E. H. PRYCE.

ELECTROMAGNETIC MASSAGE DEVICE.

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985,547.

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Fig. 1.

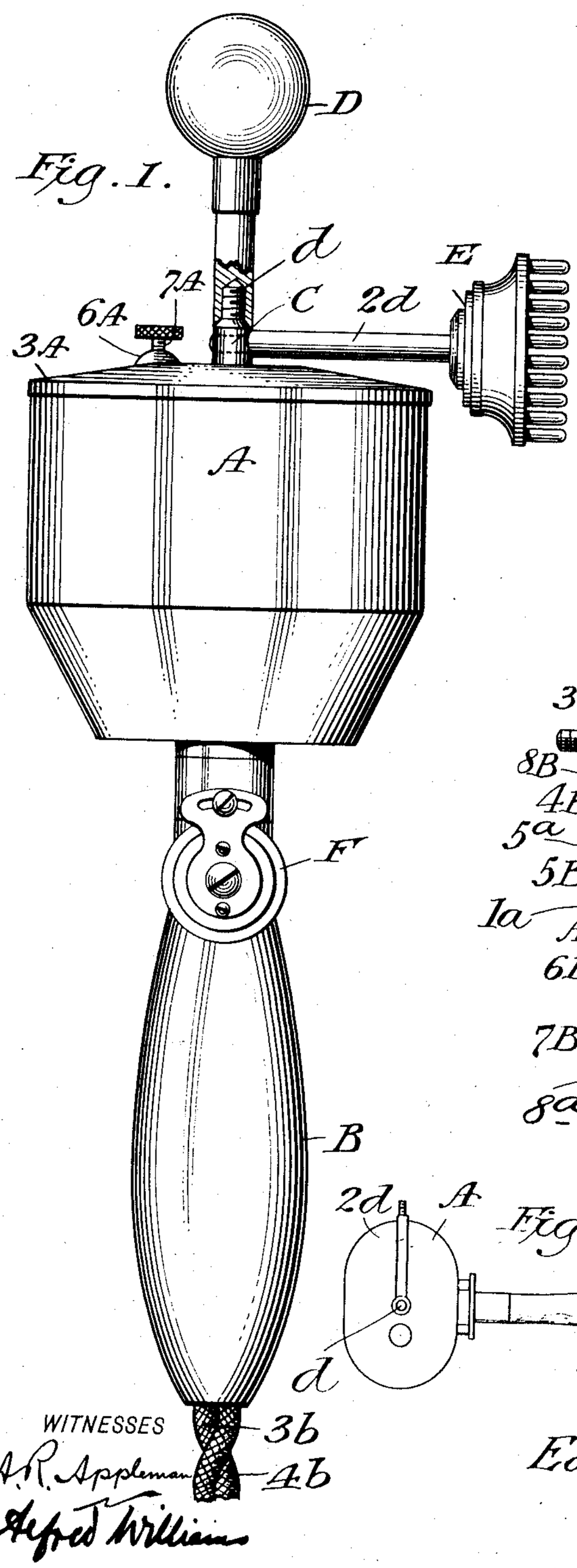

Fig. 2.

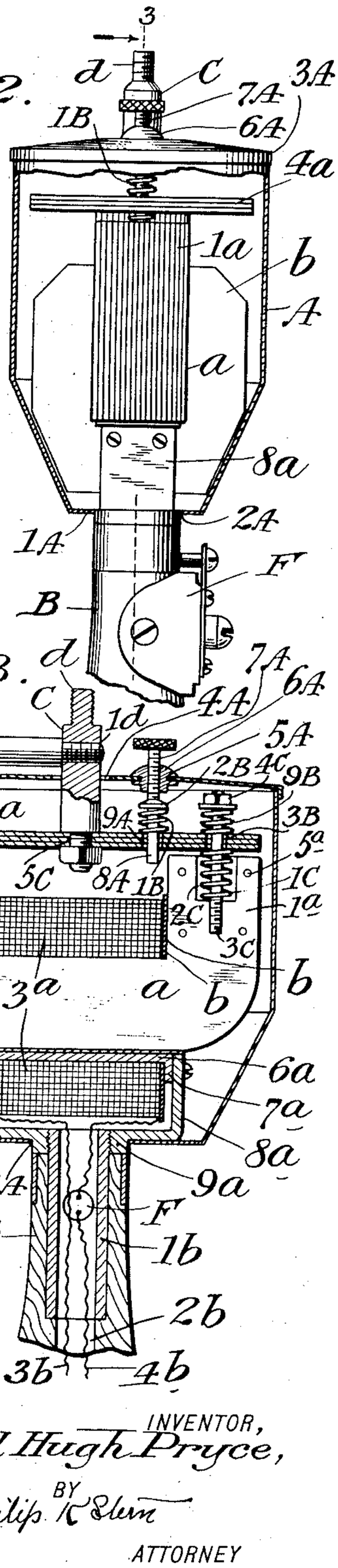

Fig. 3.

