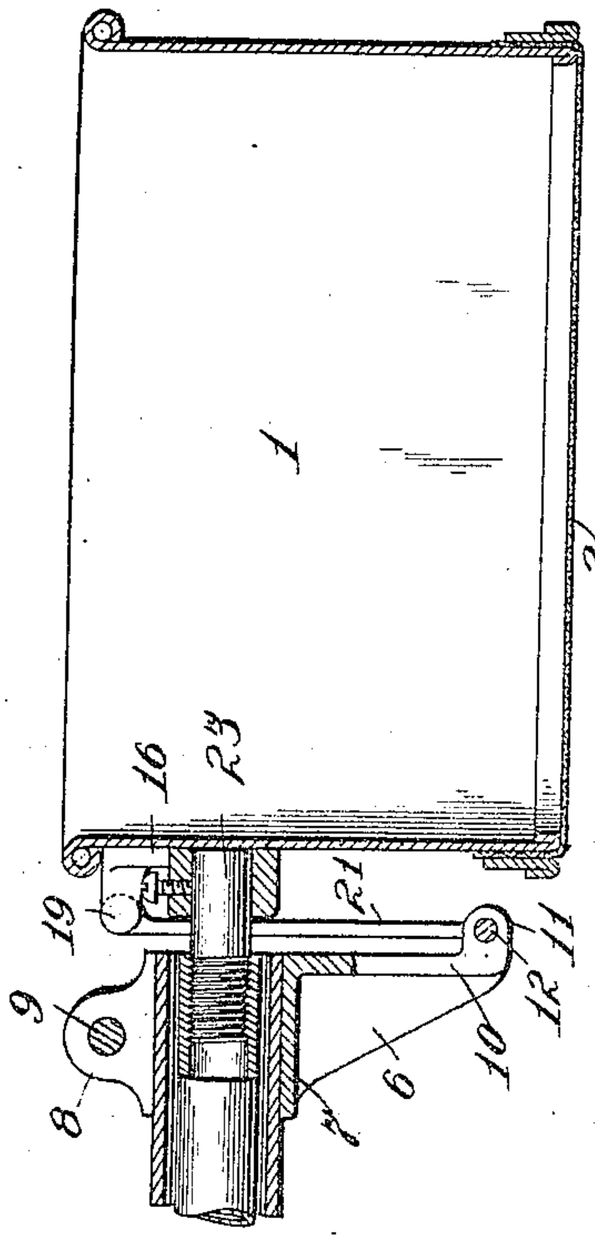
J. F. BECK & W. LINDSAY.

ELECTRICALLY OPERATED SIFTER.

APPLICATION FILED AUG. 28, 1907.

994,109.

Patented June 6, 1911.



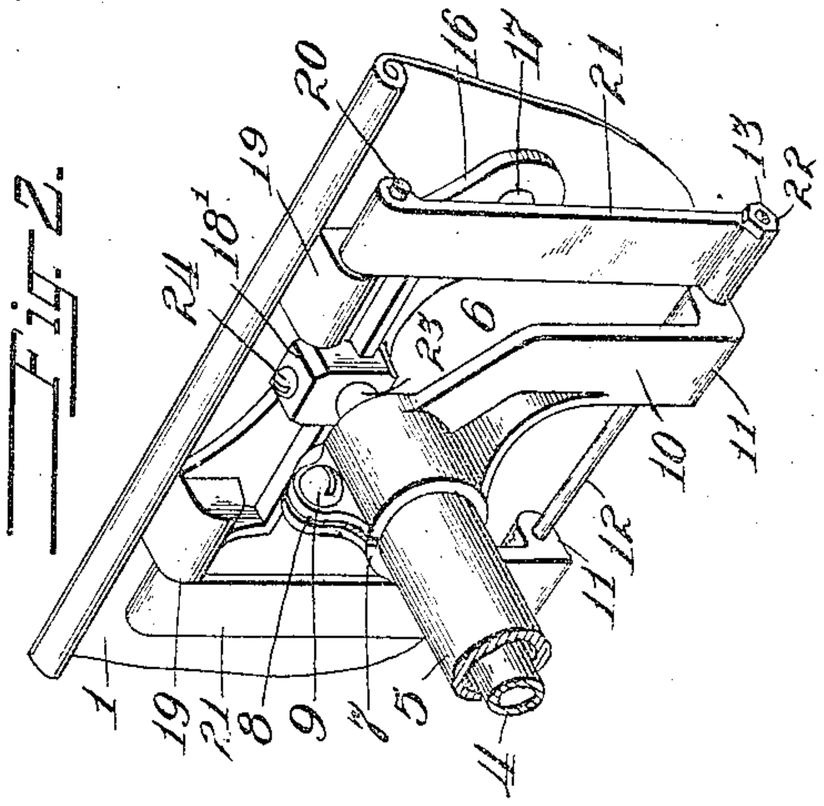


Fig. 2.

