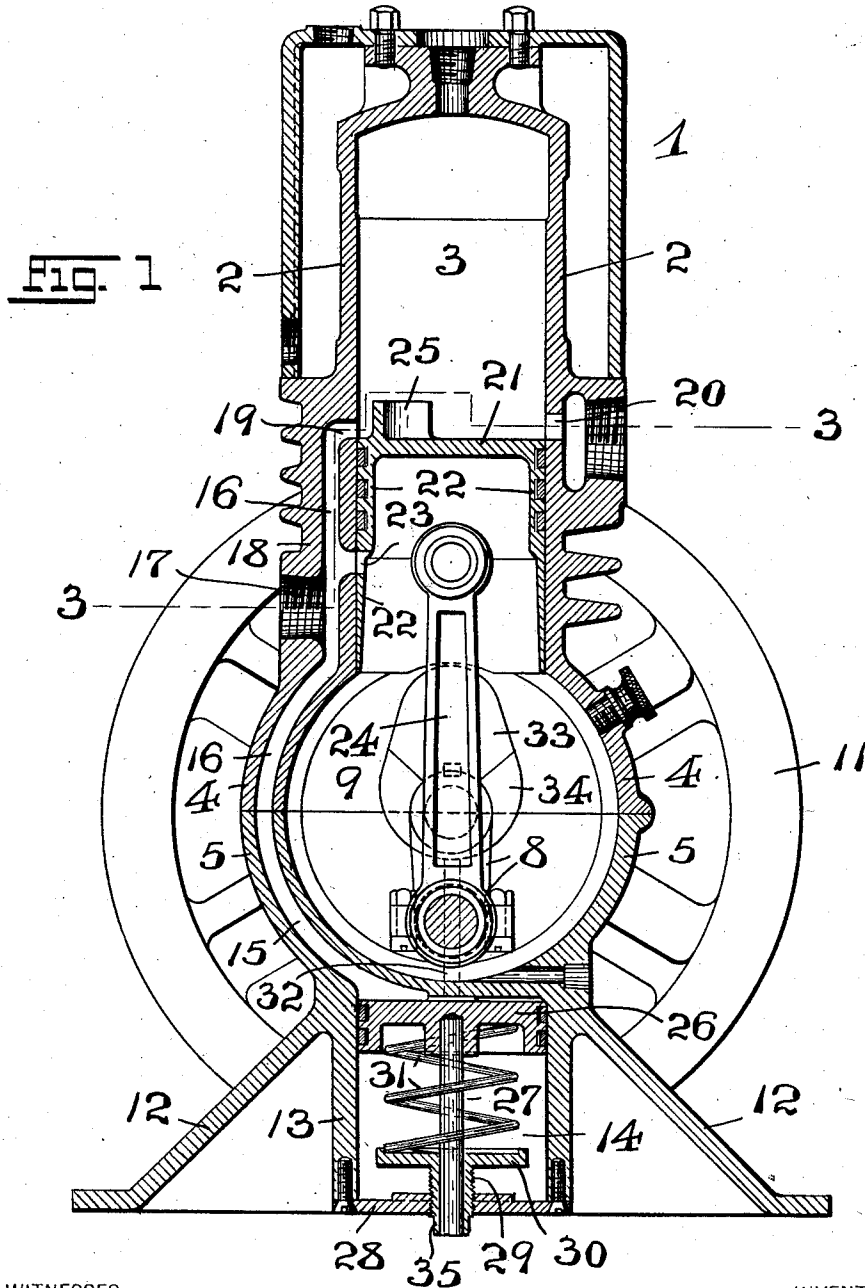


L. R. O'NEILL.
EXPLOSIVE GAS ENGINE.
APPLICATION FILED APR. 29, 1911.

1,021,791.

Patented Apr. 2, 1912.

3 SHEETS-SHEET 1.



WITNESSES:
Harry C. Pfeiffer
Anna H. Alter.

