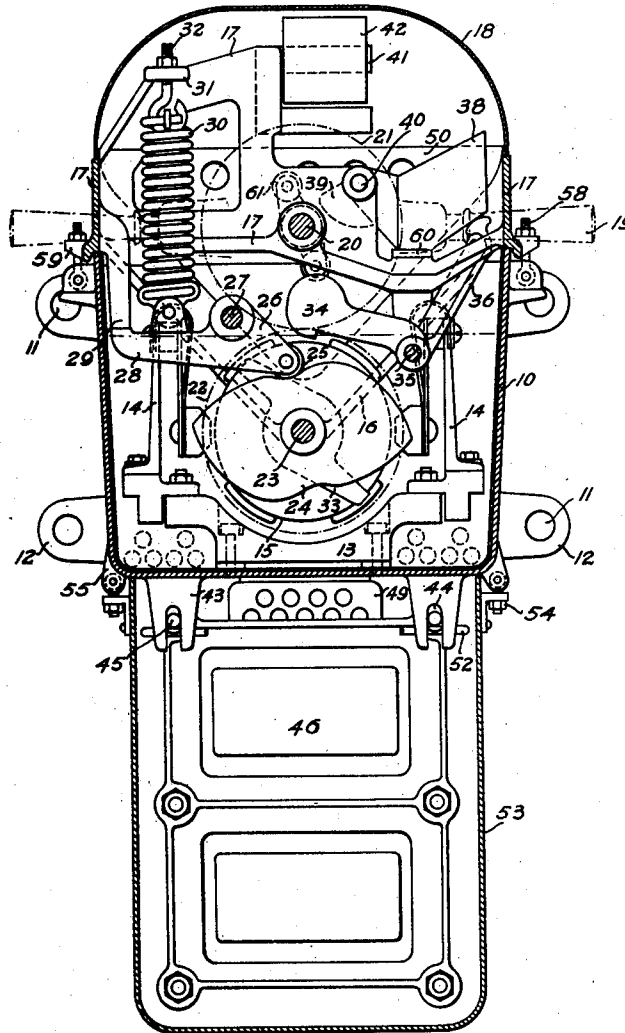


H. A. STEEN.
POTENTIAL STARTER.
APPLICATION FILED DEC. 21, 1911.

1,048,907.

Patented Dec. 31, 1912.
3 SHEETS—SHEET 1.

Fig. 1



Witnesses

Rob. E. Lott

Geo. L. Byron

Inventor

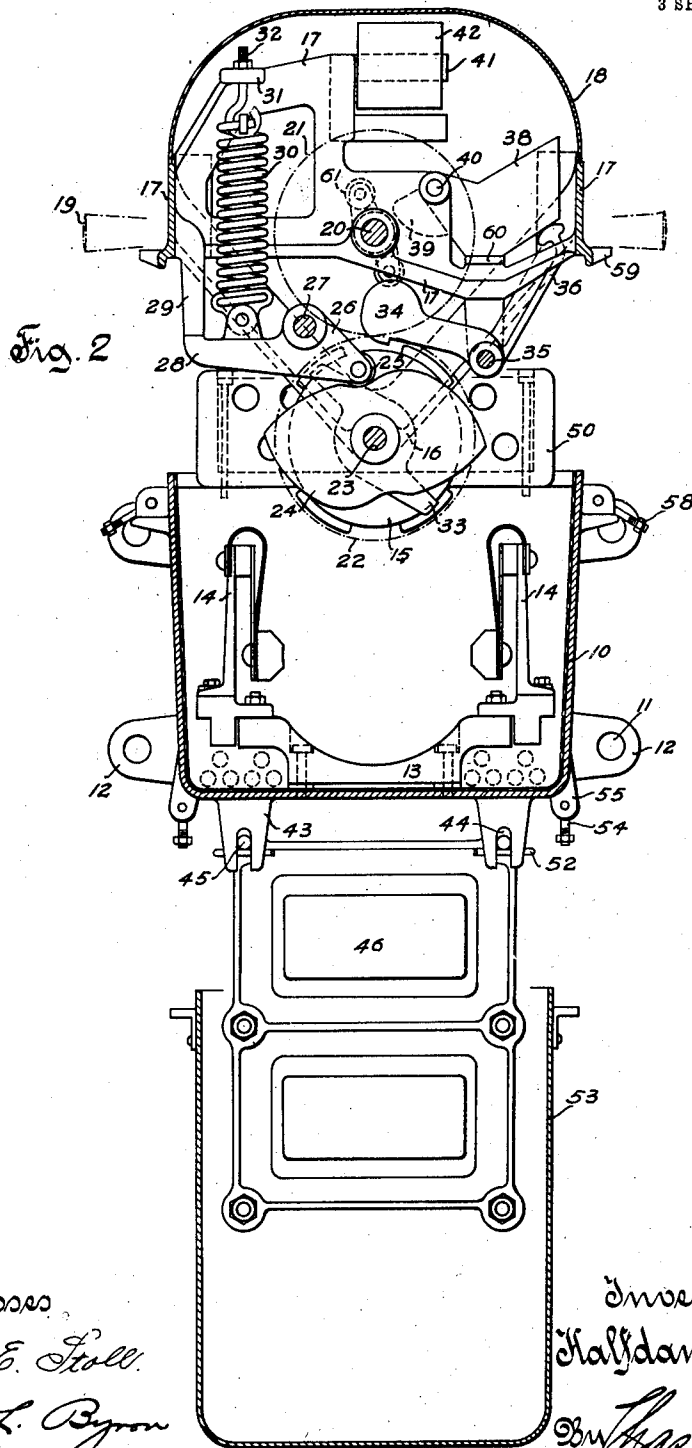
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3 SHEETS—SHEET 2.



