No. 756,646. PATENTED APR. 5, 1904.

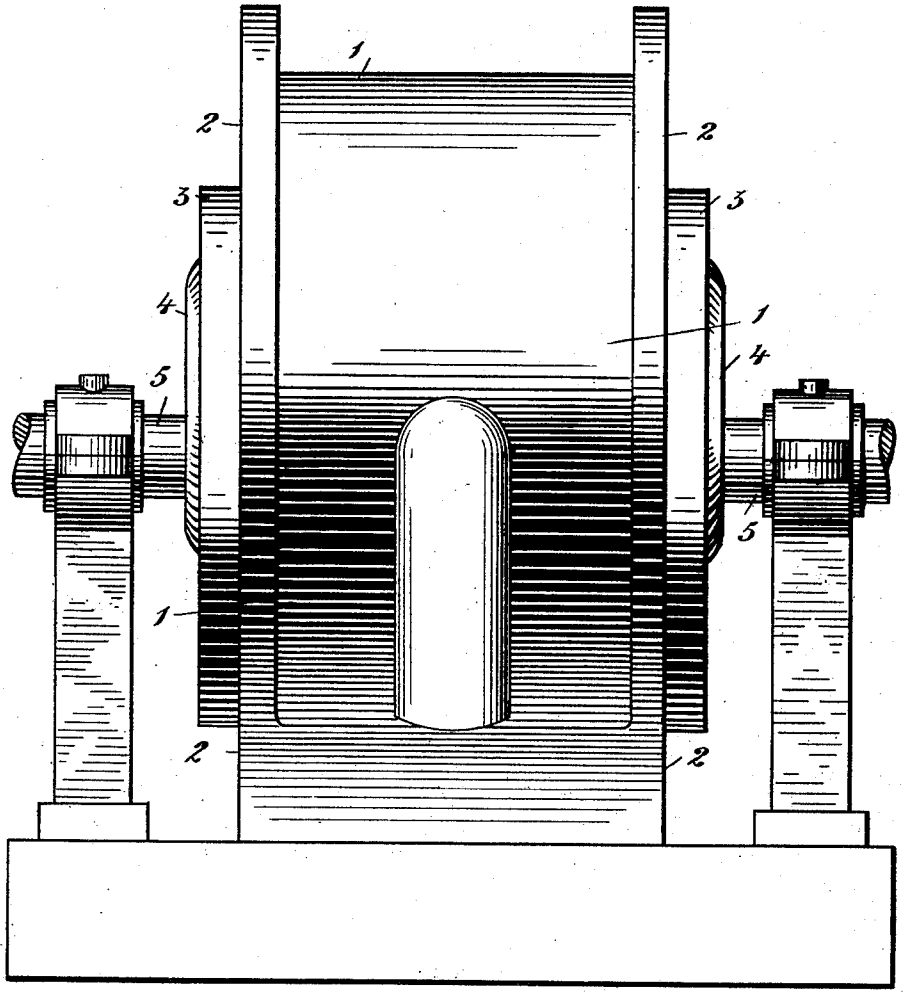
C. H. JOLLIFFE & A. COULTHARD.

ROTARY ENGINE.

APPLICATION FILED OCT. 12, 1903.

NO MODEL. 6 SHEETS—SHEET 1.

Fig. 1.