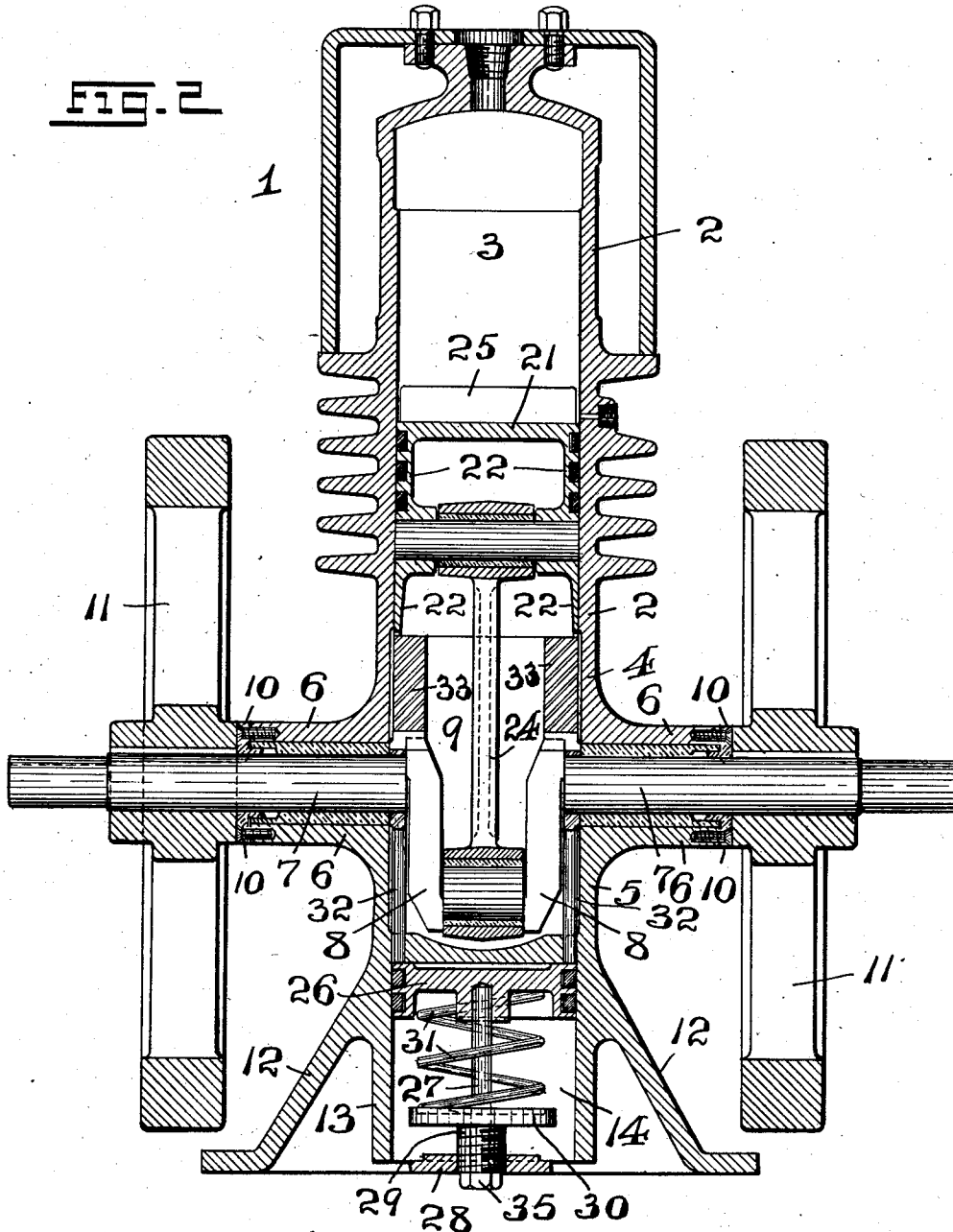
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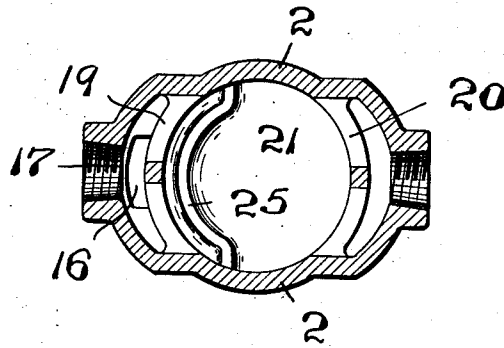