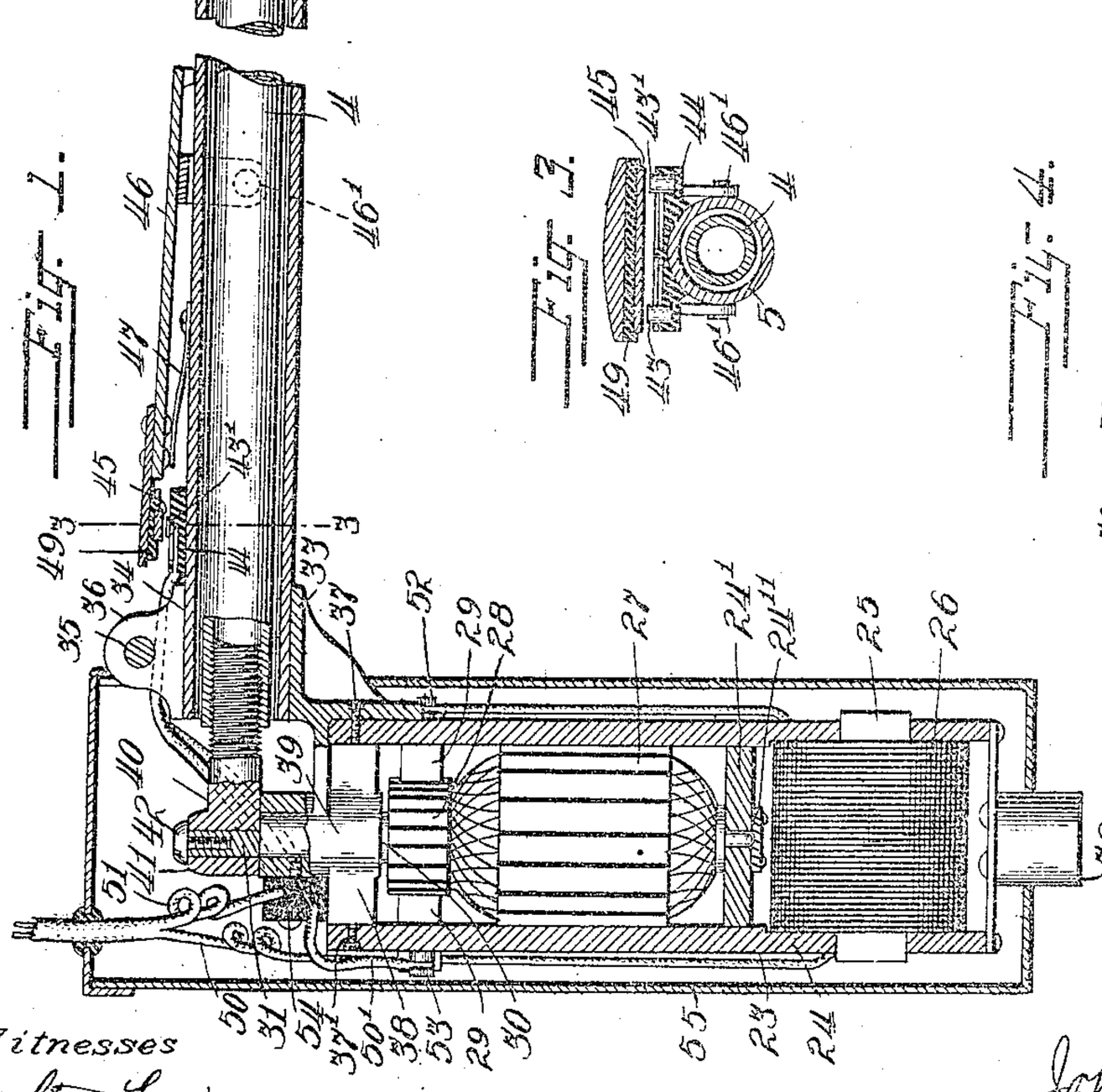


Fig. 1.

