

J. P. TARBOX.
MOTOR CONTROLLING DEVICE.
APPLICATION FILED JUNE 30, 1908.

917,183.

Patented Apr. 6, 1909.

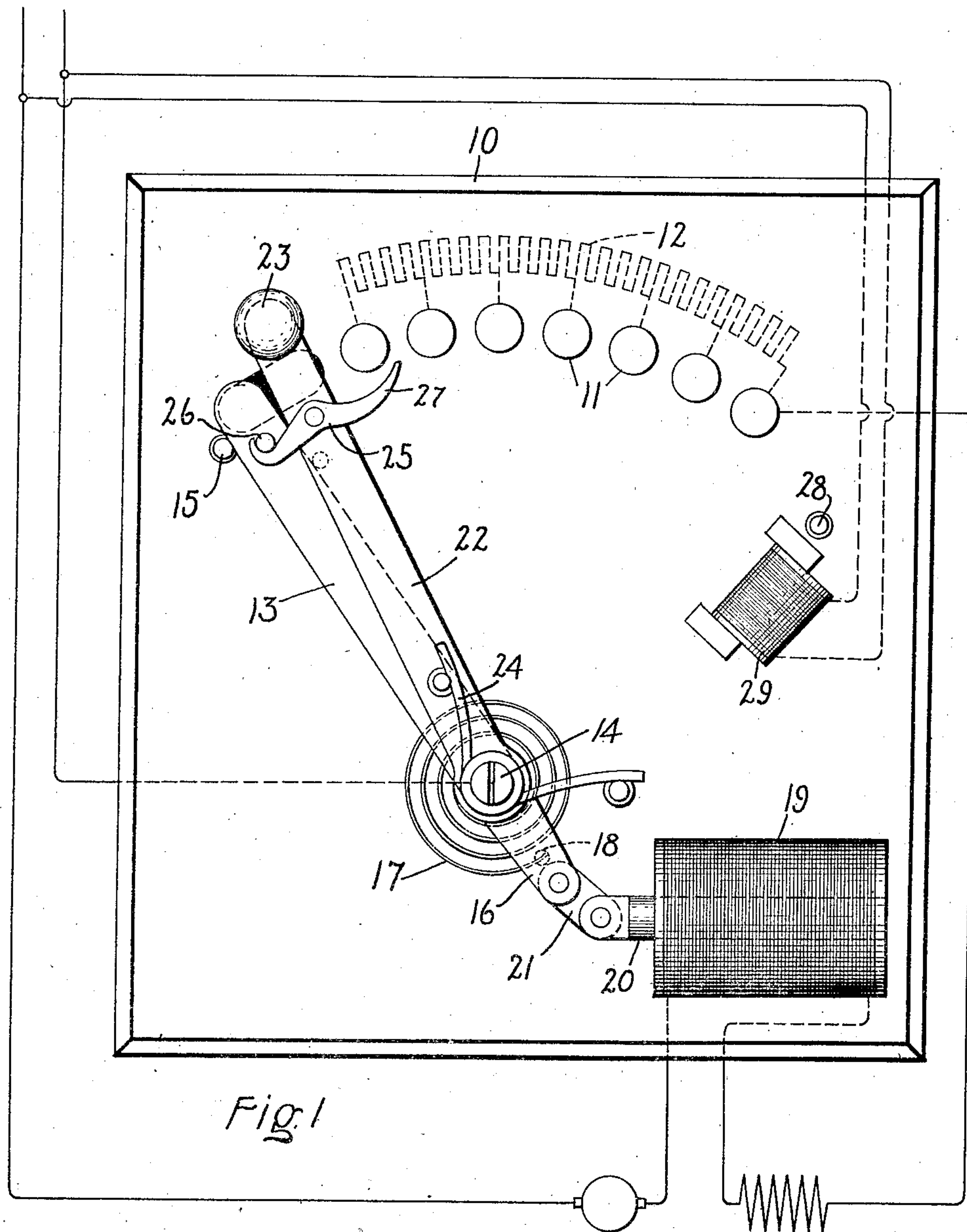
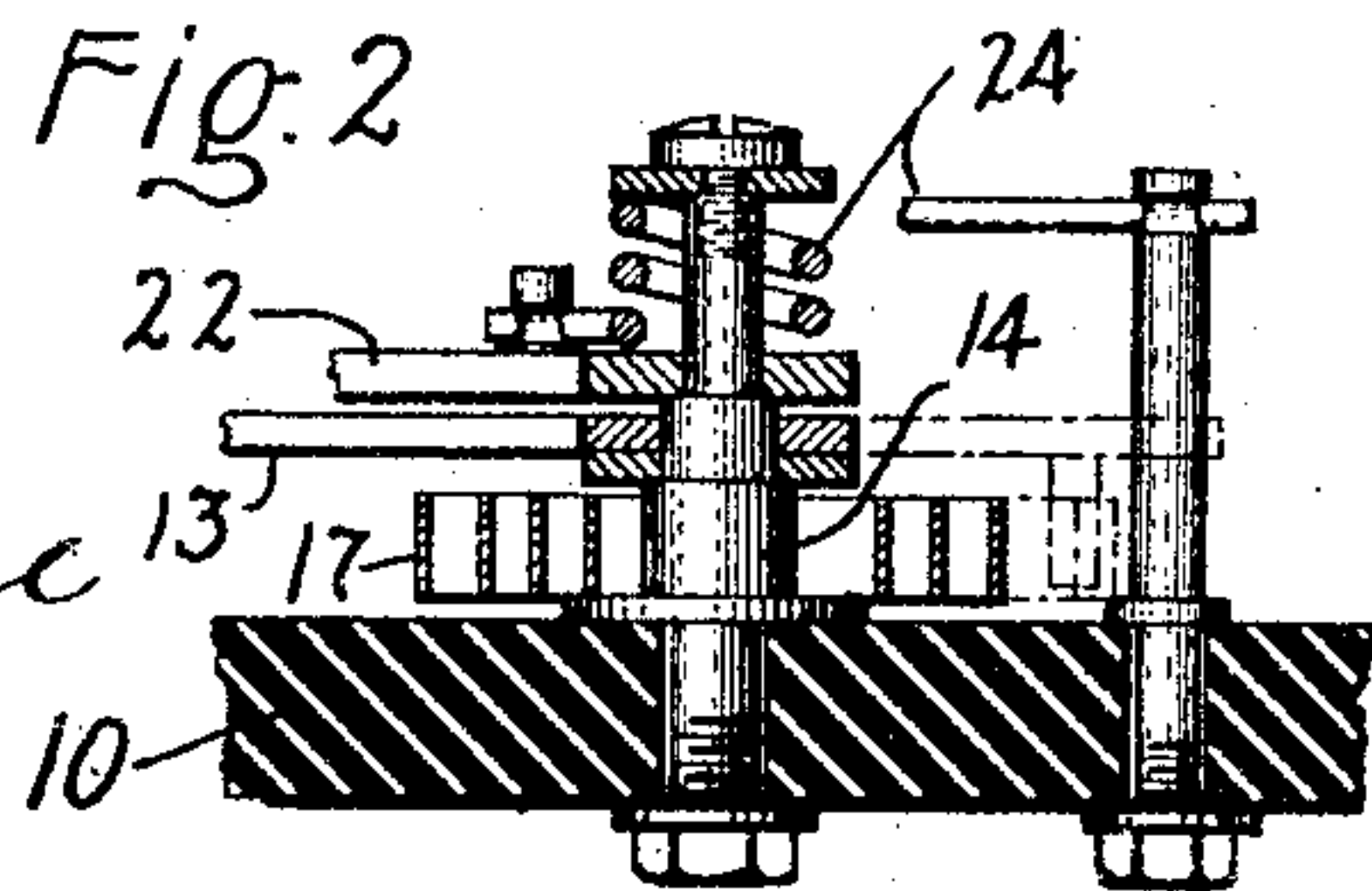


Fig. 1

Fig. 2



Witnesses:
Benjamin B. Hume
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Inventor:
John P. Tarbox,
By *Alfred D. [Signature]* Atty.