Fig. 3

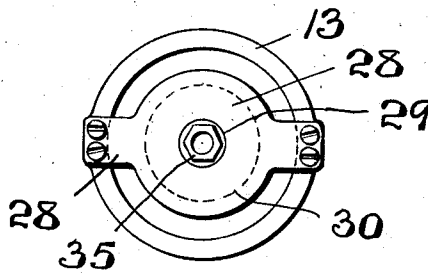


Fig. 4

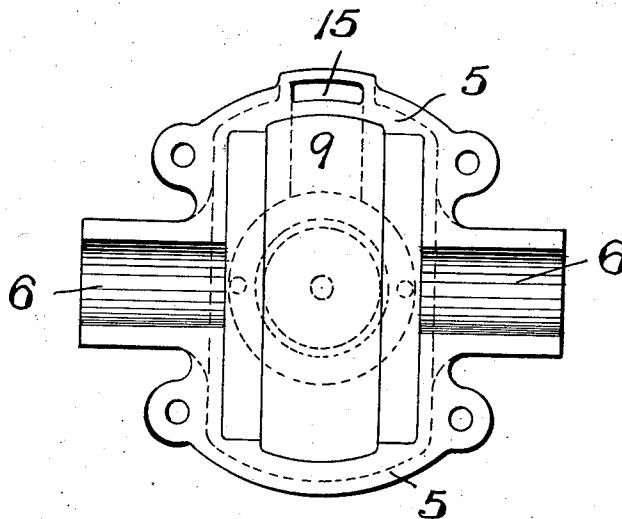


Fig. 5

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UNITED STATES PATENT OFFICE.

LEWIS R. O'NEILL, OF MONTCLAIR, NEW JERSEY.

EXPLOSIVE-GAS ENGINE.

1,021,791.

Specification of Letters Patent.

Patented Apr. 2, 1912.

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To all whom it may concern:

Be it known that I, LEWIS R. O'NEILL, a citizen of the United States, residing at Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Explosive-Gas Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention relates, generally, to improvements in explosive gas-engines; and the present invention has reference, more particularly, to a novel construction of gas-engine provided with means coöperating with the piston and cylinder for more thoroughly mixing the gasoline vapor and air to provide a richer gas, and at the same time compressing the mixture and delivering the same to the cylinder.

The present invention, therefore, has for its principal object to provide improvements in gas-engines, whereby the gas delivered to the engine by the carbureter is more thoroughly mixed and more quickly and easily delivered in a richer charge to the cylinder of the engine.

A further object of the present invention is to provide a suction means for drawing into the engine charges of gas, such suction means being auxiliary to the usual suction of the piston in the cylinder; said suction means further operating to discharge into the cylinder of the engine a quantity of gas at proper times.

Other objects of the present invention not at this time more particularly enumerated will be clearly understood from the following detailed description of the present invention.

With the various objects of the present invention in view, the said invention consists, primarily, in the novel construction of the improvements in gas-engines hereinafter set forth; and, furthermore, this invention consists in the several novel arrangements and combinations of the various devices and parts, as well as in the details of the construction thereof, all of which will be hereinafter more fully described in the following specification, and then finally

embodied in the clauses of the claim which are appended to and which form an essential part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a vertical cross-section of the novel construction of gas-engine made according to and embodying the principles of the present invention; Fig. 2 is a transverse cross-section of the same taken centrally through said Fig. 1, and in a plane at right angles to said Fig. 1. Fig. 3 is a horizontal cross-section taken on line 3—3 in said Fig. 1. Fig. 4 is a detail bottom view of an auxiliary suction means connected with said novel construction of gas engine. Fig. 5 is a detail plan view of the lower portion of the crank-casing of my novel construction of gas engine, the upper part of the said crank-casing being removed.

Similar characters of reference are employed in all of the hereinabove described views, to illustrate corresponding parts.