Fig. 3.

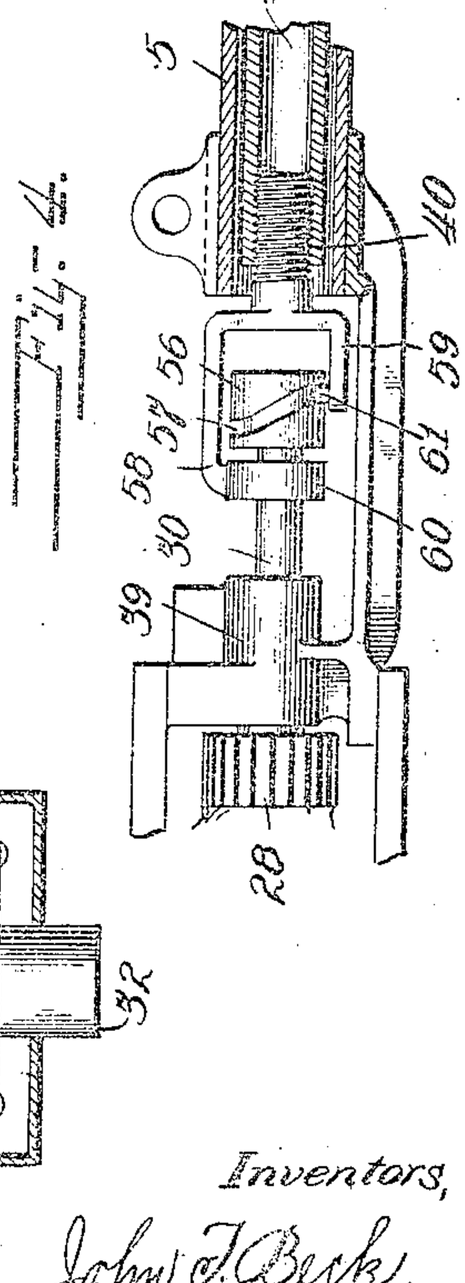


Fig. 4.

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UNITED STATES PATENT OFFICE.

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ELECTRICALLY-OPERATED SIFTER.

994,109. Specification of Letters Patent. Patented June 6, 1911.

Application filed August 28, 1907. Serial No. 390,445.

To all whom it may concern:

Be it known that we, JOHN F. BECK and WILLIAM LINDSAY, citizens of the United States, residing at the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Electrically-Operated Sifters, of which the following is a specification.

This invention relates to improvements in electrically operated sifters and in the construction shown is adapted to sift enamel powder or coating which is to be applied to metal manufactures, but of course may be used to sift various other materials.

Among the salient objects of the invention are to provide an electrically operated sifter which is actuated by a simple motor driven from any suitable current source; to provide novel hinge connections between the supporting casing and vibratory sifter box, which are such as to afford practically free or frictionless vibration of the sifter box; to provide a construction in which the armature shaft of the motor actuates the driving shaft of the sifter by means of simple and direct connections; to provide a simple unitary structure in which the actuating machanism is so arranged that it may be concealed and protected in a casing; to provide means for controlling the operation of the motor consisting in a simple thumb-pressed contact maker controlled by one hand of the operator; to provide a relatively light and portable device; and in general to provide an improved construction of the character referred to.

Referring to the drawings Figure 1 is a longitudinal vertical sectional view of our device with parts broken away to reduce the size of the drawing. Fig. 2 is a perspective view of the side of the sifter box showing the novel hinge supports and a fragmentary portion of the driving shaft and inclosing casing; Fig. 3 is a transverse sectional view taken through lines 3—3 of Fig. 1. Fig. 4 is a fragmentary detail view showing a modified construction of the driving connections between the armature shaft and actuating shaft of the sifter.

In the drawings—1 designates as a whole a sifter box open at the upper side and provided in its bottom with a screen or sieve 2 of the desired mesh. Operatively connected with the sifter box is a driving shaft 4 which reciprocates within a tubular casing member 5 and is adapted to vibrate the sifter box.

