

Sept. 26, 1933.

E. L. VIGNE

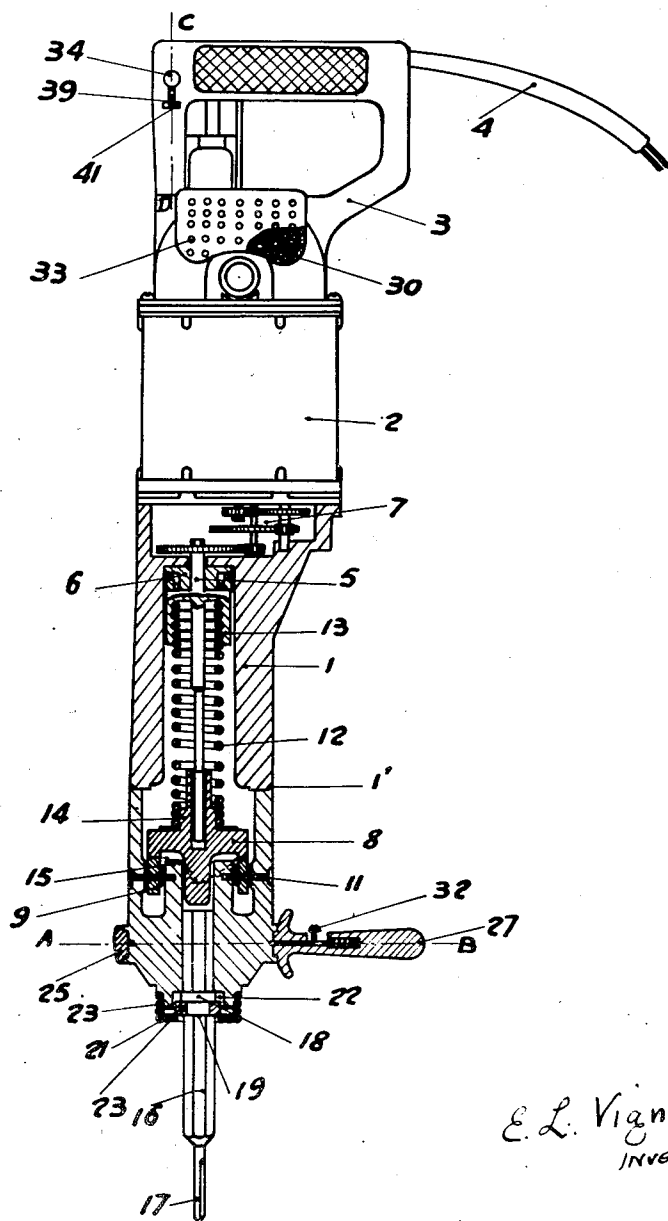
1,928,082

ELECTRICALLY CONTROLLED TOOL

Filed July 19, 1932

2 Sheets-Sheet 1

Fig. 1



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Fig. 2

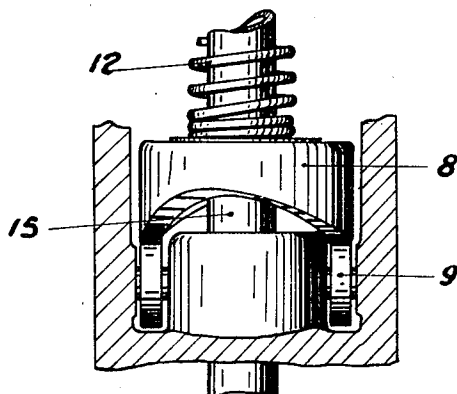


Fig. 3

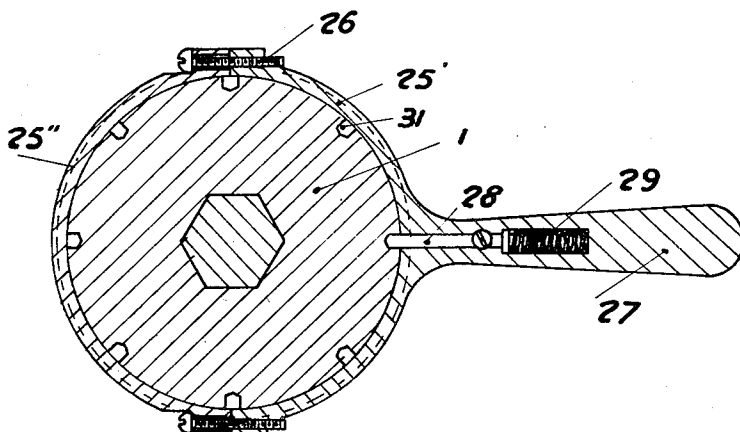
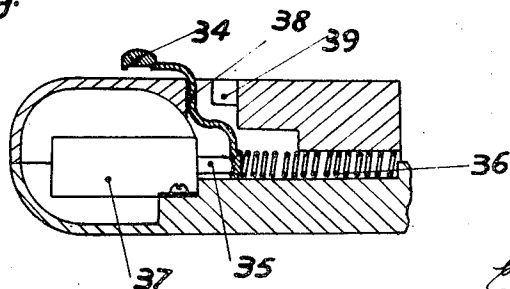


