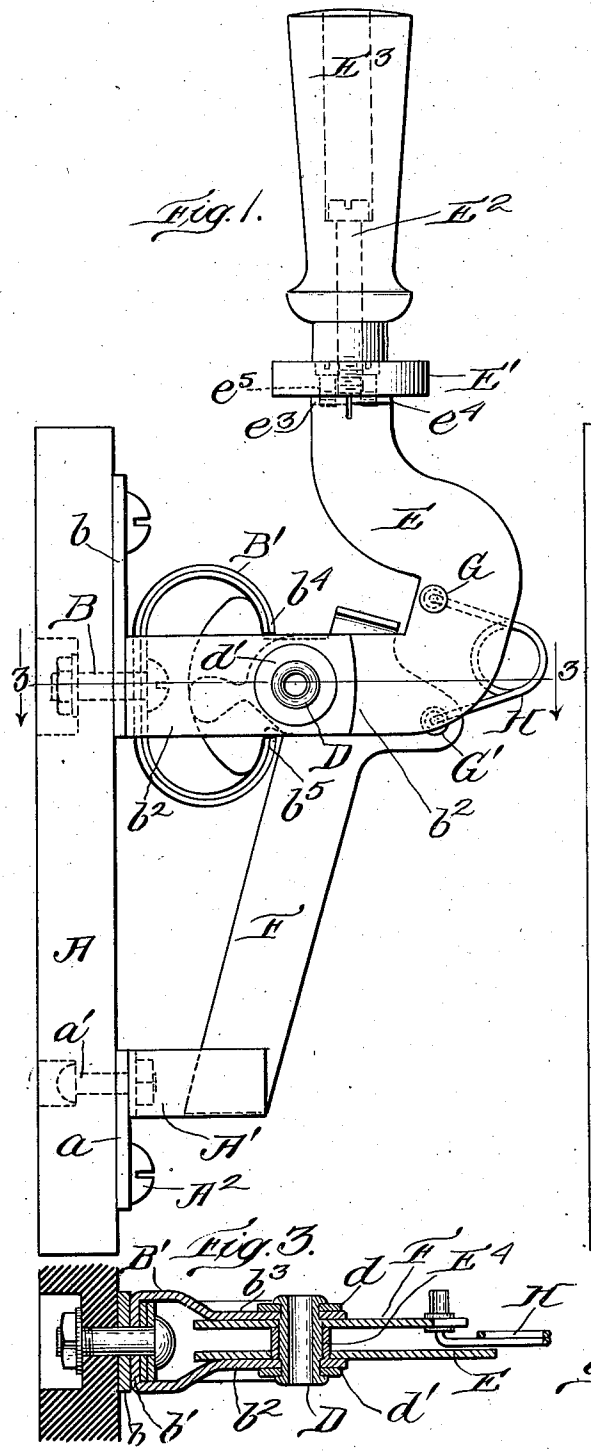
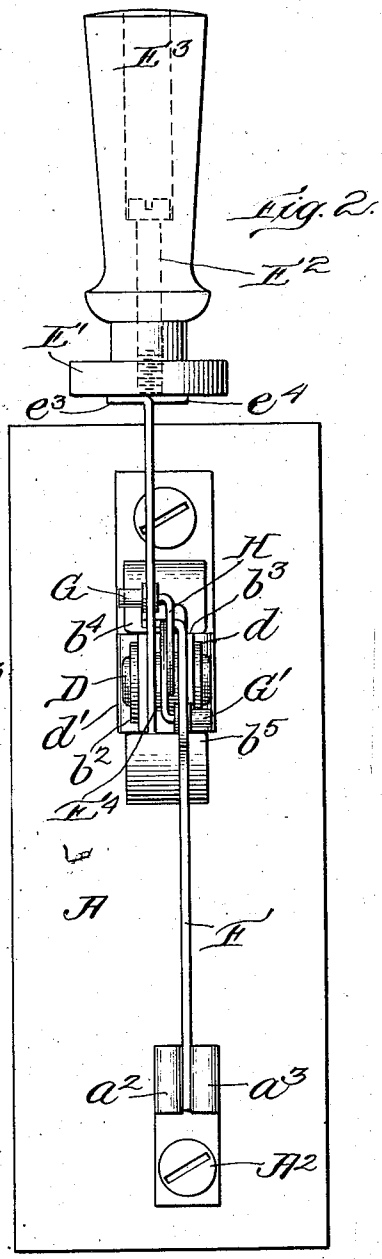
May 22, 1923. 1,455,931

