April 21, 1925.

1,534,161

H. B. COLESTOCK

TIMING SYNCHRONIZER

Filed March 9, 1921

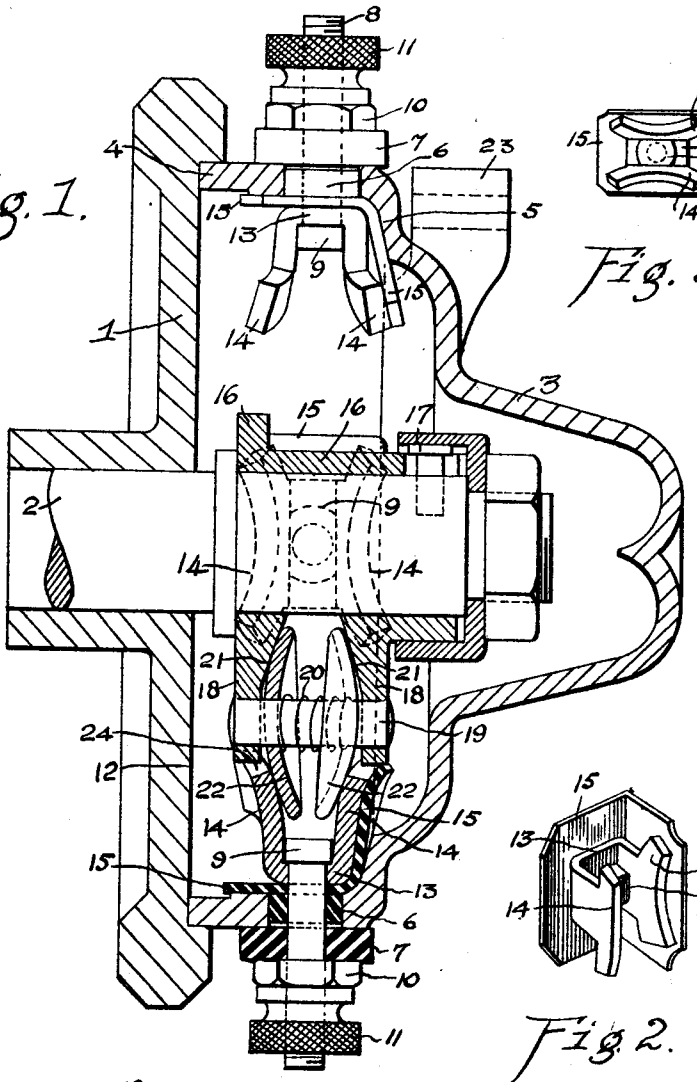


Fig. 1.

Fig. 3.

Fig. 2.

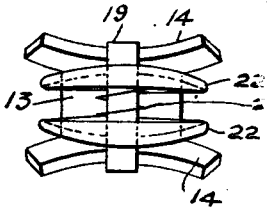


Fig. 4.

Harry B. Colestock Inventor

By M. S. Amsbury Attorney

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UNITED STATES PATENT OFFICE.

HARRY B. COLESTOCK, OF PLYMOUTH, INDIANA.

TIMING SYNCHRONIZER.

Application filed March 9, 1921. Serial No. 450,939.

To all whom it may concern:

Be it known that I, HARRY B. COLESTOCK, a citizen of the United States, residing at Plymouth, in the county of Marshall and State of Indiana, have invented certain new and useful Improvements in Timing Synchronizers, of which the following is a specification.

My invention relates to improvements in timing synchronizers, and it more especially comprises the features hereinafter pointed out in the annexed claims.

The purpose of my invention is to provide a synchronizer or timer for internal combustion engines of the Ford or other types that will withstand unprecedented wear; that is free from oxidation; that is self compensating, and which will not become deranged under the hardest usage.

With these and other ends in view, I illustrate in the accompanying drawing such instances of adaptation as will disclose the broad underlying features without limiting myself to the specific details shown thereon and described herein.

Fig. 1 is an enlarged cross section of the entire device in assembled relation.

Fig. 2 is a perspective view of a contact unit.

Fig. 3 is a front elevation of a contact unit.

Fig. 4 is a diagrammatic front elevation showing the contact rollers in relation to one of the contact units.

In devices of this general character made heretofore, it has been the practice to place one or more rollers under extraneous spring pressure so as to cause them to make electric contact at their periphery on one side of their center of rotation, without controlling the position of that portion of the roller circumference lying diametrically opposite their point of contact. In my improvement I remedy this defect and thereby secure a more permanent structure. I also attain greater adaptability of the rolling-wiping contacts by reason of the fact that both rollers of a pair react on each other through a single spring interposed between them.

When rolling contacts are used in pairs with a separate spring for each roller, there can be no reaction from one roller to the other; consequently there will not be any equalization of wear on the stationary contact units. In my improvement, it is not necessary that the stationary contacts occurring on the same plane be aligned with great precision, or that the companion contact of each pair of contacts be spaced apart with extreme accuracy. The reason for this lack of precision is found in the self-compensating feature of my device; wherein the extra shift of the roller instantly reacts on its companion through the single spring which is placed between them.