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C. D. Kesler

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Alfred Coulthard
By James L. Norris
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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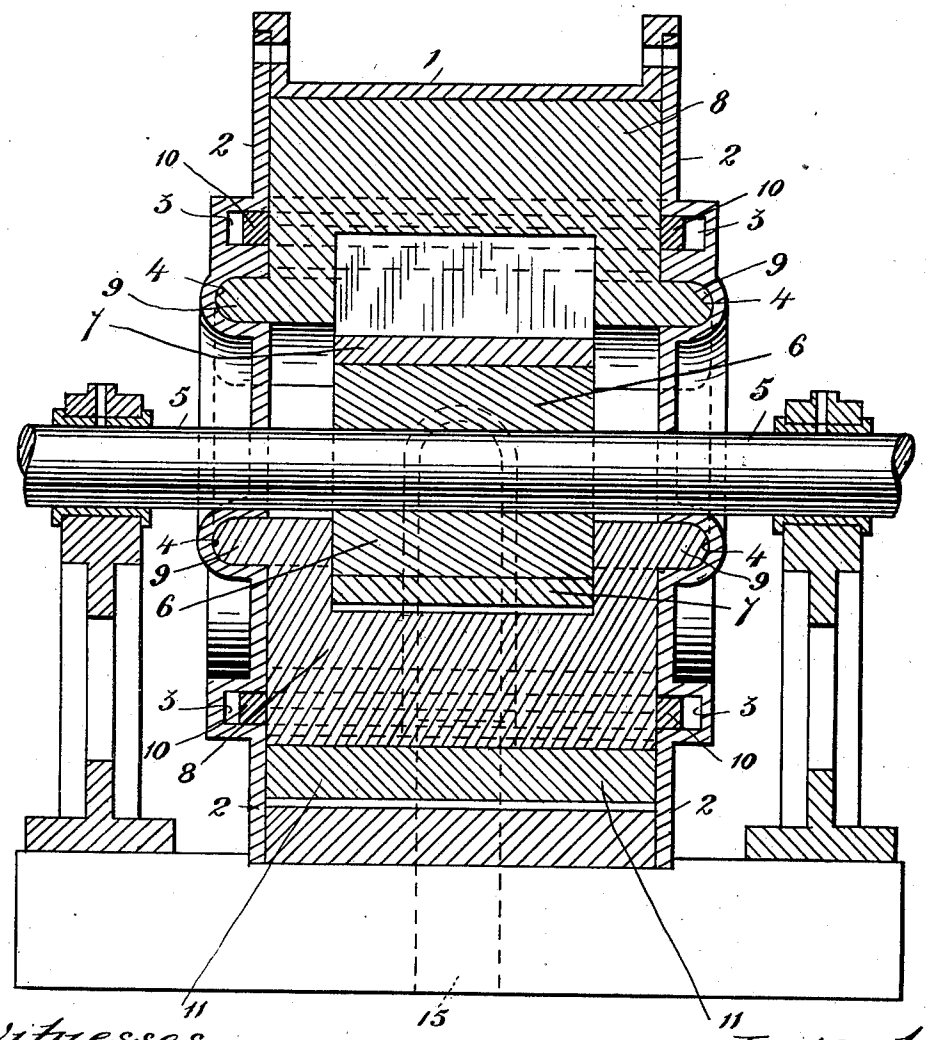
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NO MODEL. 6 SHEETS—SHEET 2.

Fig. 2.