H. G. PAPE

MANUALLY CONTROLLED QUICK MAKE AND QUICK BREAK KNIFE SWITCH

Filed March 25, 1919 2 Sheets-Sheet 1





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Fig. 7.

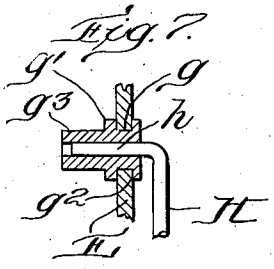
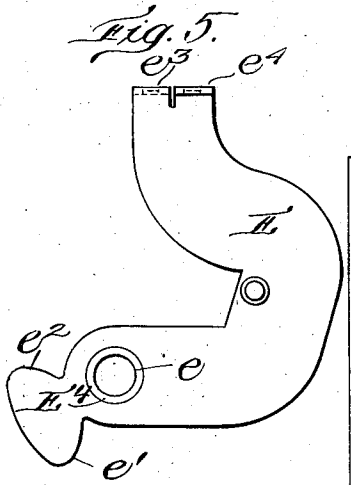


Fig. 5.



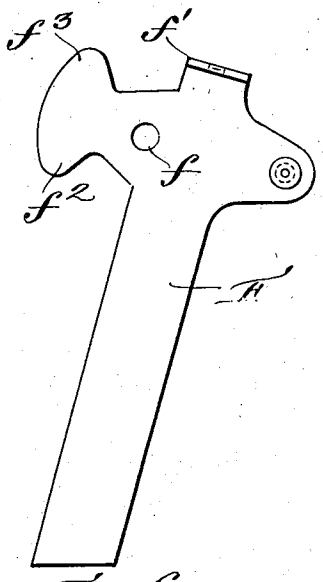
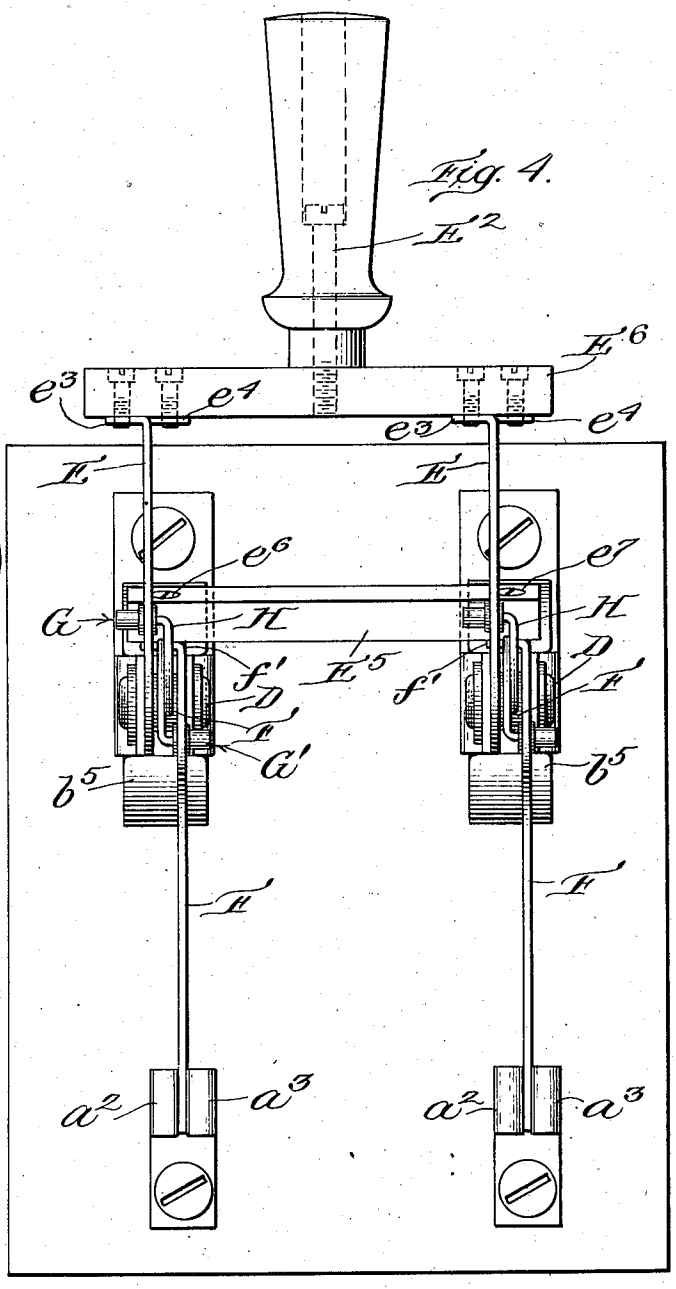


