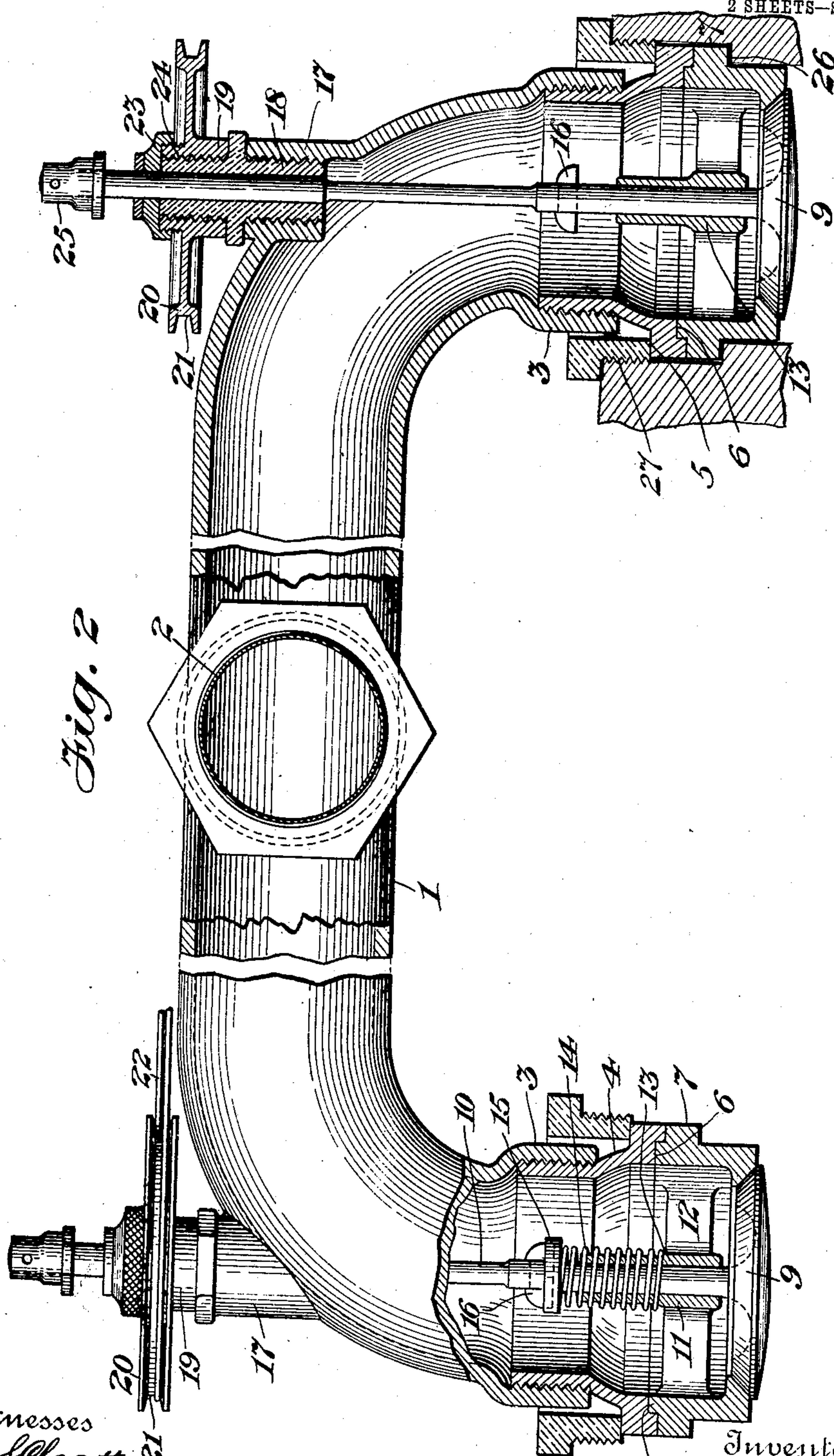
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By their Attorney,

Attorney

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UNITED STATES PATENT OFFICE.