UNITED STATES PATENT OFFICE.

JOHN P. TARBOX, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

MOTOR-CONTROLLING DEVICE.

No. 917,183.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed June 30, 1908. Serial No. 441,066.

To all whom it may concern:

Be it known that I, JOHN P. TARBOX, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Motor-Controlling Devices, of which the following is a specification.

This invention relates to devices for controlling electric circuits and has for its object the provision of means whereby an electric motor may be stopped, started and generally controlled in a reliable, simple and efficient manner.

My invention relates more specifically to starting devices for electric motors, one of my objects being to provide a starting rheostat with means whereby the motor circuit may be automatically controlled in response to variations in speed or load conditions.

While my invention is capable of wide and varied applications I regard it as of particular importance in connection with hoisting mechanism and the like. In this class of apparatus the motor is often stalled by heavy loads, and it becomes necessary therefore to protect the motor under these conditions.

In carrying out my invention I combine with a starting rheostat, automatic regulating features so that the operating mechanism is used for both starting and regulating. The motor is brought up to running speed by hand whereupon the controlling member is released so that upon change in speed or load conditions, the arm may be shifted accordingly.

In the accompanying drawing in which I have shown my invention embodied in concrete form, Figure 1 is a plan view of a combined starting and controlling rheostat embodying my invention and Fig. 2 is a detail view showing the mounting for the operating and controlling members.

Referring to the drawing, 10 is an ordinary panel board or base of some insulating material, such as slate or soapstone, having mounted thereon a series of contact studs 11 forming terminals of starting resistance 12. While I refer to this resistance as starting resistance, it is nevertheless of such a nature that it will carry current for an indefinite period and may therefore be used for regulating the speed of the motor. A controlling member or arm 13 is pivoted at 14 so that its free end engages the studs 11. The arm 13 has a projection 16 which extends beyond the pivotal point

and a spring 17 having one end fixed to the projection at 18 and the other end fixed to the central stud gives the arm 13 a bias in a clockwise direction or toward the running position. This arm 13 is arranged to be operated automatically in response to variations in the load or speed of the motor.

For purposes of illustration I have shown a series solenoid 19 as the operating agency. This solenoid is mounted upon the base as shown and its core 20 is connected with the projection 16 by means of a link 21. The arrangement is such that upon a predetermined increase in current, the core 20 will be drawn in so as to move the arm 13 in a counter-clockwise direction while, when the current again decreases, the spring 17 will operate to withdraw the core and move the arm in a clockwise direction thereby automatically regulating the speed of the motor and protecting it against dangerous overloads. An operating arm 22 is pivoted concentrically with the arm 13 upon the stud 14 so as to move independently thereof. This arm is provided with an operating handle 23 and is biased to the off position shown in the drawing by means of the spring 24. This spring is stiffer than the spring 17. The arm 22 is provided with a projection which engages the arm 13, and the spring 24 is of sufficient strength to force the arm 22 and the arm 13 to the off position thereby overcoming the tension of the spring 17 as well as the effect of the solenoid 19. A latch 25 is pivoted upon the arm 22 and has one end projecting over a pin 26 upon the arm 13 so as to lock the two arms together. The opposite end of the latch is in the shape of a finger 27 so arranged as to engage the pin 28 when the arm reaches running position and move the latch to release the arm 13. A no-voltage magnet 29 is located in the usual place so as to hold the arm 22 in running position.