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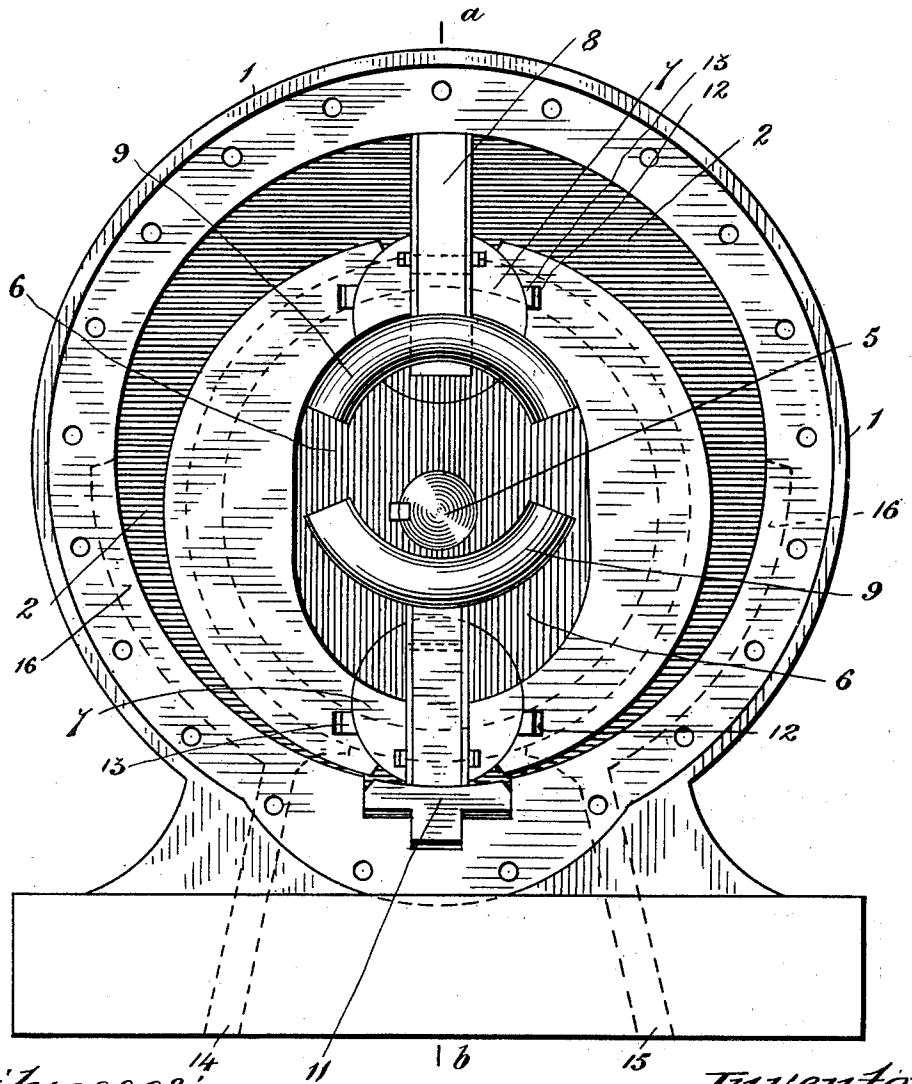
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NO MODEL. 6 SHEETS—SHEET 3.

Fig. 3.



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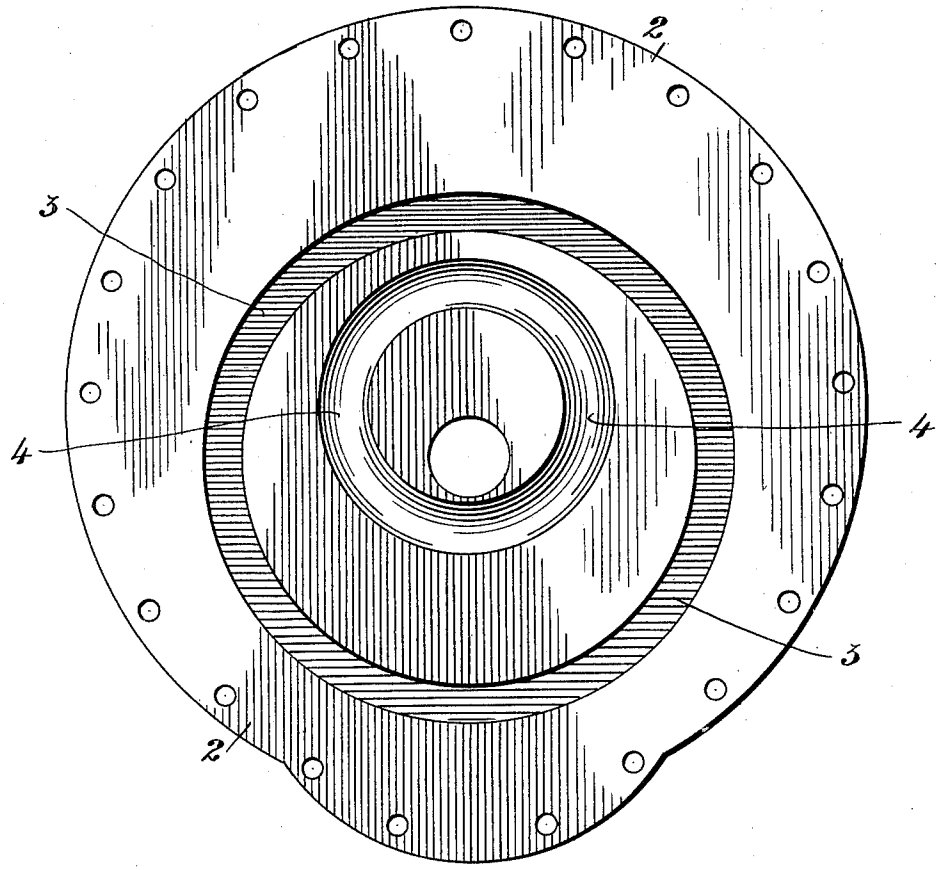
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NO MODEL. 6 SHEETS—SHEET 4.