Referring now to the several figures of the drawings, the reference-character 1 indicates a complete gas-engine constructed in accordance with and embodying the principles of my present invention, the same comprising a cylinder-casting 2 provided with the usual cylinder-chamber 3. The lower portion of said cylinder-casting 2 is, preferably, formed to provide the upper portion 4 of a crank-casing. The reference-numeral 5 indicates the lower portion of said crank-casing. Connected with the respective upper and lower portions 4 and 5 of the crank-casing are bearing-portions 6 in which are journaled the respective outwardly extending members of a crank-shaft 7, which is provided with a crank-member 8 arranged to be inclosed within the chamber 9 formed by the respective portions of said crank-casing. The said bearing-portions 6 are provided at their free ends with suitable stuffing-box caps 10, whereby the said chamber 9 formed by said crank-casing may be made gas and air-tight. Secured upon the outwardly projecting ends of said crank-shaft 7 are the usual fly-wheels 11. The lower portion 5 of said crank-casing may be provided with a suitably formed base-portion or flange 12. Formed integrally with the lower end of said portion 5 of said crank-casing is a hollow cylindrical member 13 providing a gas-chamber 14. The wall of said lower portion 5 of said crank-casing is provided with a

suitably formed duct or passage 15, the lower end of which communicates with the interior of said gas chamber 14. The wall of the upper portion 4 of said crank-casing is also provided with a suitably formed duct or passage 16, the lower end of which communicates and registers with said duct or passage 15 of said lower portion 5 of said crank-casing so as to provide a continuous passage extending upwardly from said gas-chamber 14. The said duct or passage 16 extends upwardly throughout a portion of the wall of said cylinder-casting 2. Said cylinder-casting 2 is provided with a suitable opening 17 in its wall which communicates with said passage or duct 16, and in which may be secured, in any suitable manner, a pipe or other means for conducting gas or vapor from a carbureter to said passage or duct 16. Said passage or duct 16 is, furthermore, connected with the interior of said cylinder-casting by means of a lower port 18 and an upper port 19. The reference-character 20 indicates a suitable exhaust-port in the wall of said cylinder-casting 2 and communicating with said cylinder-chamber 3.

The reference-character 21 indicates a suitable piston-head which is slidably arranged within the cylinder-chamber 3, said piston-head 21 being provided with an apron or side walls 22 in which is arranged a piston-port 23, the same being in such a location that at proper times it will register with the respective lower and upper ports 18 and 19 above described. Said piston-head 21 is connected with the crank-member 8 of said crank-shaft 7 by means of the usual connecting-rod 24. The upper side of said piston-head 21 is provided with a suitably shaped and disposed deflector-plate 25, which, when the said piston head 21 reaches the bottom of its stroke, registers opposite, or in front of said upper port 19 and deflects and directs the gas entering there-through upwardly to the upper portion of said cylinder-chamber 3.

Slidably arranged within said gas-chamber 14, formed by said hollow cylindrical member 13, is a piston-member 26 provided with a stem or rod 27. Secured across the open bottom end of said hollow cylindrical member 13 is a guide-plate 28 provided with a centrally disposed screw-threaded opening in which is adjustably arranged, by means of its exterior screw-threads, a tubular guide-block 29, the same being adapted to slidably support and guide said stem or rod 27 of said piston-member 26. Said guide-block 29 is further provided at its upper end with an annular flange-portion 30 adapted to provide a seat upon which is seated one end of a coil-spring 31, which is arranged about said stem or rod 27, and the other end of which engages the under side

of said piston-member 26. Said coil-spring 31 tends to normally return said piston-member 26 to the top of its upward stroke within said gas-chamber 14. Secured to said piston-member 26 are a pair of link-pins 32 which extend upwardly from the upper side of said piston-member 26, the same passing through suitable openings in said lower portion 5 of said crank-casing and projecting upwardly within the chamber 9 formed thereby. Secured in connection with said crank-shaft 7 are a pair of cam-members 33, which, acting upon the upper free ends of said link-pins 32, push the same downwardly thereby operating said piston-member 26 to produce its downward stroke within said gas-chamber 14. For the purpose of economizing space, said cam-members 33 may be provided with cutout portions, as at 34, so that said cams may be made to fit over said crank-members 8, if desired. It will be apparent from an inspection of the accompanying drawings, that the tension of said coil-spring 31 may be regulated by raising or lowering said guide-block 29 and its flange-portion 30, and to facilitate this operation, the lower end of said guide-block 29 is provided with a squared-head 35, whereby a wrench or other tool may be applied to turn said guide-block in the screw-threaded opening of said guide-plate 28.

