A. N. DITTLINGER.

ROTARY GASOLENE ENGINE.

APPLICATION FILED APR. 3, 1911.

1,013,139.

Patented Jan. 2, 1912.

3 SHEETS—SHEET 1.

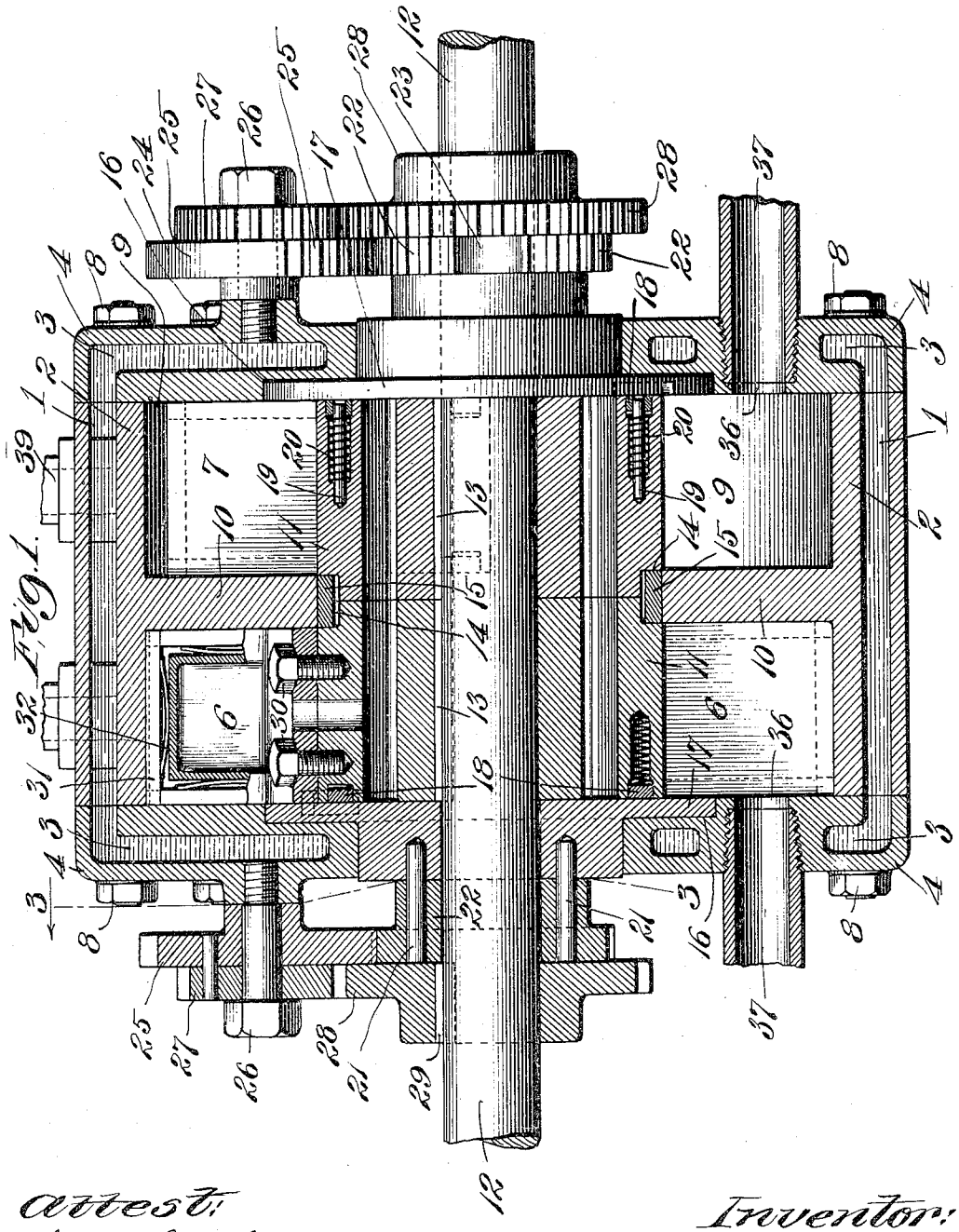

Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 3.