Fig. 4.



Witnesses
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NO MODEL. 6 SHEETS—SHEET 5.

Fig. 5.

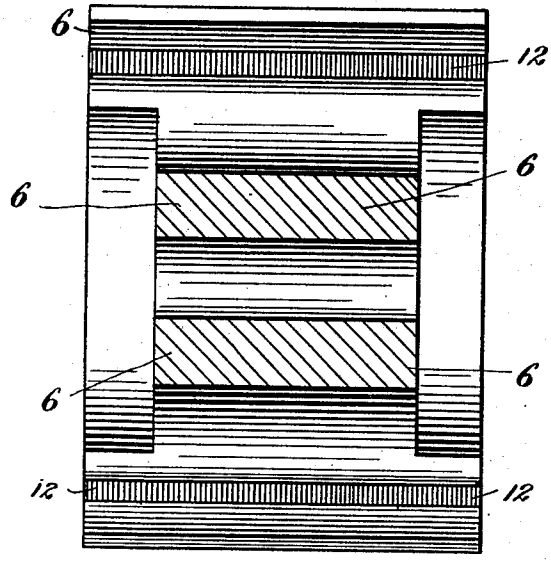


Fig. 6.

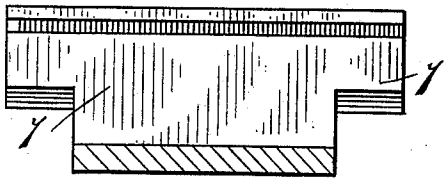


Fig. 7.

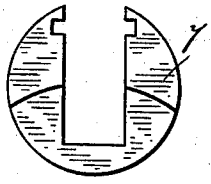
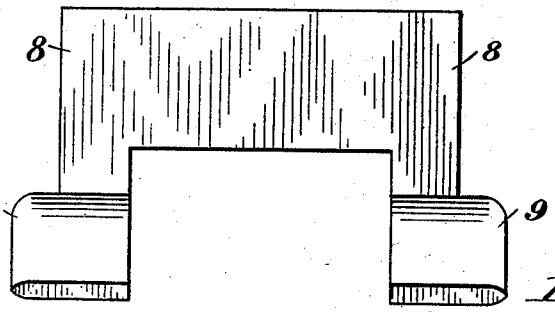


Fig. 8.



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C. H. JOLLIFFE & A. COULTHARD.

ROTARY ENGINE.

APPLICATION FILED OCT. 12, 1903.

NO MODEL. 6 SHEETS—SHEET 6.

Fig. 9.

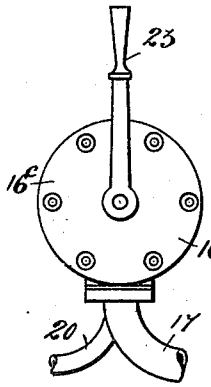


Fig. 10.

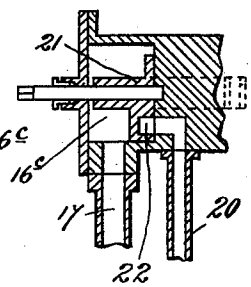


Fig. 11.

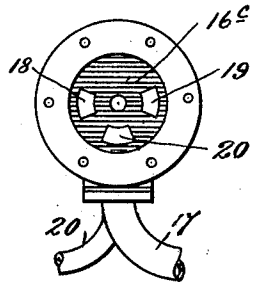


Fig. 12.