Fig. 4.

WITNESSES

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ELECTROMAGNETIC MASSAGE DEVICE.

985,547. Specification of Letters Patent. Patented Feb. 28, 1911.

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To all whom it may concern:

Be it known that I, EDMUND HUGH PRYCE, a citizen of the Kingdom of Great Britain, residing in the city of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Electromagnetic Massage Devices, of which the following is a specification.

My invention in electromagnetic massage devices relates to that type wherein a reciprocating vibratory armature is energized by electromagnetic impulses through the medium of a suitable source of electrical energy and involved inductive material and the object of my improvements is to provide a device of this character which may be varied in its therapeutic utility to a wider range than any device adapted to a similar purpose at present in vogue in so far as I am aware, and a further object of my invention is to provide in an apparatus of this character, simplicity in its application to a variety of conditions, efficiency in its operation and the production of a mechanical massage apparatus of a simple, compact and light construction which may be placed upon the market at a comparatively low price.

While investigating the requirements of vibration as therapeutically applied, my attention was directed to the lack of variation in the kinetic effects at the surface of application in the operation of massaging, and with a view to promoting the necessary agitation to the congested parts of the epidermis and the consequent effect on the deeper tissues and muscular fibers and in fact throughout the local contributories to the vascular system, I have constructed an electromechanical massage apparatus which is capable of developing a series of harmonic undulations, which may be kinetically applied locally, to an afflicted portion of the system for the direct development of the sluggish capillaries of the system under treatment or by an alteration in rhythm within the requisite range a series of undulatory or intermittent pulses may be transmitted from an accessible point with practically little or no local dermatological effect, but with considerable resultant activity at a point remote from that receiving the pulsation. Some of these effects have hitherto been developed in the operation of massaging by a competent masseur, but has been generally restricted to a fleshy or muscular portion sufficiently yielding to permit of a jelly-like motion, but I am not aware that any mechanical device has been capable hitherto of imparting a series of vibrations in harmonic relation, resulting in sinuous undulations by which these vibratory transmissions may be effected. The instrumentalities whereby I am enabled to accomplish these results and the objective features of my invention are referred to in the drawings hereto attached and forming part of this specification which are described in detail in the descriptive matter relative thereto, and the distinct features of novelty are more particularly referred to in the claims.

With reference to the drawings, Figure 1 is a side, elevational view of my improved electromagnetic massage device illustrated in full size. Fig. 2 is an end, elevational view of the same, with the end portion of the casing nearest the observer, and the handle and applicators removed. Fig. 3 is a side elevational view partly taken in section, the section being taken on the line 3—3 of Fig. 2. Fig. 4 is a modificational plan view thereof on a reduced scale illustrating a somewhat different application of the handle of the device in the directing of the applicators.

In the several figures, similar characters of reference are employed to designate like parts, wherein:

A refers to the casing which envelops an electromagnetic vibrator, comprising a laminated core *a* having rectangularly projecting parallel pole pieces 1^a and 2^a, between which and upon the core *a* is wound an energizing coil of insulated wire 3^a, and carried by the pole pieces 2^a and in inductive relation to the pole pieces 1^a is a vibratory laminated armature 4^a, and B illustrates the handle coaxially disposed with relation to the casing A, which depends from the lower extremity thereof, and oppositely situated and normally coaxial with the handle B is an applicator stud C, which projects through the casing A and is secured intermediately to and carried by the armature 4^a. To the

free terminal of the stud C is secured a coaxial applicator D and adjacently secured thereto is a horizontal applicator E.

In the construction of the apparatus, as illustrated the electromagnetic system as depicted, is adapted to the use of an alternating electrical energizing current, and both the magnet core *a* and the armature 4^a is of a laminar structure which is well known in the construction of electromagnets adapted to be energized by alternating currents, and therefore requires no further description, suffice to say however, that the laminæ is secured integral at the polar projections 1^a and 2^a by additional rivets 5^a.