In carrying out the features of my invention, I may use any alternatives which the various exegencies of practice and adaptation may require without departing from the spirit of my invention. The exemplification instanced in the drawing comprises a supporting casing 1, through which a timer shaft 2, passes. This casing has a recess 12, in which the rockable casing 3, is seated; and wherein it can be moved by means of any kind of link or connection (not shown) attached to the projecting lug 23. The casing 3, is detachably held in the recess 12, in any suitable well known manner (not shown).

On the end of the timer shaft 2, a hub 16, is secured by a pin 17, that rests in a slot of the hub; or the hub may be secured so as to rotate with the shaft 2, in any other desired manner. The hub may have free endwise movement, within limits, if desired, but these details are largely modifiable to suit varying requirements of design, etc. The hub 16, has two radial arms 18, which form a slot 24, between them. At the inner portion of this slot the side falls are beveled at 21, so as to control the position of the contact rollers, disks or wheels, 22, and prevent unnecessary spreading of the rollers at their peripheries nearest the shaft 2, and also thereby prevent needless wear on themselves and the supporting pins 19. A single spring 20, is placed on each of these pins between the rollers 22, so as to uninterruptedly act on both rollers at all times.

The timer casing 3, has a flange 4, that is seated in the recess 12 of casing 1. This flange terminates in a shoulder 5, against which the formed insulating angle piece 15, abuts. This serves to prevent the contacts 14, shifting about the center of the attaching screws 8, thereby maintaining the several contacts in working alignment. The contacts 14, are curved away from each other as shown in Fig. 1; and at the same time they are curved away from the plane

of rotation of the rollers or disks 22, as they travel with the hub 16. This is especially shown in Figures 1, 3 and 4. The contacts 14, occur in pairs, being joined by a supporting head 13, through which a screw 8, passes. The heads 9, of these screws are flattened to pass between the sides 14, as shown in Fig. 3.

There are as many contact or tracks units in a casing 3, as there are cylinders to be served, being practically duplicates of each other. The screws 8, pass through insulating bushings 6. These bushings co-operate with insulating washers 7, and the formed insulating angles 15, to completely insulate the contact units from the casing 3. Locking nuts 10, are threaded onto screws 8, to clamp the contact units onto the flange 4, of the casing 3; and binding nuts 11, are placed outside of nuts 10, to hold the ends of the wires which lead to the respective cylinders (not shown).

It is a demonstrated fact that when contacts are placed in parallel, they have less resistance than when used singly. It is also known that wiping or sliding contacts are soon worn out; and equally well known that end to end contacts sooner or later oxidize and cause trouble; but with mutually interacting rollable contacts as herein disclosed, when grouped in pairs, the usual disadvantages disappear.

While rollers have been referred to in the description it is to be understood that my rollable contacts are really disks, which make a side contact that does away with undue heating on account of the large surfaces which engage each other. The ordinary form of roller contact only makes engagement over an extremely small surface area, being in a sense almost a "knife edge" which soon deteriorates when the usual current strengths are dealt with.

The inner inclined surfaces 21, on account of the disks 22, rubbing against them serves to automatically keep their contact faces clean and in the best electrical condition.

An additional feature, which assists in reducing the sparking, is the formation of a miniature horse-shoe magnet comprised in the projections 14, and heads 13. These may be made with a soft inner core. The magnetizing effect is due to the passing current. The residual remnant in the outer portion of projections assists in producing a magnetic blow-out effect which also tends to reduce sparking when the circuit is broken at the contacts.

What I claim is

1. In timing mechanisms, a plurality of stationary duplex tracks, a pair of rollable disks, means for successively moving said disks past the tracks and in engagement therewith, a common support for the disks on which they have free movement, and elastic means placed between them to press the disks outwardly independent of each other.

2. In timing mechanisms, a plurality of duplex tracks arranged in a group, a suitable casing therefor, means for shifting the casing so as to move all the tracks simultaneously, a pair of yieldable rolling disks adapted to successively engage the tracks, means for yieldingly pressing the disks away from each other, means for limiting the spreading apart of the disks, and means comprising the aforesaid tracks for moving the disks toward each other during the time they are making contact with any one of the tracks.

3. In timing synchronizers, a pair of rollable contact making members, a pin common to both, a spring acting on the adjacent faces of both members simultaneously while supported by the pin.

4. In timing synchronizers, a rotating arm, a pair of rollable contacts, interdependent on a single tension member as to sidewise position with respect to each other; but independent of each other as to their rollability, and means on said arm limiting the extent of the action of the aforesaid spring.

5. In timing synchronizers, a pair of rollable contacts having relatively flat faces adjacent each other and curved outer faces, and a tension device common to both contacts.

6. In timing mechanisms, a duplex curved diverging faced track, a contacting member comprising a pair of rollable disks, a supporting pin for said disks, a holder for the pin external of the disks, yielding means between the disks adapted to cause said disks to move away from each other, and means for rotating the disk holder so as to successively bring the disks between the duplex tracks and while in such position the diverging faces of the track will press the disks toward each other.

7. In timing mechanisms, a pair of rollable disks, yielding means for moving the disks away from each other, means for periodically positively moving the disks toward each other through their engagement with a suitable duplex track or contact.

8. In timing mechanisms, a U-shaped member constituting a duplex track, rollable disks engaging the adjacent faces of said track to make electric contact therewith, said U-shaped member being magnetized and thereby assists in extinguishing an electric spark that may be formed when the disks and track are separated from each other.

In testimony whereof I affix my signature.

HARRY B. COLESTOCK.