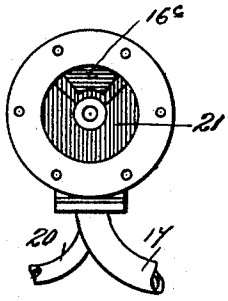


Fig. 13.

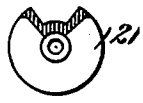


Fig. 14.

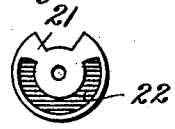


Fig. 15.

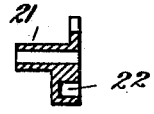


Fig. 16.



Witnesses

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 756,646. Patented April 5, 1904.

UNITED STATES PATENT OFFICE.

CHARLES HENRY JOLLIFFE, OF ST. HELENS, AND ALFRED COULTHARD, OF WORKINGTON, ENGLAND.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 756,646, dated April 5, 1904.

Application filed October 12, 1903. Serial No. 176,696. (No model.)

To all whom it may concern:

Be it known that we, CHARLES HENRY JOLLIFFE, residing at The Brewery, St. Helens, county of Lancaster, and ALFRED COULTHARD, residing at Workington, Cumberland county, England, subjects of the King of England, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

The object of this invention is to construct a rotary engine to be worked by continuous pressure in either direction and stopped by the actuation of one handle alone.

The invention will be clearly understood from the following description, aided by the accompanying drawings, in which—

Figure 1 is an end elevation of the engine without the fly-wheel and governor or outside appliances, these being of the well-known construction ordinarily applied. Fig. 2 is a section on line *a b* of Fig. 3. Fig. 3 is a side elevation, the side plate being removed. Fig. 4 is an inside elevation of a side plate of the engine. Fig. 5 is a section of the drum. Fig. 6 is a longitudinal section; Fig. 7, an end view of the compensating roll-bearing. Fig. 8 is a front elevation of the piston. Fig. 9 is an elevation of the pressure-chest and throttle-valve, showing the handle for reversing or stopping the engine. Fig. 10 is a section of Fig. 9. Fig. 11 is an elevation of Fig. 9 with the valve and cover removed. Fig. 12 is a similar view with the valve applied. Fig. 13 is a front view; Fig. 14, a back view; Fig. 15, a section; Fig. 16, a side elevation of the operating-valve.

The appliance is composed of an outer casing or cylinder 1, having side walls 2, in which are formed grooves 3 4, eccentrically arranged to each other. The side walls 2 carry the axle 5, and to this axle is keyed a drum 6, this having the middle portion of less thickness than the outer portion, as at Fig. 3, which outer portion is recessed or cut away at opposite edges for carrying compensating roll-bearings 7, these being slotted for carrying the pistons 8, which pistons are provided with extensions 9, which ride in the grooves 4, and also with spring-plates or angles on their working edges to insure a tight joint. The grooves 3 carry spring-rings 10 or their equivalent for insuring a steam-tight joint.

The drum 6 is set eccentrically to the cylinder 1, and the lower portion of the periphery is disposed about flush with the inside surface of the cylinder at that part, and to insure a proper steam-tight joint a spring-controlled plate 11 is fitted in a recess of the cylinder 1 so as to have action upon the drum 6 always and insure a steam-tight joint. The inner edge of the openings in the drum carrying the bearings 7 have slots 12, which carry spring-controlled pieces 13 to press against the bearings 7 and form a steam-tight joint thereon.

Passage from the source of power—say a steam-boiler—is made to the engine by the conduits 14 15 either acting as supply or exhaust, according to the direction of running of the engine, and the cylinder is provided with ducts 16, running up from the conduits 14 15 to about level with the axle 5, so as to produce about equal pressure upon both sides of the working piston during a portion of its stroke; but as soon as the working piston reaches the end of the channel 16 the steam will act on both pistons for additional propulsion, the expended steam in front of the first moving piston being passed to the open exhaust.