Fig. 6.

Fig. 4.



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Patented May 22, 1923. 1,455,931

UNITED STATES PATENT OFFICE.

HERMAN G. PAPE, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO BEAVER MACHINE AND TOOL CO., INC., OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MANUALLY-CONTROLLED QUICK-MAKE AND QUICK-BREAK KNIFE SWITCH.

Application filed March 25, 1919. Serial No. 285,003.

To all whom it may concern:

Be it known that I, HERMAN G. PAPE, of New York, in the county and State of New York, have invented a new and useful Manually-Controlled Quick-Make and Quick-Break Knife Switch, of which the following is a specification.

My invention relates to the class of electric switches known as knife switches and particularly to those having a quick make and a quick break and my main object is to provide an efficient and compact switch of that class.

One feature of my invention is the provision of means to avoid recoil, particularly on making of the circuit, and in the preferred form I provide a yielding stop to engage the rear half of the knife blade and preferably close to the pivot.

Another feature is the provision of an extension of the knife blade to engage a buffer spring on the under side of the latter.

Another feature is the extended bearings for the actuating spring.

Another feature consists in interchangeable parts so that one handle may be used with one or any desired number of switching units, which are so connected as to operate in unison.

Another feature is locating the actuating spring so that it operates between the handle member and the knife blade member and preferably oscillates bodily in a plane parallel to said members.

Another feature is a bushing of relatively high conductivity carried by the handle member.

Other features will be pointed out below.

In the drawings

Figure 1 is a side elevation of a switch embodying my invention;

Figure 2 is a front elevation thereof;

Figure 3 is a section on line 3—3 of Figure 1;

Figure 4 is a front elevation of a modification;

Figure 5 is a detail of a part of the handle members;

Figure 6 is a detail of the knife blade; and

Figure 7 is a detail of one of the bearing blocks, on a larger scale.

The base A is made of slate or other suitable material and to it is connected conducting plate a by means of a screw a', which may be connected to a lead wire, said screw a' also holding in place the fixed contact A' which comprises the spring jaws a^2 a^3 to receive the movable knife blade. I may use screw A^2 if desired to fasten the base to a suitable support.

Screw B is to be connected beneath the base with a lead wire and holds in position conducting plate b and also the support which comprises central portion b' and integral upright perforated posts b^2 b^3 and also the spring buffer or stop B', the latter consisting of two parallel leafs having ends b^4 and b^5 to limit the movement of certain parts hereinafter described.

The pivot member D extends through the posts b^2 and b^3 and to it are pivoted the handle member E at e and the knife blade member F at f. Suitable washers d d' are provided and the ends of member D are upset as shown. It is advisable to make the member E of iron or of other material of relatively low conductivity and I therefore insert in member E a bushing E^4 of brass or copper so as to increase the conductivity between post b^2 and knife blade F which is of relatively high conductivity, preferably being made of copper.