Describing now the manner of connecting the casing and shaft to the sifter, we provide hinged oscillatory connections between the tubular supporting casing and the sifter box which permit of limited vibration of the latter when the driving shaft is actuated and avoids the friction incident to guides and analogous supports. To this end a bracket 6 having a split ring 7 with a pair of ears 8, is clamped over one end of the tube 5 by means of a screw bolt 9. This bracket also comprises a pair of downwardly extending arms 10 each of which terminates in a lug 11. The arms 10 support a through rod 12 each end of which extends through the lugs 11 so as to form journal extensions 13. Upon the rear face of the sifter box is fixed a bracket 16 by means of screws 17 inserted through ears 18. The upper end of this bracket is centrally provided with an enlarged nut-like socket portion 18′ and upon each outer end of the brackets is integrally cast a lug 19 in which lugs are fixed alined journal studs 20. The bracket 16 and sifter box are pivotally connected to the bracket 6 by means of a pair of strap arms 21 engaged with the respective journal extensions 20 and 13 and held in place by nuts 22 on the lower journal extensions. The main driving shaft 4 is connected to the bracket 20 by means of a shaft section 23 screw threaded at one end into the tubular shaft 4 and at its other fastened in the socket 18′ by means of an impinging screw 24. The object of this construction is to permit the main portion of the shaft to be made hollow so as to decrease its weight and at the same time secure strong connections between the shaft and the sifter box. Inasmuch as the connecting arms 21 are pivotally mounted on their respective journal pins, it will be seen that the supporting straps have free oscillatory movement. Inasmuch as the shaft 4 is confined within the tubular casing member 5, it will be seen that the sifter can vibrate only in a substantially horizonal direction. This obviates any danger of the powdered enamel being thrown out of the sifter box.

To actuate the sifter, we employ an electrical motor designated as a whole 23. This

motor is of the direct current type and comprises an ordinary horse-shoe magnet 24, core 25, field windings 26, armature 27, commutator 28 and brushes 29. The armature shaft 30 extends upwardly and is provided with a reduced extension 31 constituting an eccentric wrist as will be hereinafter described. Between the pole pieces is secured a cross piece 24′ of non magnetic material, in which is formed a step bearing 24″ which supports the lower end of the armature shaft. The lower end of the motor is provided with a foot or supporting block 32, which is adapted to rest on the floor when the device is in use.

In order to connect the end of the tubular casing 5 to the top of the motor so that the two may mutually support each other, we provide a brass or other suitable bracket 33, the upper arm of which is provided with a split ring 34 adapted to be clamped over the end of the casing 5 by means of a screw 35 inserted through upstanding ears 36. The lower arm of the bracket is secured to one of the field pieces by a screw 37. The bracket also comprises a cross piece 38 which is secured to the opposite field piece as at 37′ and has an integral journal portion 39 through which the armature shaft passes.

In order to connect the driving shaft 4 with the armature shaft 30, the latter has a solid extension 40 one end of which is screw threaded into the shaft 4 while its other end is provided with a head 41 which is apertured so as to fit over the eccentric extension 31 of the armature shaft 30 and is there held in place by means of a screw 42. It will thus be seen that as the armature shaft revolves it will transmit a reciprocatory motion to the shaft 40 and main shaft 4.

To control the circuit through the motor a pair of contact posts 43—43′ respectively are provided, which are supported above and insulated from tubular casing 5 by means of an insulated supporting piece 44. Directly above the contact posts 43, 43′ is mounted a coöperating contact piece 45 secured to an arm 46 pivotally connected to the tube 5 as shown at 46′. The contact member 45 is insulated from the arm 46 by an insulating strip 49, and the upper contact member 45 is normally held out of engagement with the contact posts 43, 43′ by means of a spring 47.

Describing now the circuit connections of the motor, a pair of insulated wires 51, 52, connected with any suitable source of current are led in through the casing at the top thereof. As seen clearly in Fig. 1, the wire 50 passes down to and through the field windings 26 thence from the field windings to the contact screw 52 of one brush, thence through the brush and windings of the armature to the second brush. From the contact screw 53 of the latter, a wire 50′ leads through an insulating block 54 secured to the bracket 33 and thence to the contact post 43. The other wire 51 passes through the insulated block 54 to the other contact post 43′.