DAVID F. GRAHAM AND FRANK A. FOX, OF STAMFORD, CONNECTICUT,
ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE EISENHUTH HORSE-
LESS VEHICLE COMPANY, OF MIDDLETOWN, CONNECTICUT, A COR-
PORATION OF MAINE.

VALVE-CONTROLLING MECHANISM FOR EXPLOSIVE-ENGINES.

No. 813,043.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed March 11, 1903. Serial No. 147,228.

To all whom it may concern:

Be it known that we, DAVID F. GRAHAM and FRANK A. FOX, citizens of the United States, residing at Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Valve-Controlling Mechanism for Explosive-Engines, of which the following is a specification.

10 This invention relates to inlet-valve-controlling mechanism for explosive-engines; and its primary object is to provide improved means for insuring the uniform action of all the inlet-valves between the cylinder and
15 vapor-pipe of the engine.

A further object of the invention is to provide effective means for closing all of the inlet-valves simultaneously when the engine is throttled.

20 Still further objects of the invention are to so project and expose to view the stem of the inlet-valve that the operation of the valve may be readily observed and any sticking or inaccuracy of its movement easily remedied
25 and to so construct the valve-seat and valve-stem as to render these parts removable and easy of access for renewal or repairs.

The construction of the improvement will be fully described hereinafter in connection
30 with the accompanying drawings, which form part of the specification, and its novel and characteristic features will be particularly set forth, and defined in the appended claims.

In the drawings, Figure 1 is a horizontal
35 section, partly in plan, of the vapor-pipe of an explosive-engine with our improved valves and controlling mechanism applied thereto; and Fig. 2 is a sectional elevation of the same.

Corresponding parts in both the figures are
40 denoted by the same reference characters.

The reference-numeral 1 designates the vapor-pipe of the engine, having the central vapor-passage 2 and downwardly-turned
45 ends 3, the latter being each internally threaded to receive the externally-threaded end of a coupling-union 4. The outer portion of each union 4 is flared and formed with an annular shoulder 5 and on its under surface with an annular recess 6.

50 7 designates valve-seats, each formed at its upper end with an annular flange 8, fitting the recess 6 of the union and beveled at its

lower end to conform to the contour of the inlet-valve 9, having a stem 10 extending through a centering-guide 11, supported by
55 radial arms 12. The guide 11 is circumferentially reduced at its upper portion to provide a shoulder 13 to support the lower end of a coil-spring 14 the upper end of which bears against a washer 15, mounted upon the valve-
60 stem and secured by a key 16 above the washer.

The upper surface of the vapor-pipe is formed adjacent to each end with an internally-threaded passage 17, in vertical align-
65 ment with the guide 11, and within said passage is fitted a threaded bushing 18, through which the valve-stem extends. The bushing 18 projects above the vapor-pipe and is formed with a thread corresponding to the in-
70 ternal thread on the hub 19 of a throttle-wheel 20, formed with a peripheral groove 21 to receive an endless cable 22, as will be hereinafter referred to. Above each of the throt-
75 tle-wheels is an internally-threaded cap 23, fitting an externally-threaded boss 24 projecting from the throttle-wheel, and upon the upper end of each valve-stem is fitted a stop-
nut 25, which limits the downward movement of the valve-stem by striking against the
80 cap 23.

Each of the valve-seats 7 is formed with an external annular shoulder 26, adapted to bear against a shoulder within the cylinder-
85 opening, with which the valve-seat communicates, and the union 4 is firmly clamped against the valve-seat by means of a nut 27, fitting a threaded opening in the outer end of the valve-opening in the cylinder, as indicated at the right-hand side of Fig. 2.

90 The operation of the valve-controlling mechanism constructed as above described will be readily understood by those skilled in the art to which this invention relates.