Fig. 4



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UNITED STATES PATENT OFFICE

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ELECTRICALLY CONTROLLED TOOL

Emile Léon Vigne, Paris, France

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3 Claims. (Cl. 125—33)

My invention has for its object an electrically controlled striker or hammering tool wherein the rotation of a shaft driven by an electric motor is transformed into a reciprocating striking motion parallel to this shaft through the agency of a cam capable of a rotary and of a rectilinear movement with reference to the shaft to which it is connected through a coil spring wound round the shaft; this cam cooperates with rollers which cause said cam when it rotates to rise periodically against the action of the spring.

The objects of my invention are to provide inter-alia a tool which may be mounted and dismounted in a simple manner, which is light and easily portable and the number of possible applications of which is greatly increased.

Thus the casing constituted of two parts and secured to the electric motor extends in a direction parallel to the motor shaft and is arranged in a manner such that the different parts which it contains and guides may be readily accessible after an easy dismantling.

The connection between the spring on one hand and the rotary shaft and the cam freely mounted on it on the other is provided simply by the coils of the spring itself, which coils brought into close contact towards both ends of the spring form a thread engaging screw threads of opposed direction formed respectively on the shaft and on the cam.

The elastic return of the tool after striking and the holding of the tool in the casing are also ensured by a coil spring the upper coils of which form a thread engaging a screw thread at the end of the tool casing while its lower coils disposed in a common plane perpendicular to the axis of the spring so as to reduce the diameter thereof, serve as a bearing for a removable washer inserted in the tool handle.

In order to allow an easy handling of the tool by the workman who uses it, I provide in a peripheral groove of the tool casing, a collar provided with a handle and carrying stops adapted to engage the casing whereby it is possible to secure the handle in any desired angular position with reference to the tool.

The starting of the tool is ensured as in all similar tools through the agency of a contact adapted to be closed by a knob controlled by the operator. A stop system is provided which allows the operator to lock the knob in its contact closing position whereby he may work without having to keep the knob down.

Tools according to my invention are suitable for work in stone and masonry, for instance for

sculpture, scraping concrete surfaces, pricking up coatings, removing rust or paint, removing scale from boilers, cleaning ship's hulls, boring cement, brick, soft stone, pulling down buildings, vibrating reinforced concrete, or foundry molds, paring off, setting metals, stamping, riveting etc. It allows the cutting of rubber tires, of thick sheets of lead, of clay, asphaltum, ice, etc.

I have described hereinbelow by way of example and illustrated in accompanying drawings a form of execution wherein:

Fig. 1 is a side view of the tool, partly in axial cross-section,

Fig. 2 is a detail side view of the striking system with the casing shown in cross-section,

Figs. 3 and 4 are cross-sections at an enlarged scale through lines AB and CD of Fig. 1 respectively.

The apparatus comprises a casing 1 constituted of two parts secured together at 1' and carrying in a suitable manner an ironclad electric motor 2 carrying in its turn a handle 3 through which enters the electric cable 4 fed from the mains.

Inside the casing is a shaft 5 rotating in a ball bearing 6 and driven through the gearwork 7 contained inside the upper part of the casing, from the main shaft of the motor 2. The lower end of the shaft 5 engages a recess bored in the cam 8. This cam carries slopes (Fig. 2) cooperating with rollers 9 mounted on spindles 11 screwed into the casing wall. The vertical guiding of the cam along the shaft may however be ensured in any other manner. A coil spring 12 fitted over the shaft 5 connects this shaft with the cam. To this end the shaft 5 carries an inwardly threaded sleeve 13. This thread is engaged by the upper coils of the spring 12 which are brought vertically into close relationship so as to form a kind of screw. On the other hand the cam 8 shows an outwardly threaded boss 14 the new thread on which is engaged by the lower coils of the spring 12 which are also brought vertically into close relationship. Of course the direction of the threads is such that for the direction of rotation given by the motor 2 to the shaft 5, the sleeve 13 has a tendency to be screwed on to the spring. Obviously also, the cam may show an inner thread and the shaft an outer thread. Or again the threads on the shaft and on the cam may be both outer threads or both inner threads. I provide thus between the shaft 5 and the cam 8 a yielding connection allowing a very easy disconnection. The projecting part 15 of the cam abuts directly against the upper

part of the carrier 16 of the tool 17. This carrier guided by the lower end of the casing 1, is provided with a groove comprised between the two shoulders 18, 19 and in which is fitted the two part washer 21. The shoulder 18 and the washer 21 are held inside a recess 22 provided at the end of the casing 1. This retaining action is ensured through a coil spring 23 the upper coils of which are screwed into a screw thread provided on the outside of the casing. The lower coils of the spring 23 are brought into a same plane perpendicular to the axis of the spring, inside the cylinder constituted by the remaining spring coils. The lower coils form thus an elastic bearing for the washer 21.