The motor is inclosed in a box-like casing 55, the upper side of which is cut away so as to fit around the bracket 33 while the top and bottom are provided with apertures for the wires 50 and 51 and the foot 32 respectively.

In Fig. 4 we have shown a modification of the driving connections between the armature shaft 30 and the stub shaft 40, designed to permit the motor shaft and sifter actuating shaft to be arranged in alinement. To this end, the armature shaft is provided with a cam head 56 in which is cut a cam groove 57. The stub shaft 40 terminates in a yoke having arms 58 and 59 respectively. The upper arm 59 terminates in a collar 60 which fits and slides on the armature shaft 30. The shorter lower arm 59 is provided with a cam stud 61 arranged to engage the cam groove 57. The rotation of the cam imparts reciprocatory movement to the sifter shaft, as in the previously described construction.

The device of either of the two modifications shown is operated by placing a suitable charge of pulverulent material in the sifter, grasping the handle of the device between the motor and sifter, and holding the sifter in freely extended and supported position, and while so held closing the switch and moving the shifter receptacle back and forth over the device to be coated. The weight of the motor acts as a counterbalance to the weight of the sifter receptacle and the charge therein, and in this way materially lessens the labor and fatigue of holding the sifter in the freely extended position which is necessary to properly use the device. The direct connection between the sifter receptacle and the armature of the motor insures a comparatively smooth shaking movement and avoids the disagreeable jar incident to prior devices in which the sifter receptacle is agitated by hammer-like blows or concussion. The circuit controlling switch is so located that it may be opened and closed without changing the position of one of the hands grasping the handle for supporting the sifter while operating it. The motor is so organized that it may be used from ordinary electric lighting systems, and the sifter may therefore be used without any special equipment in any factory or room which is wired for electric lighting or power, and this feature in itself is an important consideration.

Other modifications in construction and arrangement may be made without departing from the invention.

We claim as our invention:

1. The combination with a sieve, a handle therefor, an electric motor mounted to be carried by the handle, a shaking or vibrating device operatively associated with the sieve, and power transmitting means between the vibrating device and the electric motor.

2. The combination of a sieve, a handle, and means for effecting discharge of material from the sieve including a shiftable part operatively associated therewith, an electrically operated device mounted to be carried by the sieve, and power transmitting means also mounted to be carried with the sieve constituting the operating connection between the electrically operated devices and the shiftable part.

3. The combination of a sieve, a handle therefor, vibratory means associated with the handle in approximately the plane thereof, an electric motor and power transmitting means between said motor and said vibratory means, the motor and power transmitting means being arranged at one side of the handle and its associated parts to balance the device, and maintain the sieve in operative position.

4. The combination of a sieve, supporting and vibratory means therefor, an electric motor suspended therebeneath, power transmitting means intermediate the motor and the vibratory device, and means for controlling the actuation of the device arranged above the supporting means, substantially as described.

5. The combination of a sieve, a handle therefor, vibratory means associated with the handle in approximately the plane thereof, and instrumentalities comprising an electric motor provided with power transmitting means operatively associated with said vibratory means, said motor being arranged laterally of the handle and its associated parts, to assist in counterbalancing the weight of the latter when the handle is grasped by the hand of the user.

6. In a hand tool, the combination of a sieve, a handle, vibratory means for shaking the sieve, an electric motor operatively associated with said vibratory means for actuating the same, means for mounting the motor at the end of the tool opposite the sieve and at a point beyond the handle, the handle being arranged between said motor and the sieve whereby the motor balances the sieve, and means carried with the tool for controlling the operation of the vibrating means.

7. In a hand tool, the combination of a sieve, vibratory means for shaking the sieve including a rod, an electric motor operatively associated with said vibratory means for actuating the same, and means for detachably mounting the motor so that the same is carried by the sieve including a detachable coupling between said rod and the motor shaft.

8. In a portable manually-held sifter, the combination with a sifter receptacle, a handle attached at one end of said sifter receptacle, an electric motor carried by the other end of said handle whereby said parts are balanced in supported position, a driving shaft positively connected at one end to the motor and at its other end to the receptacle whereby electrical actuation of the motor imparts a shifting movement to the receptacle.