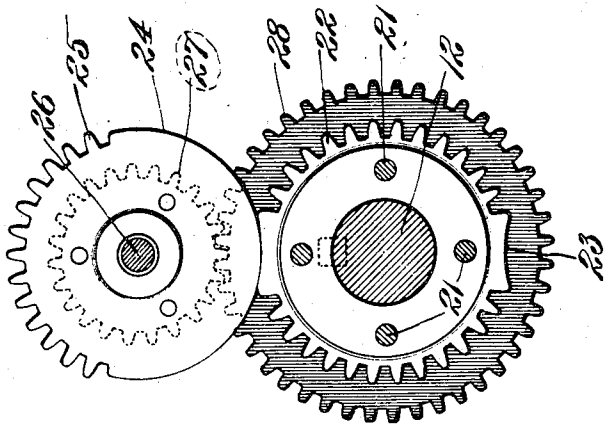
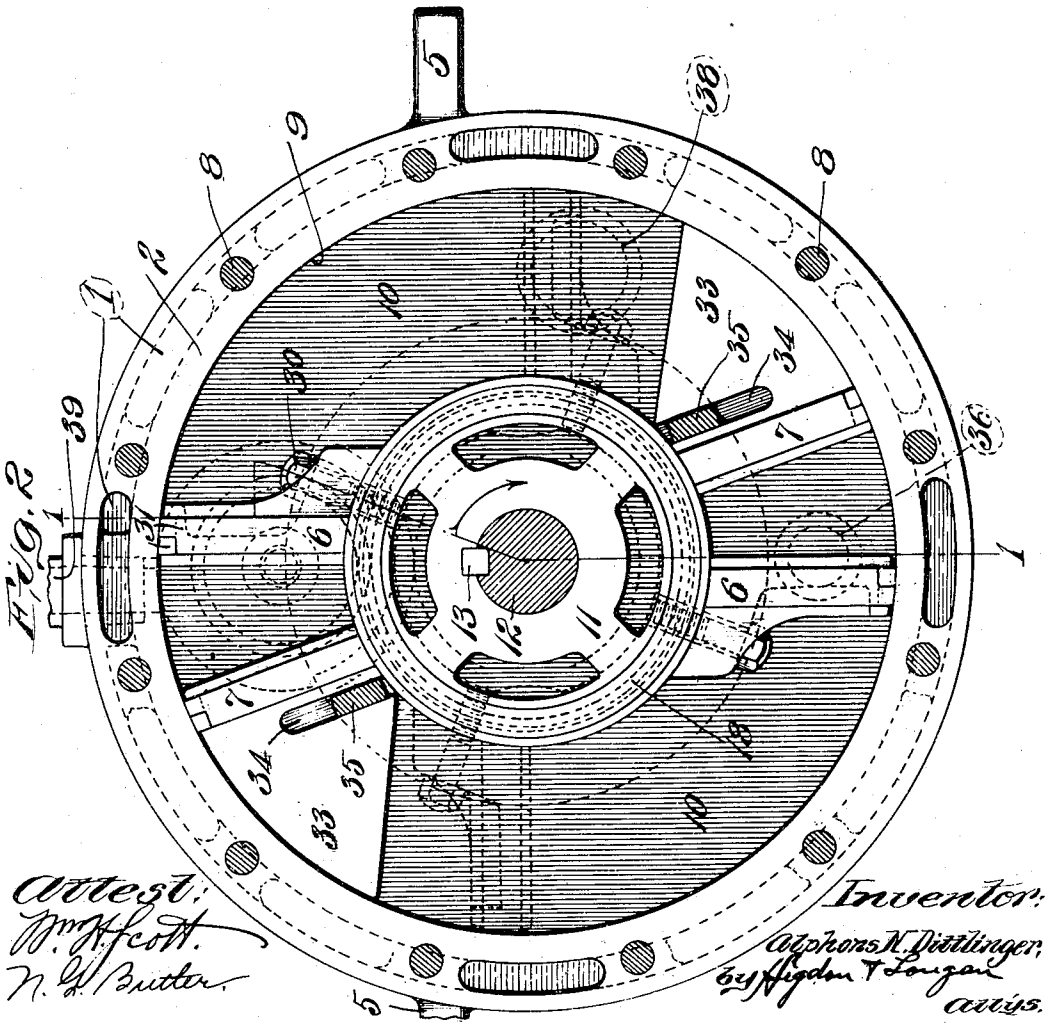


Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4.