The partial vacuum created within the cyl-
95 nder by the motion of the piston draws the valves 9 away from their seats, causing the stop-nuts 25 to contact with caps 23 above the throttle-wheels. At the same time the charge of vapor is drawn into the cylinder.

100 The revolution of the throttle-wheels 20 by means of the endless-cable connection 22 lifts the throttle-wheels, and consequently, also, the valve-stems and valves, through the

intermediacy of the threaded connection between the throttle-wheels and bushings 18. The cable or flexible connection 22 is suitably connected with a controlling wheel or lever 5 located within easy reach of the operator, and when the controlling mechanism is employed in connection with the engine of an automobile it is located on any convenient part of the vehicle where it can be manipulated by the operator. 10

It will be apparent that the improvement affords ready means for removing the valve-seats and other parts for repairs or renewal and that a uniform simultaneous movement 15 of the valves is insured.

An important feature of the improved construction is the projection of the valve-stems beyond the vapor-pipe. This arrangement exposes the valve-stems to view, so that any 20 irregularity in the operation of the valves may be readily observed and corrected. Again, the upward movement of the valve-stems is effected positively by means of the screw connection between the throttle-wheels and 25 bushings, and said throttle-wheels are accurately centered with the valve-stems by the bushings employed.

While the throttle-wheels are operated in unison, either of them may be adjusted independently of the other. 30

We would have it understood that the invention is not restricted to all of the details shown and described, and we therefore reserve the right to make all such variations 35 and modifications in the construction and relative arrangement of parts as may fall within the purview of the following claims.

Having thus described our invention, we claim and desire to secure by Letters Patent— 40

1. In a controlling device for inlet-valves of explosive-engines, the combination with a vapor-pipe having a plurality of inlet-openings and valve-seats for said inlet-openings, 45 of inlet-valves for controlling said openings, throttle-wheels, a connection between said wheels for causing them to operate in unison and connections between said throttle-wheels and valve-stems, substantially as described.

50 2. In a controlling device for inlet-valves of explosive-engines, the combination with a vapor-pipe having a plurality of inlet-openings and valve-seats for said inlet-openings, of inlet-valves for controlling said openings,

throttle-wheels, a connection between said 55 throttle-wheels for causing them to operate in unison, and adjustable connections between said throttle-wheels and valve-stems for adjusting said throttle-wheels to limit the withdrawal of the valves from the seats of 60 said openings.

3. In a controlling device for inlet-valves of explosive-engines, the combination with a vapor-pipe having a plurality of inlet-openings and valve-seats for said inlet-openings, 65 of inlet-valves for controlling said openings, throttle-wheels, an endless cable connecting said throttle-wheels for causing them to operate in unison, connections between said throttle-wheels and valve-stems for adjust- 70 ing said throttle-wheels to limit the withdrawal of the valves from the seats of said openings, substantially as described.

4. The combination with the vapor-pipe of an explosive-engine, of a union-coupling secured to the end of said pipe and provided 75 with an annular flange having an annular recess in its under side, a valve-seat provided with an annular flange having an annular projection engaging said recess, a cylinder 80 provided with an annular shoulder to receive the flange of the valve-seat and an upwardly-extending annular flange having interior threads, a valve for said seat, and a clamping nut or ring arranged to bear down on the 85 flange of said coupling and clamp it and the flange of the valve-seat to the cylinder thereby holding the valve-seat in place.

5. In an explosive-engine, the combination with a vapor-pipe, and a plurality of 90 valve-seats and valves for said seats, of externally-threaded bushings mounted in said pipe, stems connected to said valves and mounted to slide in said bushings and provided above said bushings with stops to limit 95 their downward movement, throttle-wheels mounted to screw on said bushings and adapted to be raised or lowered thereon and to be engaged by said stops, and means for turning said wheels in unison, as set forth. 100

In testimony whereof we have signed our names in the presence of the subscribing witnesses.

DAVID F. GRAHAM.
FRANK A. FOX.

Witnesses:

F. O. McCLEARY,
J. CLARK RYBAS.