The pressure-chest and throttle-valve can be fitted to any part of the engine or its base and is connected to the source of power by the unsual piping, and such pressure-chest or throttle-valve is constructed as shown in Figs. 9 to 16, and is connected to the engine by the two conduits 14 15.

The pressure-chest or throttle-valve comprises a box 16^c, having four openings 17, 18, 19, and 20, one, 17, supplying steam to the box 16^c, another, 18, to one side inlet 15, another, 19, leading to the other side inlet 14, and the other, 20, leading to the exhaust. The box 16^c contains a valve 21, having a race 22, the race leading from the openings 18 and 20 or 19 and 20, according to the position it is

placed in by the handle 23, and when the handle 23 is in the upright position, as shown in Fig. 9, the valve has closed the openings 18, 19, and 20 and the supply to cylinder stopped, as will be understood from Fig. 12.

Now supposing the handle 23 be turned to the right the valve 21 uncovers the inlet 19, so as to establish communication with the cylinder by the conduit or channel 15, the exhaust 20 being open to the conduit or channel 14 and opening 18 to drive the pistons 8 in one direction; but to reverse the direction of travel the handle 23 is moved to the left of the vertical when valve uncovers the ports 18 and the race 22 connects 19 and 20 for exhaust, the steam being thus conveyed to the opposite side of the piston 8 and a reversal of movement is effected.

Now assuming that the engine is desired to travel in one direction, the pistons and revolving drum being in the position shown at Fig. 3, the handle is moved—say for the steam-inlet to be open—to the conduit 15 and steam will enter the cylinder by the conduit 15. The exhaust from 14 being open steam will rush in and up the groove 16, acting upon the then uppermost piston 8, causing the drum 6 to revolve. During the revolution and after the lowermost piston has passed the inlet 15 the steam acts upon both pistons and giving about equal pressure on both sides of the lowermost piston, and by the time both pistons have reached the horizontal and at the end of the groove the lowermost piston shuts off the supply to the first advancing piston, so that the then second moving piston receives the full pressure of the incoming steam, and at the same time the opposite piston is about passing the groove 16 on the opposite side of the piston, thereby causing the steam between the two pistons to exhaust readily and the full pressure act upon the piston, the operation being continued successively upon each piston as it passes round. The drum-piston and roll-bearings can be made hollow in places for lightness and the outside casing and side plates be strengthened by webs or otherwise.

During the revolution of the drum the pistons are kept up against the inside periphery of the cylinder by the piston extensions 9 riding in the grooves 4 of the cover, these grooves being concentric with the cylinder.

What we claim, and desire to secure by Letters Patent, is—

1. A rotary engine comprising a cylindrical casing, a drum eccentrically mounted in said casing, rollers, the drums having recesses to receive said rollers, and pistons, the rollers being slotted to receive said pistons, the latter having segmental extensions, and a side wall of the casing having a concentric groove to receive said extensions.

2. A rotary engine comprising a cylindrical casing, a drum eccentrically mounted in said casing, rollers, the drum having recesses to receive said rollers and said recesses having slots, pistons, the rollers being slotted to receive said pistons, the latter having segmental extensions, and a side wall of the casing having a concentric groove to receive said extensions, and yieldable pieces set in the slots in the recesses and bearing against said rollers.

3. A rotary engine comprising a cylindrical casing, a drum eccentrically mounted therein, rollers, the drum having recesses to receive said rollers, pistons, the rollers being slotted to receive said pistons, the latter having segmental extensions, and a side wall of the casing having concentric grooves one of which receives said extensions, and packing set in the other groove.

4. A rotary engine comprising a cylindrical casing, a drum eccentrically mounted in said casing, rollers, the drum having recesses to receive said rollers, pistons, the rollers being slotted to receive said pistons, the latter having segmental extensions, and a side wall of the casing having a concentric groove to receive said extensions, and a spring-controlled plate, the inner surface of the casing being slotted to receive said plate, and the latter engaging the periphery of the drum.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

CHARLES HENRY JOLLIFFE.
ALFRED COULTHARD.

Witnesses:
JOHN HAMMILL,
W. IRWIN ELLIS.