In view of the fact that members E and F are preferably of thin sheet metal I prefer to provide special relatively long bearing blocks for the ends of the actuating spring H and I mount one of those bearing blocks or sockets G on the member E and the other G' on the member F. As they are substantially alike I shall only describe bearing block G, particularly in connection with Figure 7. Bearing block G is a special tubular rivet having a shank portion g extending through member E, one end of said shank having a shoulder g' at one end seated against one side of member E and being upset at the other end at g^2, the upset portion being seated against the opposite side of said member E. I thus provide a bearing much greater in length than the thickness of member E and preferably I extend the shank as at g^3 to form a longer bearing.

One bent end h of round wire spring H is journalled in bearing block G' mounted

on member F and the other end in block G mounted on member E, each of said members acting to hold said spring in engagement with the other member.

Members E and F are arranged parallel to each other and fairly close together but spaced to permit operation of spring H which is a bow spring with one coil, said coil being in a plane between, and parallel to the members E and F, and the body portion of the spring being located between said members, thus giving a very important characteristic of compactness to my invention.

The handle member E is pivoted to member D at e and has an integral extension provided with a shoulder e' to engage the under side of end b^5 to limit the movement of member E in the closing movement of the switch and provided with a shoulder e^2 to engage the under side of end b^4 to limit the movement of member E in the opening movement of the switch. Member E is slit at one end and provided with two laterally extending tangs e^3 and e^4 threaded to engage screws which extend through insulating member E′, said insulating member having a threaded hole e^5 to receive screw E^2, the latter thus holding the handle E^3 in place.

The knife blade member F is pivoted at f to member D and has a laterally extending tang f' with a threaded perforation for a purpose hereinafter described. Member F has an integral extension provided with a shoulder f^2 to engage the under side of end b^5 to limit the opening movement of member F and provided with a shoulder f^3 to engage the under side of end b^4 to limit the closing movement of member F. My construction is of particular advantage because the buffer or stop B′ has its active or stopping ends very close to the pivot thus practically eliminating recoil, which is important generally in avoiding shaking and jarring of the switch mechanism and its important particularly when the blade engages the fixed contact because any substantial recoil at that time might cause arcing or even break the circuit. I therefore have the stop engage the blade at the rear half of the blade as distinguished from the front half which engages the contact and preferably the engagement is closely adjacent to the pivot.

When the handle in Figure 1 is moved to the right the end of the spring in block G is carried around pivot D stressing the spring until said end passes the line extending from pivot D through the other end of the spring, whereupon said spring will operate the knife blade independently of the handle with a very quick break, the spring turning bodily 180° in a plane parallel to the knife blade and handle member and arm b^5 yieldingly limiting the movement of the blade while arm b^4 yieldingly limits the movement of the handle member. Reverse movement of the handle will again stress the spring but in the opposite direction and the spring will then actuate the knife blade with a quick make, the recoil of the blade in this movement being prevented by arm b^4 and of the handle member by arm b^5.

In Figure 4 I illustrate my invention as applied to a plurality of units, two being shown, and each unit is exactly the same as in Figures 1 and 2 except that I have interchanged the member E′ for an insulating cross-bar E^6 and except that the knife blades are connected by the cross-bar E^5 so that the two handle members E E operate in unison and the two knife blades operate in unison. The cross-bar E^6 is connected to handle E^3 by screw E^2 as before and it is provided at each end with two screw holes so that fastening screws may be used to engage the tangs e^3 and e^4 of each member E, thus requiring no change whatever in the device of Figures 1 and 2 except the use of member E^6 for member E′.

The cross-bar E^5 requires no change whatever in the single units, it being attached by screw e^6 to tang f' of one knife blade and by screw e^7 to tang f' of the other knife blade.

I could thus unite any desired number of units by providing cross-bars E^6 and E^5 of suitable length for the desired number of units.

What I claim is:

1. A knife switch comprising a handle; a pivoted blade; and means including a spring connecting the handle and blade through which the latter is controlled by the former but operates independently thereof with a quick make and a quick break; a fixed contact; and a stop independent of the fixed contact to limit the movement of said blade as it is moved into engagement with said fixed contact, said stop engaging the blade at the half thereof nearer to the pivot.