The operation of the above described features of my novel construction of gas-engine is as follows: The gas or vapor is fed from a suitable carbureter to the respective passages or ducts 15 and 16 through the opening 17. Upon an upward stroke of said piston-head 21, a suction is created within the chamber 9 formed by said crank-casing. The gas or vapor in said passage or duct 16 is drawn by said suction into said crank-casing chamber 9, first through the upper port 19 and the piston-port 23, when the latter registers with the former, and again through the lower portion 18 after the walls or apron 22 of the piston-head 21 pass the same. As will be clearly apparent from an inspection of the accompanying drawings, the cam-members 33 revolving with the crank-member 8 act upon the ends of said link-pins 32 pressing the same downwardly and consequently forcing the piston-member 26 downwardly within said gas-chamber 14. This movement is synchronous with the upward stroke of the piston-head 21. It will thus be apparent that as the gas or vapor is drawn into the crank-casing chamber 9, in the manner above described, a further quantity of gas or vapor is sucked through the passage or duct 15 and into said gas-chamber 14 by said downward stroke of said piston-member 26. As the piston-head 21 descends the gas or vapor is compressed within said crank-casing chamber

9, but as soon as the piston-port 23 registers with the lower port 18, the gas or vapor is discharged into said passage or duct 16 and through said upper port 19 into the cylinder-chamber 3, being deflected to the upper part thereof by said deflector-plate 25. Synchronously with the discharge of the gas or vapor from said crank-casing chamber 9 to said cylinder-chamber 3, the cam-members 33, which are preferably of a quick-acting type, release their downward pressure upon said link-pins 32, allowing the coil-spring 31 to press upwardly said piston-member 26, thereby discharging the gas or vapor collected within said gas-chamber 14 through the passages or ducts 15 and 16 where it mingles with the gas or vapor discharged from said crank-casing chamber 9, flowing therewith into said cylinder-chamber 3 through said upper port 19. It will thus be clearly apparent, that this auxiliary gas-controlling means, acting in concert with the devices controlling the collection and compression of the gas or vapor within said crank-casing chamber, operates to more thoroughly mix the gasoline and air, making a richer gas in a shorter space of time and delivering the same to the cylinder-chamber 3 at proper times.

Of course, it will be clearly understood that various changes may be made in the several arrangements and combinations of the various mechanisms and devices, as well as in the details of the construction of the same, without departing from the scope of the present invention, as described in the foregoing specification, and as defined in the claims which are appended to said specification. Hence, I do not limit my invention to the exact arrangements and combinations of the various mechanisms and devices as described in the said specification, nor do I confine myself to the exact details of the construction of the various parts of the same as illustrated in the accompanying drawings.

I claim:—

1. In an explosive engine, the combination with a cylinder, of a crank-casing connected with said cylinder, said cylinder and crank-casing having communicating gas-passages or ducts formed in their walls, said gas-passages or ducts communicating with an upper and a lower port, a piston-head, an apron depending from said piston-head having a piston-port therein, said piston-port registering at proper times with said lower and said upper ports, a crank-shaft arranged in said crank-casing, a connecting rod connecting said crank-shaft with said piston-head, a cylindrical member connected with said crank-casing providing an auxiliary gas-chamber communicating with said gas-passages or ducts, a piston-member arranged in said gas-chamber, link-pins con-

nected with said piston-member and extending into said crank-casing chamber, cam-members connected with said crank-shaft and operating in engagement with said link-pins to operate said piston-member, and an adjustable coil-spring in engagement with said piston-member to return the same upon the retreat of said cam-members, substantially as and for the purposes set forth.