The arrangement of circuits and mode of operation are as follows: When it is desired to start the motor, the arm 23 is grasped and since the two members 13 and 22 are locked together they will both move to the running position thereby bringing the motor up to running speed. When the arm 22 reaches running position it is held by the magnet 29. At the same time the finger 27 engages the pin 28 and releases the arm 13. This arm 13 being relieved of the tension of spring 24 will not be returned to the off position but will be

controlled by the solenoid 19. When the load on the motor becomes heavy the arm 13 will be moved in a counter-clockwise direction so as to insert resistance in the armature circuit to protect the motor. When the load is relieved the spring 17 will move the arm so as to cut out the resistance. Upon the failure of voltage the arm 22 will be released by the retaining magnet and will return to the off position, carrying with it the arm 13, the two arms thereupon being automatically latched together.

While I have shown my invention in connection with actuating mechanism arranged to operate in a definite way, it should be understood that this is done merely for purposes of illustration since various modifications of my invention will suggest themselves to those skilled in the art without departing from the spirit of my invention, the scope of which is set forth in the annexed claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. A rheostat comprising a starting resistance, a controlling member therefor, means responsive to variations in load conditions of the motor for automatically shifting said member to vary the resistance, and an operating member having a bias to starting position arranged to move the controlling member in the direction of the bias.
2. A rheostat comprising a starting resistance, a controlling member therefor, an electromagnetic device responsive to variations in the motor for automatically shifting said member to vary the resistance, and an operating member having a bias to starting position arranged to move the controlling member in the direction of the bias.
3. A rheostat comprising a starting resistance, a controlling member therefor, means for automatically shifting said member to vary the resistance in response to variations in the speed of the motor, and means for giving said member a bias toward starting position sufficient to overcome the shifting means until the running position is reached and then removing said bias.
4. A rheostat comprising a starting resistance, a controlling member therefor, means responsive to variations in the load conditions of the motor for automatically shifting said member to vary the resistance, an operating member having a bias to starting position arranged to normally press the controlling member in the direction of the bias, and a no-voltage magnet for holding the operating member in running position.
5. A rheostat comprising a starting resistance, a controlling member therefor, an electromagnetic device responsive to changes in the motor current for automatically shifting said member to vary the resistance, an operating member mounted to give the con-

trolling member a bias to starting position, a no-voltage magnet, and means for locking said members together until the magnet is reached and then releasing the controlling member.

6. A rheostat comprising a starting resistance, a controlling member therefor, means responsive to current variations in the motor for automatically shifting said member to vary the resistance, an operating member locked to the controlling member and having a bias sufficient to move both members to starting position, a no-voltage magnet, and means for unlocking said members and releasing the controlling member when running position is reached.

7. A rheostat comprising a starting resistance, a controlling member therefor, a solenoid in circuit with the motor arranged to shift said member in response to variations of the motor current, and an operating member having a bias to starting position and in engaging relation with the controlling member so as to move it in the direction of the bias.

8. A rheostat comprising a starting resistance, a controlling member therefor, a solenoid in circuit with the motor arranged to shift said member in response to variations of the motor current, an operating member having a bias to starting position latched to the controlling member, a no-voltage magnet, and means for unlatching said members and releasing the controlling member when the operating member engages the magnet.

9. A rheostat comprising a starting resistance, a controlling member therefor having a bias to running position, a solenoid for moving said member to starting position, an operating member mounted to give the controlling member a bias to starting position sufficient to move the controlling member against its own bias, a no-voltage magnet, and means whereby said members are caused to move together until the magnet is reached and then the controlling member is released.

10. A rheostat comprising a starting resistance, a controlling member therefor having a bias to running position, a solenoid to move said member to starting position, an operating member locked to said controlling member and mounted to give the latter a bias to starting position sufficient to move it against its own bias, a no-voltage magnet for holding the operating member in running position, and means whereby said members are unlocked and the controlling member released when the magnet is reached.

In witness whereof, I have hereunto set my hand this 26th day of June, 1908.

J. P. TARBOX.

Witnesses:

JOHN W. TUCKER,
THOMAS DURANT.