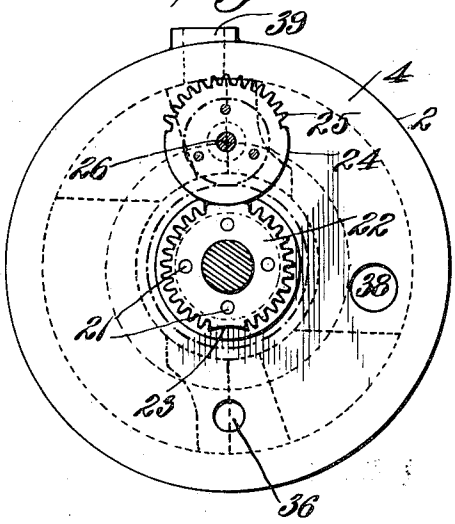


Fig. 5.

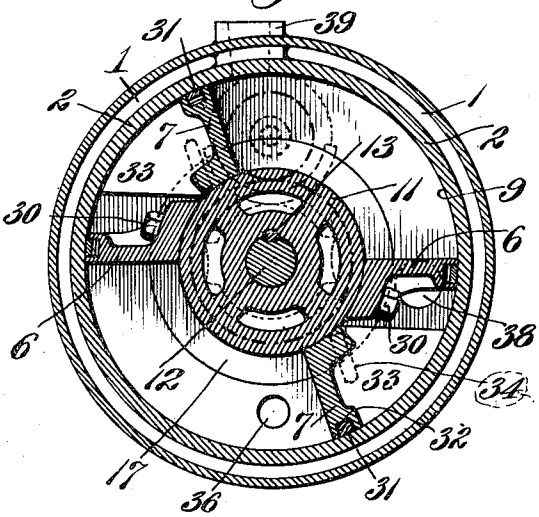


Fig. 6.

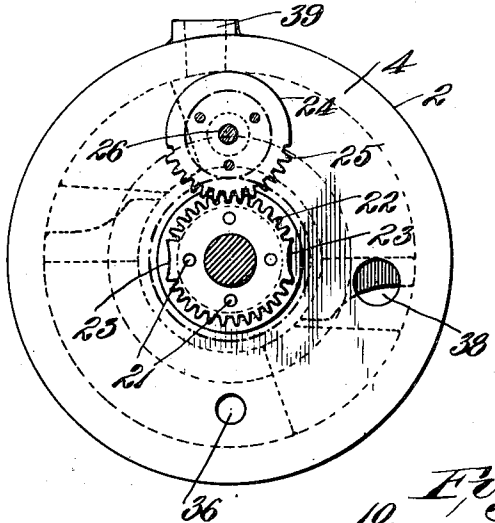


Fig. 7.

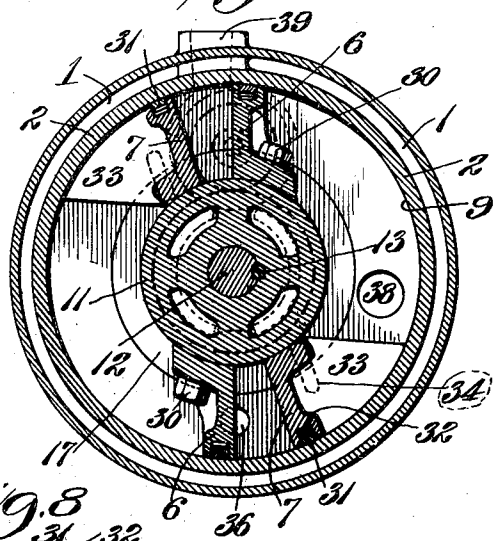
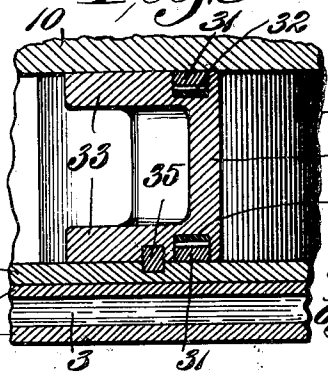


Fig. 8



Attest:

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UNITED STATES PATENT OFFICE.