2. In an explosive-engine, the combination with a cylinder and a crank-casing having gas-passages or ducts communicating with the interior of said cylinder and crank-casing, of a piston-head arranged in said cylinder, a crank-shaft supported in said crank-casing, a connecting rod connecting said crank-shaft with said piston-head, a cylindrical member providing an auxiliary gas-chamber in communication with said gas-passages or ducts, a piston-member arranged within said gas-chamber, link-pins connected with said piston-member, cam-members connected with said crank-shaft and operating in engagement with said link-pins to operate said piston-member, and an adjustable coil-spring in engagement with said piston-member to return the same upon the retreat of said cam-members, substantially as and for the purposes set forth.

3. In an explosive-engine, the combination with a cylinder and a crank-casing having gas-passages or ducts communicating with the interior of said cylinder and crank-casing, of a piston-head arranged in said cylinder, a crank-shaft supported in said crank-casing, a connecting rod connecting said crank-shaft with said piston-head, a cylindrical member providing an auxiliary gas-chamber in communication with said gas-passages or ducts, a spring-controlled piston-member arranged within said gas-chamber, and means connected with said crank-shaft for operating said piston-member to suck an auxiliary supply of gas into said auxiliary gas-chamber and subsequently discharge the same into said cylinder, substantially as and for the purposes set forth.

4. In an explosive-engine, the combination with a cylinder and a crank-casing having gas-passages or ducts communicating with the interior of said cylinder and crank-casing, of a piston-head arranged in said cylinder, a crank-shaft supported in said crank-casing, a connecting rod connecting said crank-shaft with said piston-head, a cylindrical member providing an auxiliary gas-chamber in communication with said gas-passages or ducts, a piston-member arranged within said gas-chamber, link-pins connected with said piston-members, cam-members connected with said crank-shaft and operating in engagement with said link-pins to operate said piston-member, a rod or stem connected with said piston-member, a guide-plate, a guide-block connected with

said guide-plate adapted to slidably support said rod or stem, a flange providing a spring-seat connected with said guide-block, a coil-spring arranged between said spring-seat and said piston-member, and means for adjusting the position of said guide-block with relation to said guide-plate to control the tension of said coil-spring, substantially as and for the purposes set forth.

5. In an explosive engine, the combination with a cylinder, of a crank-casing connected with said cylinder, said cylinder and crank-casing having communicating gas-passages or ducts formed in their walls, an upper and a lower port communicating with said gas-passages or ducts, a piston-head, an apron depending from said piston-head having a piston-port therein, said piston-port registering at proper times with said lower and upper ports, a crank-shaft arranged in said crank-casing, a connecting rod connecting said crank-shaft with said piston-head, a cylindrical member connected with said crank-casing providing an auxiliary gas-chamber communicating with said gas-passages or ducts, a piston-member arranged in said gas-chamber, link-pins connected with said piston-members, cam-members connected with said crank-shaft and operating in engagement with said link-pins to operate said piston-member, a rod or stem connected with said piston-member, a guide-plate, a guide-block connected with said guide-plate adapted to slidably support said rod or stem, a flange providing a spring-seat connected with said guide-block, a coil-spring arranged between said spring-seat and said

piston-member, and means for adjusting the position of said guide-block with relation to said guide-plate to control the tension of said coil-spring, substantially as and for the purposes set forth.

6. In an explosive engine, the combination with a cylinder, of a crank-casing connected with said cylinder, said cylinder and crank-casing having communicating gas-passages or ducts formed in their walls, an upper and a lower port communicating with said gas-passages or ducts, a piston-head, an apron depending from said piston-head having a piston-port therein, said piston-port registering at proper times with said lower and upper ports, a crank-shaft arranged in said crank-casing, a connecting rod connecting said crank-shaft with said piston-head, a cylindrical member connected with said crank-casing providing an auxiliary gas-chamber communicating with said gas-passages or ducts, a spring-controlled piston-member arranged within said gas-chamber, and means connected with said crank-shaft for operating said piston-member to suck an auxiliary supply of gas into said auxiliary gas-chamber and subsequently discharge the same into said cylinder, substantially as and for the purposes set forth.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 25th day of April, 1911.

LEWIS R. O'NEILL.

Witnesses:

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FREDK. H. W. FRAENTZEL.