To all whom it may concern:

Be it known that I, ALLEN J. GARDENHOUR, a citizen of the United States, residing at Waynesboro, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Combination Electric Switches, of which the following is a specification.

This invention relates to electric switches, and the primary object of the invention is the provision of an improved combination switch for electric circuits for effectively preventing the oscillating operation of the switch and the closing of the circuit by unauthorized persons, and for eliminating the employing of the usual lock fixtures now in vogue and thus dispense with the necessity of carrying an operating key.

Another object of the invention is the provision of an improved switch for electric circuits embodying a plurality of independent bridge members hidden from the view of an observer and mounted for independent movement into and out of contact position and having means known to the user of the switch for bringing the bridge pieces into contacting position.

A further object of the invention is the provision of an improved means for adjusting the tension of the contact springs or brushes for regulating the pressure thereof on the bridge members.

A still further object of the invention is the provision of a combination electric switch which is especially adapted for use with ignition systems of automobiles, for electric lights, telephones, elevator circuits, and the like.

A still further object of the invention is the provision of improved electric combination switch of the above character which is durable and efficient in use, one that is simple and easy to manufacture, and one which can be placed upon the market at a reasonable cost.

Other objects of the invention will appear in the following description taken in connection with the accompanying drawings, forming a part of this specification, and in which drawings:

Figure 4 is a front elevation of the improved electric combination lock.

Figure 2 is a transverse section of the same taken on the line 2—2 of Figure 1.

The specification is limited to three claims.

Figure 3 is a central vertical section through the same.

Figure 4 is an enlarged detail transverse section taken on the line 4—4 of Figure 3.

Figure 5 is a detail perspective view of Figure 3.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter A indicates the improved combination electric switch which includes the casing B having mounted therein the spaced contacts C, which are adapted to engage the bridge pieces D carried by the rotatable members E having the combination indicating means F. The casing B is of box like configuration and includes the upper and lower walls 10 and 11, the front and rear walls 12 and 13 and the end wall 14. The rear wall 13 is so disposed in position by hinges 14' as to permit the interior of the casing to be exposed when desired to make repairs or the like to the device. The rear wall 13 is however sealed or locked in its closed position so as to prevent entrance into the casing by unauthorized persons.

The lower wall 11 has secured thereto by suitable bolts, screws, or other fastening elements 15 spaced pairs of contact posts 16, which are arranged in series, and each pair of the posts 16 are electrically insulated from the bottom wall 11 of the box by suitable insulating plates or sheets 16', and the fastening elements 15 are insulated from the posts by means of sleeves 17 formed of insulating material, which surrounds the shank of the fastening elements. The upper surface of the contact posts also carry insulating plates 18. Each contact post 16 is substantially L-shaped as clearly shown in Figures 2 and 4 of the drawings, and the upstanding arms 19 of the posts have secured at the lower end thereof by screws or other fastening elements 20 the contact springs 21 formed of conducting material. The contact springs 21 extend above the upper surface of the upright arms 19 of the contact posts 16 and the upper end of each spring 21 has formed on its inner face the contacting point 22 formed of copper, brass, silver or other material of high conducting quality. The upper ends of the arms 19 of the contact posts 16 carry the transversely extending set screws 23, which are adapted to engage the inner face of the springs 21, so as to adjust the tension thereof. As stated, the contact posts are arranged in pairs and the inner posts of each pair are elec-
trically connected together by connecting wires 24 which have their terminals secured in position by set screws or the like 25 which extend into the lower arms of the contact posts. The outer posts of the outer pairs of contact posts 16 are electrically connected by connecting wires 26 to the binding posts 27, which are of the ordinary or any preferred configuration and are arranged adjacent to the terminals of the lower wall of the casings. The binding posts 27 have also secured thereto the terminals of the line wires 28 which extend through an opening 29 formed in one end wall of the casing. The wall of the aperture may carry a suitable insulating bushing 30 if so desired.