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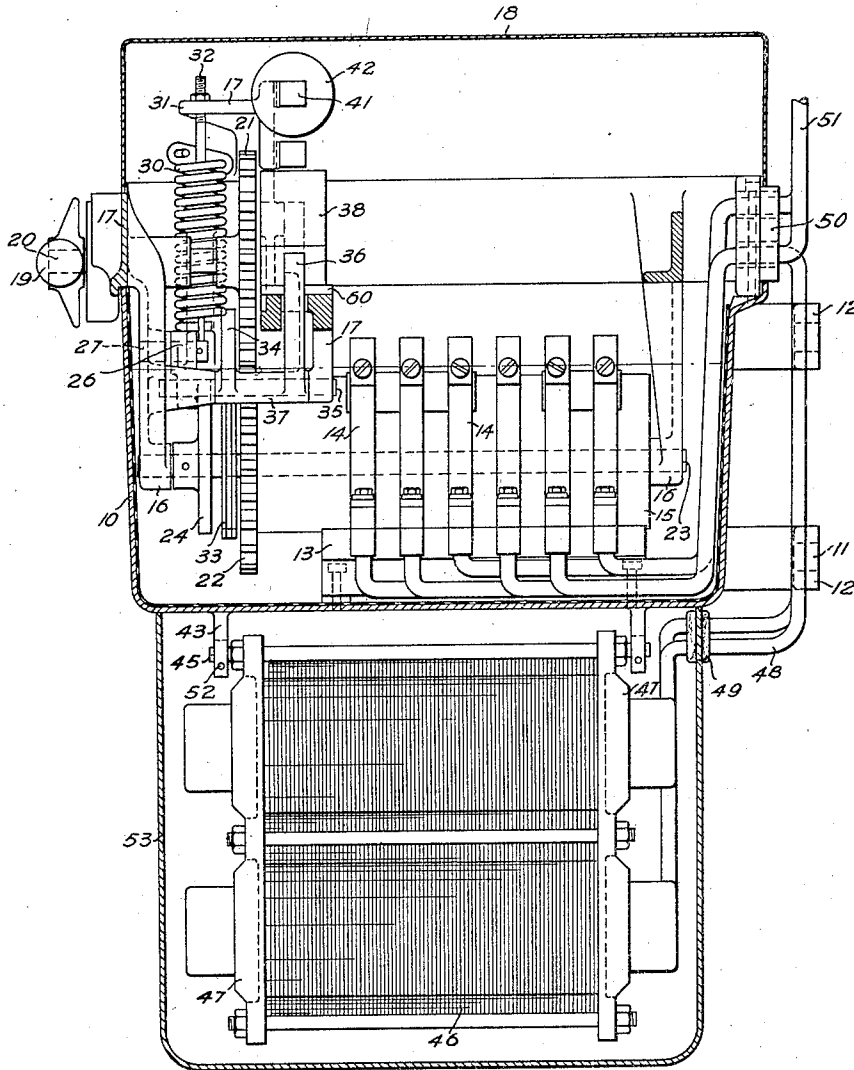
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3 SHEETS—SHEET 3.

