Oct. 17, 1950 C. H. SPARKLIN 2,525,839

VARIABLE-SPEED ELECTRIC DRILL

Filed Jan. 31, 1946 2 Sheets-Sheet 1

Fig. 1

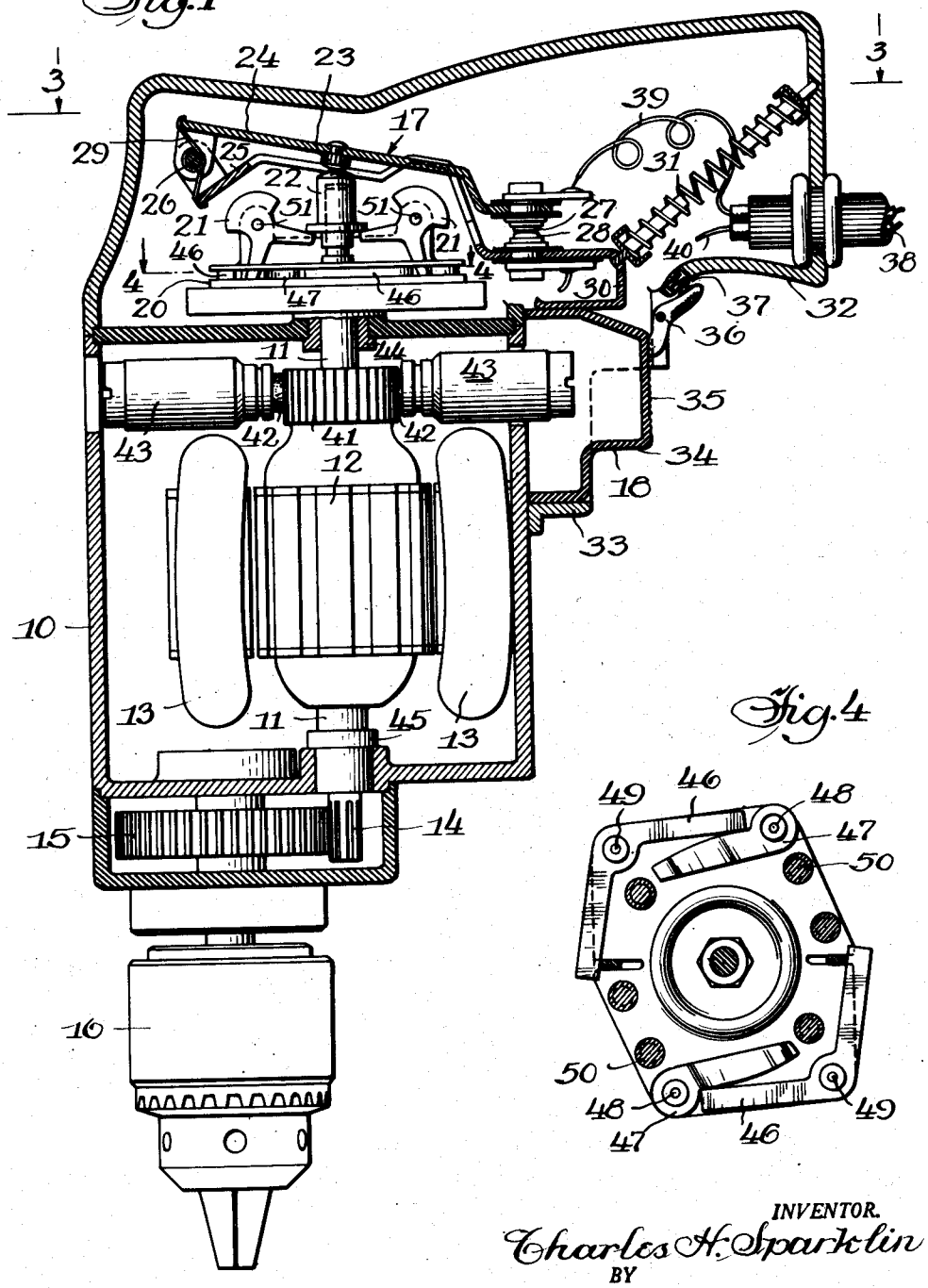


Fig. 4

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Filed Jan. 31, 1946 2 Sheets-Sheet 2