9. In combination with a sifter receptacle, a reciprocatory sifter shaft fixed at one end to said receptacle, a tubular casing member surrounding said shaft, hinged connections between said casing and said receptacle, an electric motor having an armature shaft extension, supporting connections between said casing and motor, and positive mechanical connections between the armature shaft extension and one end of said sifter shaft whereby the rotation of the former reciprocates the latter.

10. In a portable manually-held sifter, the combination of a sifter receptacle, a reciprocatory shaft having one of its ends positively connected to said receptacle, an electric motor having an armature extension rotating with the armature thereof, and operative connections between said armature extension and said reciprocatory shaft, whereby the sifter receptacle is reciprocated positively by and with the reciprocating shaft.

11. In a portable manually-held sifter, the combination of a sifter receptacle, a reciprocatory shaft having one of its ends positively connected to said receptacle, an electric motor having an armature extension rotating with the armature thereof, operative connections between said armature extension and said reciprocatory shaft, whereby the sifter receptacle is reciprocated positively by and with the reciprocating shaft, and a manually operable switch located upon that part of the contrivance normally grasped in supporting and operating the device, arranged to control the circuit connections of said motor.

12. In combination with a portable sifter receptacle, a tubular casing member constituting a handle, hinge-like link connections between said tubular casing member and said receptacle, a reciprocatory shaft extending through said handle and connected at one end to said receptacle, an electric motor mounted upon the opposite end of the handle, and positive mechanical connections between said shaft and the armature shaft of the motor whereby a reciprocatory motion is imparted to said shaft when said motor is driven.

13. In combination with a sifter receptacle, a shaft casing constituting also a handle, a bracket extension upon said casing member, a pair of links pivotally connected at one end to said bracket and at the other end pivotally connected to said sifter member, a shaft connected at one end to said sifter receptacle, and extending through, but supported out of contact with, said casing member, a bracket upon the end of said casing member remote from the sifter box and an electric motor operatively mounted upon, and supported by said latter bracket and positive mechanical connections between the armature shaft of the motor and said sifter shaft.

14. In combination with a sifter receptacle, a tubular casing constituting a handle, a bracket extension upon said casing, a pair of hinge-like links operatively connecting the sifter receptacle with said bracket; an actuating shaft extending through the tubular casing and connected at one end to the sifter receptacle, an electrical motor mounted upon the end of the tubular casing remote from the sifter receptacle, operative connections between the armature shaft of the motor and actuating shaft of the sifter, suitable circuit connections for operating the motor and a manually controlled switch lever mounted upon the tubular handle casing at a point intermediate the length of the latter and controlling said circuit connections.

15. In a portable sifter, a combination of a tubular handle member, a sifter box, hinge-like link connections between the end of the tubular handle and the side of the sifter box, a shaft extending through said tubular handle and operatively connected with the approximate side of the sifter box, a motor supporting bracket mounted upon the end of the handle remote from the sifter box and provided with an armature shaft journal portion extending at right angles to the longitudinal axis of the handle, an electric motor rigidly supported upon said bracket with its armature extending through the journal portion thereof, an eccentric rest upon said armature shaft operatively connected with the corresponding end of the sifter actuating shaft, suitable circuit connections for operating the motor and a manually controlled switch controlling said circuit connections.

16. In a portable sifter, a combination of a tubular handle member, a sifter box, hinge-like link connections between the end of the tubular handle and the side of the sifter box, a shaft extending through said tubular handle and operatively connected with the approximate side of the sifter box, a motor supporting bracket mounted upon the end of the handle remote from the sifter box and provided with an armature shaft journal portion extending at right angles to the longitudinal axis of the handle, an electric motor rigidly supported upon said bracket with its armature extending through the journal portion thereof, an eccentric rest upon said armature shaft operatively connected with the corresponding end of the sifter actuating shaft, suitable circuit connections for operating the motor and a manually controlled switch controlling said circuit connections, and a box-like casing completely inclosing the electric motor.

17. In a portable sifter, the combination with a tubular handle member, a sifter box movably supported upon one end of said handle and an actuating shaft connected with the sifter box and extending through the handle, of an electric motor having its frame portion rigidly united with the end of said handle remote from the sifter box, with the axis of its armature shaft arranged at right angles to the axis of the handle, a foot extension upon the end of said motor frame remote from the handle and operative connections between the motor and sifter actuating shaft.

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