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ROTARY GASOLENE-ENGINE.

1,013,139. Specification of Letters Patent. Patented Jan. 2, 1912.

Application filed April 3, 1911. Serial No. 618,597.

To all whom it may concern.

Be it known that I, ALPHONS N. DITTLINGER, a citizen of the United States, and resident of St. Louis, Missouri, have invented certain new and useful Improvements in Rotary Gasolene-Engines, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to an improved rotary gasolene engine, and consists in the novel construction and combination of parts hereinafter described and pointed out in the appended claims.

The object of my invention is to provide a true rotary gasolene engine which shall possess all the advantages of almost perfect balancing of the rotative parts; light weight; low cost of construction and operation; and which shall produce an almost continuous torque.

A further object is to produce a rotary gasolene-engine having a suitable casing or shell; a rotary hub mounted on a straight main-shaft within said casing, so as to form concentric explosion and compression-chambers (or cylinders) in the space between the interior of said casing and the periphery of said hub; continuously-rotating pistons, mounted diametrically-opposite each other on the periphery of said hub, within said concentric-chambers; intermittently-rotating pistons, also mounted in said concentric-chambers and arranged to follow the path of said first-mentioned pistons, so as to compress the charge in rear of said continuously-rotating pistons, then stop momentarily while the charge is fired and expanded, then move forward at double the speed of said first-mentioned pistons to scavenge the said chambers, and "catch up" with said first-mentioned pistons and momentarily stop there while the said first-mentioned pistons draw in a charge; and suitable operative connections between the said main-shaft and said intermittently-moving pistons, for intermittently locking them to the said main-shaft, and to said casing, intermittently releasing them, and intermittently moving them forward in accomplishing the necessary "cycles."

In the drawings, Figure 1 is a sectional side-elevation of a rotary engine embodying my invention, the section being taken on line 1—1 of Fig. 2. Fig. 2 is a sectional end-elevation of my engine, as shown in Fig. 1, with one of the end-covers or heads carrying the gears removed, and looking toward the right-hand in Fig. 1. Fig. 3 is a sectional detail of the intermittent-gears, the section being taken on line 3—3, and looking in the direction indicated by the arrow of Fig. 1. Fig. 4 is end-view, looking at the parts at the left-hand end of Fig. 1, in a direction the reverse of that indicated by the arrow therein shown, and with the gears in a different position. Fig. 5 is a reduced sectional end-elevation, showing the relative position of the parts within the concentric chamber which is that at the right-hand in Fig. 1, while the like parts of the companion (or left-hand) chamber are in the position in which they are shown in Fig. 2. Fig. 6 is a similar view to Fig. 4, with the parts thereof in a different position. Fig. 7 is a view similar to Fig. 5, with the parts thereof in a different position, and Fig. 8 is a detail section, through a portion of the water-jacket shown at the left-hand end of Fig. 1, and the contiguous parts.

I preferably construct my engine with a water-jacket 1, surrounding the cylindrical-casing 2 and communicating with the water-jacket passages 3 of the heads 4, although any skilled workman may readily construct my engine with cooling-devices known as an "air-cooled" type, by omitting said water-jacket and applying the well-known "cooling-flanges, or cooling-ribs."