Fig. 3

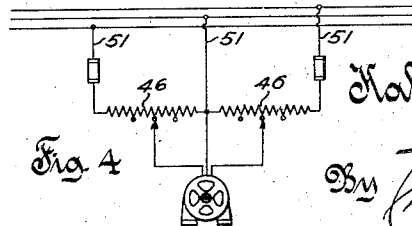


Witnesses

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Fig. 4



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UNITED STATES PATENT OFFICE.

HALFDAN A. STEEN, OF NORWOOD, OHIO, ASSIGNOR TO ALLIS-CHALMERS COMPANY,
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POTENTIAL STARTER.

1,048,907.

Specification of Letters Patent.

Patented Dec. 31, 1912.

Application filed December 21, 1911. Serial No. 667,135.

To all whom it may concern:

Be it known that I, HALFDAN A. STEEN, a subject of the King of Norway, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Potential Starters, of which the following is a full, clear, and exact specification.

This invention relates to motor starters, and particularly to potential starters for induction motors.

In the operation of motor starting devices, such as potential starters, it is necessary at intervals to inspect the contacts and operating mechanism to ascertain the conditions thereof. To make this convenient, it is desirable to divide such starting devices into various units which are detachable from each other. For example, in potential starters I have found it desirable to divide the starter into three units, the first including a main support in the form of an oil tank having stationary contacts therein, the second including the operating mechanism with a switch drum, and the third including a transformer. I have found that inspection is more readily effected and repair to the parts more easily made by dividing such potential starter into the three units considered and arranging said parts so that they may be detachable from each other.

The object of my invention is, therefore, to provide a simple, durable, and inexpensive potential starter wherein the various parts comprising the starter, may be easily supported and readily detached from each other for purposes of inspection and repair.

The various novel features of my invention will appear from the specification and drawings, and will be particularly set forth in the appended claims.

The invention is illustrated in the accompanying sheets of drawings, in which—

Figure 1 is a front elevation of my potential starter, with parts in section and broken away for the sake of clearness; Fig. 2 is a similar view with the operating mechanism of the starter removed from the stationary oil tank and with the transformer cover lowered; Fig. 3 is a side elevation of my starter, parts of the cover being removed for the sake of clearness; and, Fig. 4 is a diagram showing connections of the starter with supply mains and a motor.

A stationary oil tank 10 forming the main

body portion or support of the potential starter is adapted to be secured to a switch-board by passing bolts or rods through the openings 11 formed in lugs 12. Mounted and secured in the stationary oil tank or receptacle 10 is an insulating support 13 upon which are mounted contact fingers 14. These contact fingers are adapted to cooperate with a switch drum 15 supported in bearings 16 forming a part of a large irregular shaped casting 17, which includes a portion of the cover for the oil tank, the remaining part 18 of the cover being of sheet metal and secured over the part 17. The drum is operated by a handle 19 mounted on a shaft 20 which is supported in the casting 17 and to which is secured a gear 21, meshing with a gear 22 mounted on the same shaft 23 with the drum 15. Also mounted upon the shaft 23 is a cam 24 upon which a roller 25 is adapted to ride. The roller is mounted in a casting 26 which is pivotally mounted on a rod 27 and is provided with a finger 28 adapted to engage a stop 29, forming a part of the casting 17. Secured to the finger 28 is one end of a spring 30, the other end of which is secured to a portion 31 of the casting 17 by an eye-bolt 32. This spring 30 presses the roller 25 against the surface of cam 24 under all conditions. Also secured to the drum shaft 23 is a catch 33 adapted, when the potential starter is in running position, to be held by a weighted latch 34 which is pivotally mounted on a rod 35 and is provided with an arm 36. The latch 34 and arm 36 are integrally formed and connected by a sleeve 37. A hammer 38 having a projection 39 and pivotally mounted on a rod 40 is adapted to engage the arm 36 to disengage catch 33 and latch 34 to permit the spring 30 to throw the starter into off position. After striking the arm 36, the hammer 38 engages and rests on a padded stop 60. This hammer 38 forms the armature of the no-voltage magnet having a core 41 forming a part of the casting 17 and a coil 42. The hammer 38 is moved into engagement with the core 41, by one of the rollers 61 being forced against the top of the hammer projection 39 while the handle is being turned from off to running position. When the magnet is energized, it holds the hammer armature 38 against the core 41, but when said magnet becomes deenergized, the armature or hammer 38, being biased to

fall due to the position of its pivotal point 40, swings out to engage the arm 36 for tripping latch 34 to permit the switch drum 15 to be thrown into off position. The operating mechanism, including the switch drum 15, is mounted and held in the support 17, which, in this case, as above mentioned, is a large irregular shaped casting. This support for the operating mechanism is normally supported by the oil tank 10, is also detachable from said tank and may be removed with its operating mechanism entirely out of and away from said oil tank for purposes including the inspection and repair of the parts.