Fig. 2

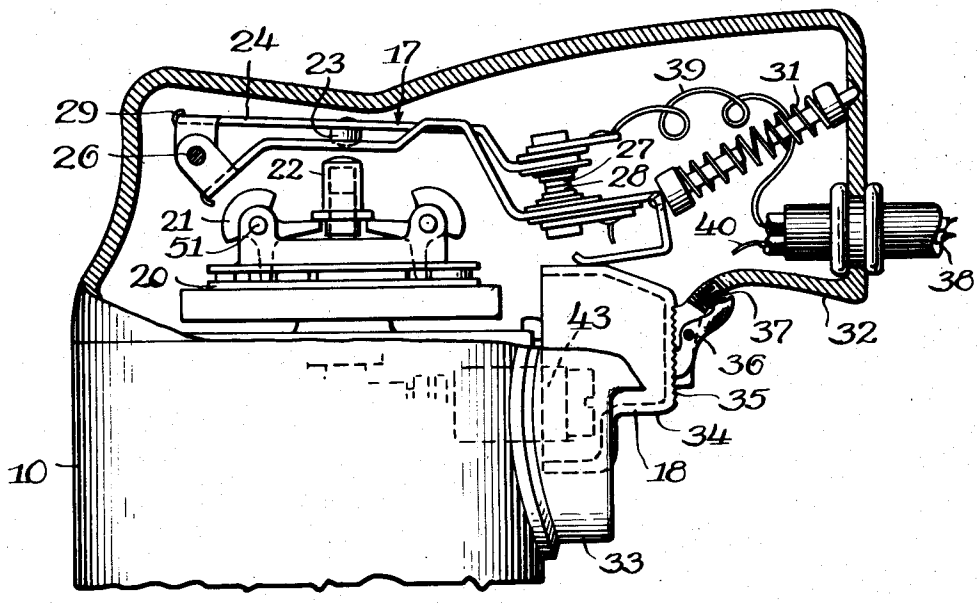
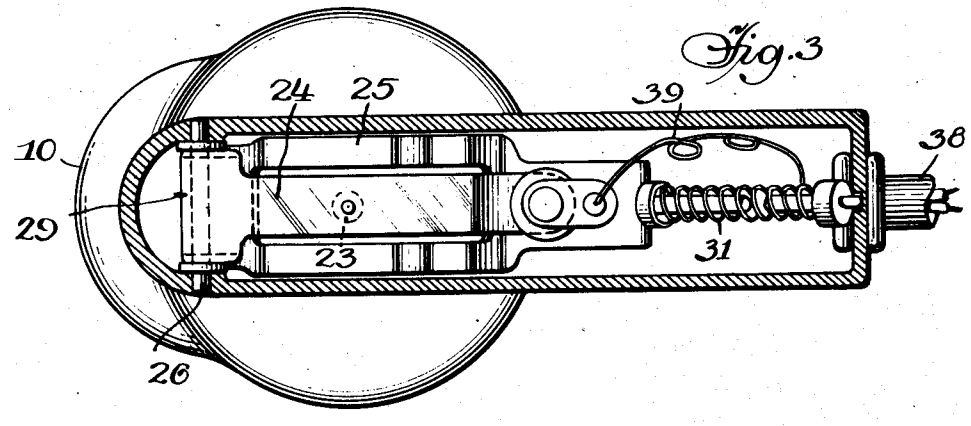


Fig. 3



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VARIABLE-SPEED ELECTRIC DRILL

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Application January 31, 1946, Serial No. 644,509

4 Claims. (Cl. 172—36)

1

This invention relates to a variable speed electric drill, and particularly to a portable hand drill.

Electric drills of the portable type have not heretofore been constructed wherein the speed is variable over a wide range. In most variable speed electric drills the speed range is rather narrow, and the transfer from one speed to another is rather erratic. In these prior drills the speed is not smooth and constant for any given setting of the speed control mechanism, and there has been no simple means of locking the mechanism at one predetermined speed. In the prior drills it has also been difficult to hold the drill steady, as the fingers of the operator had to always engage the speed control trigger or other mechanism.

I have invented a variable speed electric drill wherein the speed can be regulated over a wide range. The control trigger may be set for any desired speed and locked in position so that this speed will be maintained. The drill operates smoothly and efficiently, and a change from one speed to another is easily accomplished. In the new drill there is no need to manually hold the control trigger to any desired position, and the speed can be changed by the action of one finger, usually the second finger, while the index finger and the others are used to hold the drill steady. The locking mechanism that holds the trigger in its desired position may be readily released. In one embodiment of the invention the index finger of the operator is used to hold the drill steady, the second finger is used to regulate the speed, while the third finger is used to release the lock mechanism.

The invention will be described as related to the embodiment set out in the accompanying drawings. Of the drawings Fig. 1 is a vertical section taken through a variable speed hand drill embodying the invention; Fig. 2 is a fragmentary elevation of the top portion of the drill partially broken away for clarity of illustration; and Fig. 3 is a horizontal section taken along line 3—3 of Fig. 1. Figure 4 is an elevation of the centrifugally responsive members.

The drill shown in the accompanying drawings comprises a housing 10, a motor armature 12, field windings 13, a pinion 14 at the lower end of the shaft 11 and operating against a circular gear 15, a drill chuck 16 rotated by the gear 15, a speed governor 17 at the upper end of the shaft 11, and a trigger 18 for operating the speed governor.