My engine, on account of its relatively-great power and light weight, is especially adapted for use in automobiles and flying machines; the casing 2 being provided with the usual lugs 5 for supporting the engine upon the frame of the vehicle. (See Fig. 2.) Said casing is preferably in the form of a cylindrical-casting of any suitable diameter and length for the purpose required of it; it being bored internally to receive the pistons 6 and 7 which rotate within it, and faced upon its ends to receive the said heads 4, which latter are secured in position by the usual studs and nuts 8. The said casing may be of sufficient length to accommodate within it the pistons of one, two, three or more complete and independent engines. In the present instance, I have shown the pistons of but two engines within said casing, the concentric cylinders 9

of which are separated by a fixed partition 10, said partition being, of course, annular in form as shown in the drawings. Each engine has a hub 11, which is fixed upon the straight main-shaft 12 by a key 13, and adjoining hubs are provided with a packing-ring groove 14, in which is mounted a common circular packing ring 15. The outer periphery of said packing-ring 15 forms a tight joint with the adjacent edge of the annular partition 10, and in this way said ring performs the dual function of packing the joint between adjacent hub-ends, and also packing the joint between the said partition 10 and the peripheries of the said hubs. Mounted loosely upon the main-shaft 12, and having a recessed bearing 16 in the head 4 (that is, the head of each engine) is a revolving disk 17. The outer ends of said hubs 11 form a tight joint with the inner face of said disks 17, there being common circular packing-rings 18 recessed into the ends of said hubs for such purpose (see Fig. 1). Said packing-rings 18 are compelled to rotate with the said hubs, by reason of pins 19 seated in the ends of the hubs and engaging corresponding apertures in the said packing-rings. Springs 20 surround said pins 19 and urge the said packing rings into contact with the face of the said revolving disks. Said revolving disks 17 are, as before stated, loose on the said main-shaft, and are only intermittently revolved. The means for intermittently revolving said disks will now be described: Fixed upon the exterior of said disks 17, but detachably secured thereto, by means of strong pins 21, are intermittent gear wheels 22, having diametrically opposite portions of their teeth supplanted by concave sections 23, which fit the corresponding smooth segment 24 of a mutilated gear 25, which latter is mounted upon a stud 26 projecting from the head 4 directly above the main shaft. Fixed upon the outer face of the mutilated gear 25 is a "two-to-one" pinion 27, which meshes with a corresponding gear-wheel 28, which is secured upon the main shaft 12 by means of a key 29, or other suitable securing device.

I will now describe the detailed construction of the rotating pistons and the intermittently-rotating pistons.

The rotating pistons 6 are of course rectangular in shape to fit the rectangular cross-section of the said concentric cylinders 9, and said pistons are secured upon the said hub 11 diametrically opposite each other for each engine, suitable bolts 30 being used for securing said pistons to the said hubs. The pistons 6 are packed by means of common packing strips 31, mounted as usual in grooves in the outer faces of the said pistons, and held in position by means of common flat springs 32. The said intermittently-rotating pistons 7 are also provided with the usual packing strips 31 and springs 32, as just described, in connection with the said rotating pistons 6, but the said intermittently-rotating pistons 7 are provided with rearwardly-extending guide-flanges 33, the outer one of which is provided with a slot 34, which receives a key 35. The key 35 connects the intermittently-rotating piston 7 to the adjacent revolving disk 17, and each of said disks is thus connected to two of said intermittently rotating pistons which are diametrically opposite.

Suitable inlet-ports 36 are formed in the heads 2, and provided with inlet-pipes 37 for connection with the carbureter or carbureters (not shown). The exhaust-ports 38 are in the head at about in a plane with the main-shaft.

The main-shaft 12 may be fitted with the usual fly-wheel and starting-crank, as the judgment of the skilled workman dictates.

The usual electrical sparking-mechanism and spark-flues (not shown) are made use of. The spark-plugs are applied to the spark-plug connections 39, shown at the top of the engine, so that the charge compressed between the coacting pistons may be exploded.