Projecting from the oil tank 10 are lugs 43 having openings 44 for the reception of rods 45, which pass through the upper part of the frame of a transformer 46. The core of the transformer 46 is retained between end plates 47. This transformer is provided with tap leads 48 which pass through insulating bushings 49 and 50 and are connected to the contact fingers 14. The main line leads 51 also pass through the bushing 50, which is secured to the upper part of the oil tank 10. The transformer, which is suspended from the oil tank and which may be removed therefrom by withdrawing the pins 52 from the lower part of lugs 43, is provided with a removable cover 53 which is normally suspended from and held by catches 54 secured to lugs 55 of the oil tank 10.

This potential starter can be considered to consist of three units, the first unit including the oil tank 10 with the stationary contact fingers 14, the second unit including the operating mechanism of which the switch drum forms a part, and the third unit including the transformer 46. When the operating mechanism is lowered into the oil tank so that the drum and its cooperating contacts 14 are in engagement, oil in the oil tank will cover said drum and contacts. This stationary oil tank forms the main support of the whole potential starter. The operating mechanism is supported by the oil tank and is detachable therefrom. The operating mechanism can be removed and raised out of the oil tank by disengaging the catches 58 on the oil tank 10 and the lugs 59 of the casting 17. Not only does the oil tank form the support for the operating mechanism, but it also forms the support for the transformer 46 which is suspended therefrom. If it is desired to inspect the transformer, it is merely necessary to drop the transformer cover 53. If it is desired to take the transformer away from the stationary oil tank, this may be accomplished by withdrawing the pins 52. With the operating mechanism and transformer removed, nothing remains but the stationary oil tank. With this arrangement all of the

parts of the potential starter can be readily inspected and repaired with the expenditure of very little time and labor.

There may be various modifications of the precise form and arrangement herein shown and described, and I intend to cover all such modifications which do not involve a departure from the spirit and scope of my invention as set forth in the appended claims.

What I claim as new is:

1. In a potential starter, the combination of a stationary oil tank, stationary contacts mounted therein, switch operating mechanism supported thereby and detachable therefrom, and a transformer suspended from said oil tank.

2. In a potential starter, the combination of a stationary oil tank, stationary contacts mounted therein, switch operating mechanism including a switch drum being supported by and detachable from said stationary oil tank, and a transformer suspended from said oil tank.

3. In a potential starter, the combination of a stationary oil tank, contact fingers secured to said tank, switch operating mechanism including a switch drum supported by and removable from said oil tank, a transformer suspended from said stationary oil tank, and leads connecting said transformer and said stationary contacts.

4. In combination, a stationary oil tank, contact fingers fixed therein, and operating mechanism including a drum adapted to cooperate with said fingers, said operating mechanism being removable as a unit from said stationary oil tank.

5. In combination, a stationary oil tank, contacts mounted therein, a support, and operating mechanism including a drum adapted to cooperate with said contacts and being mounted in said support, said support being detachable from said oil tank, said contacts being fixed in said tank.

6. In combination, a stationary oil tank, contact fingers secured therein, a switch drum cooperating therewith, and a support therefor, said support with the switch drum being adapted to be raised and lowered with relation to said oil tank without moving said contact fingers.

7. In combination, a stationary oil receptacle, contact fingers secured thereto and a member having a switch drum mounted therein and adapted to engage said contact fingers, said member being supported by and removable from said stationary oil receptacle without moving said contact fingers.

8. In combination, a stationary oil tank adapted to be secured to a switchboard, contact fingers secured to said tank, oil in said tank, and switch mechanism including a switch drum being supported by said oil tank and immersed in the oil therein, said switch mechanism being adapted to be

raised and lowered with respect to said stationary oil tank without moving said contact fingers.

9. In combination, a stationary oil tank, stationary contacts mounted therein, a frame, and a switch drum and operating handle carried in said frame, said frame being supported by and being detachable from said oil tank.

10. In combination, a stationary oil tank, a switch drum, a latch adapted to hold said drum in a predetermined position, a hammer adapted to engage said latch, means

for moving said hammer out of engagement with said latch, and a member in which said drum, latch, hammer, and means are supported, said member being supported by and detachable from said oil tank.

Milwaukee, Wis., Dec. 4, 1911.

In testimony whereof I affix my signature, in the presence of two witnesses.

HALFDAN A. STEEN

Witnesses:

OPAL B. CAREY,
G. M. HIATT.