The speed governor 17 is shown and described

2

in my copending application, Serial No. 580,114, filed February 28, 1945. The speed governor comprises rotatable plates 19 and 20 mounted on the upper end of the motor shaft 11 with the plates holding bell cranks 21 at right angles to the plates. As described in the above application the plates 19 and 20 hold rotatably mounted arms that are movable outwardly under centrifugal force. As these arms move outwardly they operate through bell cranks 21 to force the thimble 22 in a generally outward direction. The distance that the thimble is moved outwardly depends upon the speed of rotation of the motor shaft. The construction of this portion of the speed governor and its operation are described fully in the above copending application. The thimble 22 operates against a contact button 23 on a switch arm 24. This outer switch arm 24 is arranged generally parallel to an inner switch arm 25 with the thimble 22 extending through the inner switch arm 25. Both switch arms are rotatably mounted around a common fulcrum pin 26 and have contact points 27 and 28 on their other ends. These contact points are urged together under the force of a spring 29 located around the fulcrum pin 26. The free end of the inner switch arm 25 is provided with a U-shaped extension 30 which presses against the top portion of the trigger 18. The switch arm 25 is held in contact with the trigger by means of a spring 31 extending between the portion 30 and the flat base of the pistol grip portion 32 of the housing.

The trigger 18 rests against an extension 33 of the housing when the trigger is in its "off" position. This extension is engageable with the index finger of the operator to hold the drill steady. The second finger of the operator is engageable with a depressed portion 34 of the trigger 18.

In order to lock the trigger 18 in any desired position holding means are provided. This holding means may have any form desired, and as shown comprises a serrated outer surface 35 on the trigger 18 that is engaged by serrations on a rockably mounted lever 36. This lever is mounted on the pistol grip portion 32 of the housing and the two sets of serrations are held in engaging relationship by a short spring 37 urging the upper end of the lever 36 outwardly.

The variable speed drill is provided with the usual electric lead wire 38 leading into the housing and other wires 39 and 40 leading to the contact points 24 and 25. If desired a condenser (not shown) may be provided between the contact points 27 and 28. The motor is provided

with the usual armature 41, brushes 42, brush holders 43, and motor shaft bearings 44 and 45.

When the trigger 18 is in its lowest position as shown in Fig. 1 the contact points 27 and 28 are held apart by compression spring 31. When a drill is to be operated the operator grasps the pistol grip 32 and wraps his index finger around the extension 33, his second finger around the depressed portion 34 of the trigger 18, and his other fingers around the pistol grip 32. The third finger may be used to control the locking lever 36. When it is desired to start the drill the operator, using his second finger, pulls the trigger 18 upwardly a short distance. This closes the contact points 27 and 28 and starts the drill operating at low speed. If a higher speed is desired the trigger 18 is moved to a higher position. When the trigger is pulled upwardly as far as it will go the drill will be operating at its highest speed. This position is shown in dotted lines on Fig. 1. The trigger 18, and thus the speed control mechanism, may be locked in any position by the lever 36 engaging the serrations 35 on the trigger. When it is desired to change positions the third finger will be used to relieve the lever 36, and the trigger may be moved to a new position. In the embodiment shown, therefore, the operator holds the drill steady with his thumb, index finger, palm, and last two fingers. The second finger may be used to operate the trigger 18. When it is desired to change speeds the third finger may be used to disengage the lever 36.

Having described my invention as related to the embodiment shown in the accompanying drawings, it is my intention that the invention be not limited by the deails of description unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

I claim:

1. In a variable speed electric drill comprising a motor, a motor shaft extending beyond the motor, a rotatable plate member attached to one end of said shaft, a sliding member on said end of said shaft, means on the plate member for urging the sliding member outwardly a distance dependent upon the speed of rotation of the plate member, generally parallel switch arms located beyond the upper end of the shaft and pivotally

mounted about a common fulcrum at one end of said arms, contact points at the other ends of said arms, said sliding member extending through the inner arm and contacting the outer arm, spring means normally urging the two arms together, and second spring means normally urging the inner arm toward the motor: positioning means operating on the contact end of the inner arm to position both arms relative to the upper end of the shaft.

2. The electric drill of claim 1 wherein the positioning means comprises a finger-operated trigger member and means for locking said trigger member in a predetermined position.

3. The electric drill of claim 1 wherein the drill is provided with a housing including a pistol grip including a holding portion capable of being grasped by the index finger of the operator, and the positioning means comprises a trigger member slidable on said housing and abutting against said holding portion when the trigger member is in one position, said trigger member being capable of being operated by the second finger of the operator, and there are provided readily releasable locking means for locking the trigger member in a predetermined position.

4. The electric drill of claim 1 wherein the positioning means comprises a finger-operated trigger member, and means for locking said trigger member in a predetermined position, said contact points being separated from each other when the trigger member is in an "off" position.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,489,182	Weinberg	Apr. 1, 1924
1,690,103	Clark	Nov. 6, 1928
1,827,372	Riddell	Oct. 13, 1931
2,103,589	Lee et al.	Dec. 28, 1937
2,228,801	Wilhide	Jan. 14, 1941
2,263,136	Knouse et al.	Nov. 18, 1941
2,353,314	Lee	July 11, 1944
2,406,389	Lee	Aug. 27, 1946
2,442,456	Boyden et al.	June 1, 1948