The magnetic coil 3^a composed of a number of layers of insulated magnet wire is wound over a yoke of non-inductive material 6^a, and around the core *a*, together with the necessary insulating material in a customary manner.

The yoke 6^a is provided with lugs at its opposite terminals 7^a, which embrace the heads *b* and to the lugs 7^a are secured the lugs 8^a of a screw threaded socket 9^a, into which latter is threaded a tubular nipple 1^b.

The handle B is axially bored adjacent to the casing *a* to snugly fit the exterior cylindrical surface of the nipple 1^b and from the lower terminal of the nipple 1^b it is concentrically bored coincident with the tubular aperture of the same. The said bore is referred to at 2^b, which together with the aperture of the nipple 1^b affords a passage-way or conduit for the terminals 3^b and 4^b of the coil of insulated wire 3^a.

The continuity of one of the terminals as 4^b is interrupted by a switch F which is mounted on the exterior surface of the handle B, and secured thereto. The casing *a* is composed preferably of light spun or stamped metal having a somewhat elliptical formation, and formed conical toward its lower extremity, the lower end of which is provided with an integral cap 1^A which has a central perforation 2^A into which the exterior of the threaded socket 9^a fits.

The upper extremity of the casing A is capped by a flanged cover 3^A, which has a central perforation 4^A of sufficient diameter to admit of free oscillating movement of the applicator stud C and adjacent to the perforation 4^A and radially in the major axis of the elliptical cap 3^A is a second perforation 5^A into which is secured a threaded nut bushing 6^A. In threaded engagement with the bushing 6^A is a mill-headed adjusting screw 7^A having a reduced unthreaded portion 8^A which passes through the perforation 9^A in the armature 4^a. At the junction of the reduced unthreaded and threaded portions of the adjusting screw 7^A, a shoulder results which supports a thrust washer 2^B against the thrust of one terminal of the circumscribing tension spring 1^B. The opposite terminal of the said spring circumscribes the perforation 9^A of the armature and thrusts against the latter when the adjusting screw is thrust inwardly.

The armature 4^a has terminal perforations 3^B and 4^B respectively and is secured at one of its terminals through the perforation 4^B to the polar projection 2^a of the magnet core *a* by a bolt 5^B, which passes through a fitted boring in the polar projection 2^a of the magnet core *a* which latter has a counterboring 6^B at its lower terminal, to provide a socket thereat for a clamping nut 7^B which is screw threaded to the lower terminal of the bolt 5^B. A nut 8^B screw threaded to the upper terminal of the bolt 5^B, and washer therefor is adapted to clamp the armature 4^a firmly in contact with the upper surface of the polar projection 2^a. The opposite terminal of the armature 4^a is yieldingly secured to the polar projection 1^a of the magnet core *a* by a pair of compression springs 9^B and 1^C. The latter is pocketed in a counterboring 2^C in the polar projection 1^a and the two impinge against opposite faces of the armature 4^a, and their opposing terminals circumscribe the perforation 3^B, while a threaded stud 3^C screwed into a bore concentric with the pocket 2^C at one of its terminals and a nut 4^C threaded to the opposite terminal and a washer therefor serves to set the springs 1^C and 9^B into tension. The function of these springs as just described will be referred to hereinafter.

The armature 4^a has a central perforation 5^C through which the lower terminal of the applicator stud C is thrust, and is secured thereto by a screw and nut connection. The applicator stud C is provided with an upper threaded reduced portion *d*, and a transverse perforation 1^d into which is screw threaded, a second applicator stud 2^d, which terminates in a reduced threaded portion 3^d for coupling with an applicator as E. The threaded portion *d* of the applicator stud C and the threaded portion 3^d are preferably of similar dimension to permit of the interchange of applicators as D or E.