The combination mechanism E includes a plurality of spaced shafts 31 which are mounted for rotation in suitable openings 32 formed in the front wall of the casing B. Suitable collars 33 are secured on the shafts 31 and engage the inner and outer faces of the front wall 12 of the casing B, so as to prevent relative movement longitudinally of the openings 32 of the shafts, and serve as means for holding the shafts against any canting movement. The inner terminals of the shafts 32 have secured thereto discs 34 formed of suitable insulating material and the discs are held against relative movement on the shafts 32 by suitable lock nuts 35. Each disc 34 carries the bridge piece D which is of substantially U-shaped formation and includes the contact lugs 36 and the connecting reduced bight portion 37. As shown the bridge pieces are embedded in the discs 34 so that the outer surfaces thereof lie flush with the outer surface of the disc. The contact lugs 36 are positioned adjacent the outer edge of the disc 34 and are positioned the same space apart from each other as the contact posts 16 of each pair. The bridge pieces D are held in position against movement on the disc 34 by means of screws or other suitable fastening elements 38 which extend through the bight portion 37 of the bridge pieces D into the discs 34. By rotating the discs 34 it can be seen that the bridge pieces are brought into or out of contact with the springs or brushes 21, thereby bridging the space therebetween and closing the circuit. The outer ends of the shafts 31 have secured thereto operating knobs 39 which are preferably formed of hard rubber or the like. The outer surface of the knobs 39 are roughened or serrated so as to prevent the fingers of the operator from slipping thereon.

To permit the positioning of the bridge pieces D to be known to the operator of the lock the indicating means F is provided which includes the annular ring 40 arranged in concentric relation to a shaft 31. The ring 40 is held in position on the outer face of the front wall 12 of the casing B by suitable screws or other fastening elements 41. The outer face of the rings are graduated as at 42. The shafts 31 have secured thereon for movement therewith the index or pointers 44 which are adapted to co-operate with the graduations on the dial 40.

In operation of the improved switch, each of the knobs 39 is turned until the pointer or index finger 44 comes into alignment with the graduations known to the operator, which indicates that the bridge pieces are in engagement with the spring fingers or latches 29, which closes the circuit. When found necessary or desirable, the combination can be changed by loosening the nuts 35 and turning the disc 34 until the bridge pieces D are changed in relation to the index finger or pointer 44. While I have shown three pairs of contact posts 16 and three combination mechanisms therefore, it is to be understood that I do not limit myself to this number and more or less pairs of contact posts may be employed with the increasing or decreasing of the combination mechanism accordingly.

The operation of the lock by unauthorized persons is practically impossible, as it is necessary to bring all of the bridge pieces in contact position with the spaced brushes or contact springs before the circuit is closed.

Changes in details may be made without departing from the spirit or scope of my invention; but,

I claim:

1. A combination electric lock switch for association with the ignition circuit of an internal combustion engine of a motor vehicle comprising an elongated casing, one of the walls of the casing having a plurality of longitudinally aligned bearing openings formed therein, operating shafts rotatably mounted in the openings, cooperating indicating means carried by the shafts and the mentioned wall of the casing, an insulating disc carried by each shaft for movement therewith, a plurality of pairs of longitudinally aligned contact posts arranged in the casing, means electrically connecting the outer posts of the outer pairs of contact posts with the line wires of the circuit, means electrically connecting the inner posts of the outer pairs of posts to the adjacent posts of the inner pair of posts, substantially U-shaped bridge pieces carried by the inner faces of the insulating discs, and upwardly extending resilient contact springs carried by the pairs of posts arranged to frictionally engage the inner faces of the discs and to contact with the terminals of the U-shaped bridge pieces when the discs have been moved to a predetermined position in relation to the posts.

2. A combination electric lock switch comprising an elongated casing having one of
the walls thereof provided with a plurality of aligned bearing openings, rotatable operating shafts mounted in the openings, bearing washers carried by the shafts for engagement with the opposite faces of the mentioned wall of the casing, cooperating indicating means carried by the shafts and the mentioned wall of the casing, insulating discs rotatably carried by the shafts, means for locking the discs on the shafts for movement therewith, U-shaped bridge members counter sunk in the inner faces of the discs and extending flush therewith, the terminals of the U-shaped bridge members being provided with contact lugs arranged adjacent to the periphery of the discs, pairs of L-shaped contact posts disposed in the casing in longitudinal alignment, means electrically connecting the base legs of the outer posts of the outer pairs of the posts to the line wires of the electric circuit, means electrically connecting the base legs of the inner L-shaped contact posts of the outer pairs of contact posts with the base legs of the adjacent posts of the inner pair of contact posts, upwardly extending resilient contact springs rigidly connected at their lower ends to the upstanding legs of the L-shaped contact posts, adjustable thumb screws carried by the last mentioned legs of the L-shaped contact posts for engagement with the resilient contact springs, the upper ends of the contact springs being arranged for frictional engagement with the inner faces of the insulating discs and with the contact lugs of the U-shaped bridge members, when the insulating discs are in a predetermined position in relation to said contact posts.

ALLEN JASPER GARDENHOUR.