2. A knife switch comprising a handle; a pivoted blade; and means including a spring connecting the handle and blade through which the latter is controlled by the former but operates independently thereof with a quick make and a quick break; a fixed contact; and a yielding stop to limit the movement of said blade as it is moved into engagement with said fixed contact, said stop engaging said blade closely adjacent to said pivot.

3. A knife switch comprising a handle; a pivoted blade; and means including a spring connecting the handle and blade through which the latter is controlled by the former but operates independently thereof with a quick make and a quick break; a fixed contact; and means to yieldingly limit the

movement of said blade as it is moved away from said fixed contact, said stop engaging said blade closely adjacent to said pivot.

4. A knife switch comprising a handle; a pivoted blade; and means including a spring connecting the handle and blade through which the latter is controlled by the former but operates independently thereof with a quick make and a quick break; a fixed contact; and a single spring whose ends provide two stops, one for limiting the opening movement of said blade and one for limiting the closing movement thereof, said ends engaging said blade closely adjacent to said pivot.

5. A knife switch comprising a handle; a pivoted blade; and means including a spring connecting the handle and blade through which the latter is controlled by the former but operates independently thereof with a quick make and a quick break; a fixed contact; a base supporting said fixed contact; and a spring supported by said base and having an end acting as a stop to limit the movement of said blade, the latter having a portion to engage the under side of said end of the spring to provide said limitation.

6. A knife switch comprising a handle; a pivoted blade; and means including a spring connecting the handle and blade through which the latter is controlled by the former but operates independently thereof with a quick make and a quick break; a fixed contact; a base supporting said fixed contact; and a spring supported by said base and having an end acting as a stop to limit the movement of said blade, the latter having an integral portion to engage the under side of said end of the spring to provide said limitation.

7. A device of the character described comprising a pivoted knife blade having an arm projecting from the pivoted end of said blade; and resilient stopping means embracing said arm and cooperating therewith to yieldingly limit the movement of said blade in both directions.

8. A device of the character described comprising a pivoted knife blade having an arm projecting from the pivoted end of said blade; and a bow spring embracing said arm and having ends which act as stops to yieldingly limit the movement of said blade in both directions.

9. A device of the character described comprising a handle member having a projection; a knife blade member having a projection, a spring operatively connecting said members; and a yielding stop engaging the projection of said blade to limit the closing movement of the blade and engaging the projection of the handle member to limit the movement of the latter in either direction.

10. A device of the character described comprising two upright posts; a handle member and a knife blade member arranged side by side but spaced apart and pivoted between said posts; and a spring whose body portion is movable within said space one end of the spring being fastened to and actuated by the handle member and the other end fastened to and actuating the blade.

11. A device of the character described comprising a handle member and a knife blade member arranged side by side but spaced apart; and a spring whose body portion is movable within said space, one end of the spring being fastened to and actuated by the handle member and the other end fastened to and actuating the blade, each of said members acting to hold said spring in engagement with the other member.

12. A manually controlled quick make and quick break knife switch comprising a handle member; a blade member; and a bow spring fastened to and actuating said members and operating between said members.

13. A manually controlled quick make and quick break knife switch comprising a pivoted flat handle member and a pivoted flat knife blade member arranged side by side but spaced slightly apart; a spring connecting said members and being compressed to a predetermined degree by said handle member and thereafter operating said blade member independently of the handle member with a quick make and quick break, the body of said spring moving operatively within said space.

14. A device of the character described comprising a knife blade member; a handle member; and a spring having one end fastened to the handle member and the other end fastened to the blade member and being put under compression by said handle member to a predetermined degree, and then actuating the knife blade independently of the handle member, said spring moving bodily in a plane between, and parallel with, said members.

15. A knife switch comprising a handle; a pivoted blade; means including a spring connecting the handle and blade through which the latter is controlled by the former but operative independently thereof with a quick make and a quick break; a fixed contact; and a spring whose end provides for limiting movement of the blade, said end engaging said blade closely adjacent to said pivot.

HERMAN G. PAPE.