In the operation of my improved electromagnetic massage device as just described, the terminals 3^b and 4^b are connected to a suitable source of alternating current, such for example as the public service illuminating circuits and upon the closing of the switch F in a well known manner and the energy being supplied to the energizing coil 3^a, the armature 4^a will be set into vibration in the manner of a musical reed, and its free terminal will vibrate between the compression springs 9^B and 1^C, oscillating therebetween in unison with the harmonic function of the periodicity of the alternating electrical current which is employed to energize the mag-

net core *a*, and due to the limited air gap between the free terminal of the armature 4^a and the polar projection 1^a, the energy of vibration of the armature will be of comparatively high value. While the armature 4^a is thus set into vibration, motion will be communicated to the applicator stud C, which due to the resiliency of the armature 4^a will describe at its upper terminal, a curve which will be a function of the elasticity of the spring of the armature 4^a, the moment of inertia of the load which is imposed upon the armature and a function of the amplitude of vibration of the said armature. The applicator stud 2^d at its free terminal will move in a path which will be the reciprocal at any instant of the terminal D of the applicator C. Thus, while the terminal D of the applicator C moves upwardly, the terminal 3^d of the applicator stud 2^d will move downwardly. To increase the rate of vibration of the armature 4^a with a particular applicator E in position, the tension on the compression springs 9^b and 1^c is augmented. This is accomplished by screwing down the adjusting nut 4^c. This adjustment will compensate for the inertia of any particular applicator adapted to either of the applicator studs C or 2^d, while the compensation for the energy of the blow delivered by the applicator during treatment may be effected by backing off the adjusting screw 7^A or setting it up to force the armature 4^a in a direction toward the polar projection 1^a. By this latter movement of the screw 7^A a comparatively high rate of vibration may be imparted to the applicator stud C or 2^d, and after having made the proper adjustment in the manner just described, the handle B is grasped by the hand of the operator and either the applicator D or E may be applied to the part for treatment.

In Fig. 4, I have illustrated the handle B in a somewhat different relation to the positioning of the applicators and electromagnetic mechanism than in the preceding figures and it will be observed that the position of either applicators may be adapted in the treatment without changing the position of the hand, and by merely rotating the handle through an angle of 90 degrees.

It is obvious that in lieu of the armature 4^a being secured by a bolt to the polar projection 2^a the same may be pivoted thereto in a well known manner, and it will be understood from the foregoing description that my improved electromagnetic massage apparatus may be adapted to a variety of massage treatments varying within wide ranges with respect to the amplitude and pitch of vibration and the energy of the same, and that the same is compact, simple in use and operation, and capable of high efficiency and since there are no revolving parts in the vibrating mechanism greater durability will be found a feature characteristic in its construction. It is further obvious that in lieu of an alternating electrical current for energizing the electromagnetic mechanism a unidirectional current may be employed by suitable translating mechanism which is well known in the art relating to electromagnetic mechanisms.

Having fully described my invention I claim as new and desire to secure by Letters Patent of the United States—

1. In an electromagnetic massage device, a motor element consisting of an electromagnet, provided with polar projections having a vibratory armature, one terminal thereof being magnetically connected and rigidly secured to one of the polar projections and the other extremity of the armature being flexibly secured to an opposite polar projection of the said electromagnet, the flexibly secured terminal being adapted to vibrate to and fro with respect to the adjacent polar projection.

2. In an electromagnetic massage device, a motor element consisting of a single core electromagnet provided with rectangularly disposed polar projections having a vibratory armature magnetically and rigidly secured by one terminal to one of the polar projections and the other extremity flexibly secured to an opposite polar projection of the said electromagnet, the flexibly secured terminal being adapted to restricted vibration with respect to the adjacent polar projection and an adjusting device for varying the amplitude of vibration for the said armature.

3. In an electromagnetic massage device, a motor element consisting of a single core electromagnet provided with rectangularly disposed polar projections having a laminated vibratory armature magnetically and rigidly secured at one terminal to one of the polar projections and the other extremity flexibly secured within inductive relation to an opposite polar projection of the said electromagnet, to present an air gap therebetween, the flexibly secured terminal being restricted as to vibration with respect to the adjacent polar projection and an adjusting device for varying the amplitude of vibration for the said armature and a pair of compression springs on opposite surfaces of the said armature co-acting with and controlled by the adjusting device.

4. In an electromagnetic massage device, an electromagnet having a laminated U shaped core terminating in polar projections perpendicular to the axis of the magnet, an armature secured at one terminal to one of the polar projections and in magnetic contact therewith and the opposite terminal of said armature carried over a second polar

projection of the said magnet providing therebetween an air gap and a resilient connection between said latter polar projection and the opposing armature terminal situated in the air gap and an adjusting screw and compression spring on the opposite surface of the armature to said air gap, and a second adjusting screw and compression spring adjacent thereto and a casing for the whole, said casing carrying the second said adjusting screw, substantially as described.

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

EDMUND HUGH PRYCE.

Witnesses:
A. R. APPLEMAN,
ALFRED WILLIAMS.