Inside a peripheral groove of the casing 1 is disposed a collar 25 formed of two parts 25', 25'' (Fig. 3) interconnected through the screws 26. This collar carries a handle 27 inside which is axially arranged a spindle 28 submitted to the action of a spring 29. The end of this spindle may engage one of a series of recesses 31 provided at the periphery of the casing 1. The spindle is acted upon through a knob 32. Obviously when the spindle 28 is urged backwards by the knob 32, it is possible to make the collar 25 rotate round the casing so as to secure it in one of a series of positions corresponding to coincidence between the spindle 28 and the different recesses 31. This allows the handle to be set in the position which is the most suitable for work.

The handle 3 carries a perforated plate 33 behind which is arranged a filter constituted for instance by a very fine steel sponge 30 which stops the dust which might otherwise enter the apparatus. It also carries a knob 34 adapted to close the circuit of the motor 2. This knob acts on a piston 35 urged by the spring 36 into a position for which the circuit is broken at 37. The stem carrying the knob 34 shows a bent part 38 adapted to move (Figs. 1 and 4) inside a groove 39 provided at one end with one or two notches 41 serving as stops for holding the bent part 38 in the circuit-closing position. This relieves the operator from the strain of holding the knob depressed.

The working of the apparatus is as follows:

The operator who holds the tool through the handle 3, closes the circuit through the knob 34 which he causes to slide along the groove 39 into engagement with the notch 41. He is then at liberty to hold the apparatus with both hands through the handles 3 and 27. The shaft 5 is set rotating by the motor 2 and drives the cam 8 through the spring 12. The cam rotates and its slopes, moving over the rollers 9, compress and relieve in alternation the spring 12. The cam reciprocates thus longitudinally of the apparatus. In the example shown, there are two forward strokes for each complete revolution of the shaft 5. The projecting parts of the cam hit at each forward stroke the tool carrier 16 which is returned yielding after this stroke by the spring 23.

It is apparent that the dismantling of the ap-

paratus is extremely easy: after unscrewing the spring 23, I remove the tool proper. On the other hand after removing the motor 2 from the casing 1, I may reach the gearwork 7. After separating the two parts of the casing 1 which are interconnected at 1' through lugs and bolts, I may reach all the inner parts. A mere unscrewing of the spring 12 allows the shaft 5 to be disconnected with reference to the cam.

What I claim is:

1. An electrically controlled striking apparatus comprising in combination: a handle, an electric motor to which this handle is secured, an electric circuit therefore, a two part casing enclosing a chamber the longitudinal axis of which is parallel to the motor shaft, a longitudinal shaft in this casing chamber adapted to be driven by the motor, a cam adapted to rotate and move longitudinally on this longitudinal shaft, rollers pivotally carried inside the casing and operatively engaging the surface of the cam for moving it longitudinally as it rotates, a helical spring connecting the cam with the longitudinal shaft, a tool slidably held in the casing, means controlled by the cam for imparting a longitudinal blow to the tool, on the casing a lower outwardly threaded recessed part, two shoulders on the tool the first of which penetrates in the lower recessed part of the casing, a two part washer disposed between these shoulders and projecting beyond them, a helical spring screwed over the lower threaded part of the casing, and the coils of the free end of which are brought towards the axis of the spring in a plan perpendicular thereto, the size of said spring being such that the washer bears on the last coils of the free end and that during the working, said spring brings back the tool when thrust forward by the cam.

2. An electrically controlled striking apparatus comprising in combination: a handle, an electric motor to which this handle is secured, an electric circuit therefor, a two-part casing provided with an annular groove and enclosing a chamber the longitudinal axis of which is parallel to the motor shaft, a handle, a collar carrying said handle adapted to rotatably fit in the groove of the casing, means for securing the collar to the casing for different angular positions thereof, a longitudinal shaft in this casing chamber adapted to be driven by the motor, a cam adapted to rotate and to move longitudinally of this longitudinal shaft, rollers pivotally carried inside the casing and operatively engaging the surface of the cam for moving it longitudinally as it rotates, a helical spring connecting the cam with the longitudinal shaft, a tool slidably held in the casing, means controlled by the cam for imparting a longitudinal blow to the tool and a yielding device carried by the casing and urging the tool inwards towards the cam.

3. In an apparatus as claimed in claim 1 the provision in the casing of a perforated gate and an air filter behind same.

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