The operation is as follows: The engine here shown will make four explosions to each revolution of the main-shaft, which is the same number of explosions per revolution as that made by the common eight-cylinder high compression gasolene engine; in other words, there will be two explosions in each of my concentric cylinders 9 at each revolution of said shaft. By a mere duplication of parts, a larger number of concentric cylinders may be placed on the same main-shaft, and thereby produce a greater number of explosions per revolution. As indicated by the dotted lines in Fig. 2, the rotating pistons 6 in the twin concentric cylinders 9 are fixed relatively at right angles to each other. The engine runs in the direction indicated by the arrow in Fig. 2, which is toward the right hand. It will be observed that my engine has no valves except those formed by the pistons themselves in covering and uncovering the inlet and exhaust ports. The two pistons 6 and 7, shown at the top of Fig. 2, are in a position to have the compressed charge exploded in the space between them, while the two pistons at the bottom of Fig. 2 are in a position to receive a fresh charge of gas in the space between them. With said pistons in the position just described, the two intermittently-rotating pistons 7 are locked to the casing for a moment during the explosion and expansion of the charges which have been compressed between them, such momentary locking of the said pistons 7

having been brought about by the position of the gears shown in 1 and 3, especially in the latter figure, wherein it will be seen that the concave sections 23 of the gear wheel 22 rest in contact with the smooth segment 24 of the mutilated gear 25, thus preventing said gear 22 from turning on the shaft 12, and of course also preventing rotation of the disk 16, to which said gear 22 is fixed, and likewise preventing the rotation of the said pistons 7 during the time that the smooth segment 24 is moving across the face of said concave section 23. As the movement of the rotating pistons 6 takes place by reason of the explosion, the piston 6 at the top of Fig. 2 will be driven forward until it reaches and passes over the exhaust-port 38, when the burned gases will thereupon be exhausted and the said piston will continue its movement until it assumes the position in which the piston 6 is shown at the bottom of Fig. 2. At this point the previously locked piston 7, shown at the top of Fig. 2, will be released by its gears and will be caused to follow the piston 6 which the described explosion previously moved, thus scavenging the concentric cylinder by forcing the exhaust gases out of the exhaust port at double the speed of the said piston 6, until said piston 7 "catches up" with the said piston 6 and assumes the position in which the piston 7 is shown at the bottom of Fig. 2, where it will be again locked, ready to receive a new charge of gas in the space between the pistons 6 and 7 at the bottom of Fig. 2, and so on. It will thus be seen that intermittently rotated pistons 7 move forward in a step-by-step movement, to scavenge the cylinders 9 and to compress the charge in the rear of said rotating-pistons 6. The compressed charges are all fired by the spark-plug at the top of the engine. When the explosion above described has taken place in the cylinder which is at the left-hand of Fig. 1, a charge of gas has meanwhile been drawn in through the inlet-port of the cylinder at the right-hand of Fig. 1, to be compressed and fired and exhausted in regular cycle, and so on, the two concentric cylinders and their pistons producing an explosion every quarter of a revolution of the main-shaft.

I claim:

1. A rotary gasolene engine, comprising a suitable casing having a cylindrical bore; a straight main-shaft within said casing; a hub mounted on said shaft within said casing to form a concentric chamber in the space between the interior of said casing and the periphery of said hub; continuously-rotatable-pistons fixed diametrically opposite each other on the periphery of said hub within said concentric chamber; intermittently-rotatable-pistons also mounted in said concentric chamber to follow the path of said first mentioned pistons and compress the charge in the rear thereof; means for intermittently moving said intermittently-rotatable pistons; means for locking the latter while the charge is to be fired and expanded; means for moving forward at double the speed of the said first-mentioned pistons, the said intermittently-rotatable pistons; and suitable inlet and exhaust connections for the said concentric chamber.

2. The improved rotary gasolene engine, comprising, a cylindrical casing, pistons 6 and 7 arranged to rotate within said casing, opposite heads for said casing, a straight main-shaft passing axially through said casing, a hub fixed upon said main-shaft within said casing, a revoluble disk mounted loosely on the said main shaft at one end of said casing and having a recessed bearing 16 in one of said heads, means for intermittently revolving said revoluble disk, a key 35 connecting the pistons 7 to the said revoluble disk, so that said pistons will move intermittently with said disk, the said pistons 6 being fixed upon the periphery of said hub to rotate continuously therewith, and suitable inlet and exhaust connections for said cylindrical casing.

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

ALPHONS N. DITTLINGER.

Witnesses:

E. L. WALLACE,

JOHN C. HIGDON.