Aug. 8, 1933. P. MULLER 1,921,090

BELL SWINGING DEVICE

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Fig. 1

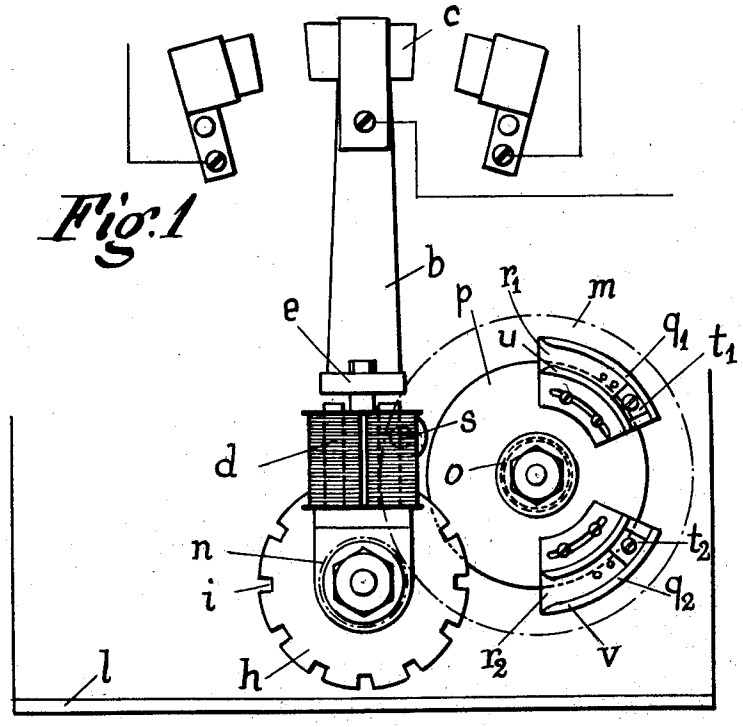


Fig. 2

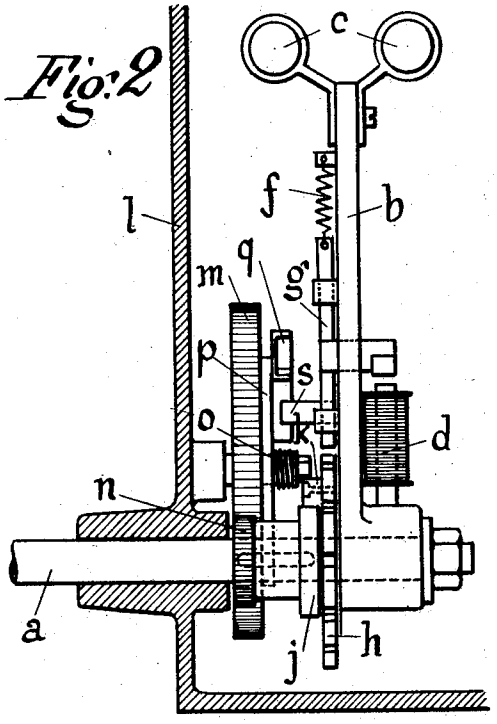
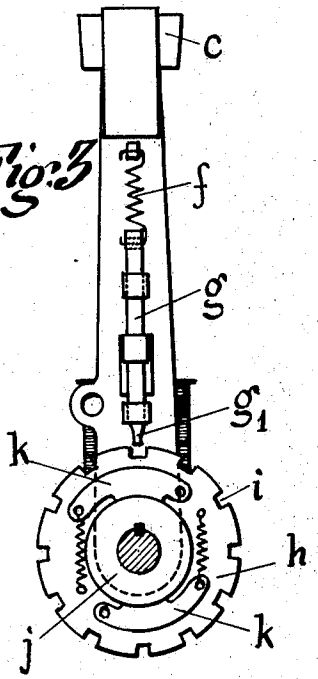


Fig. 3



Inventor
PAUL MULLER
by J. Severn
Attorney

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Fig. 4.

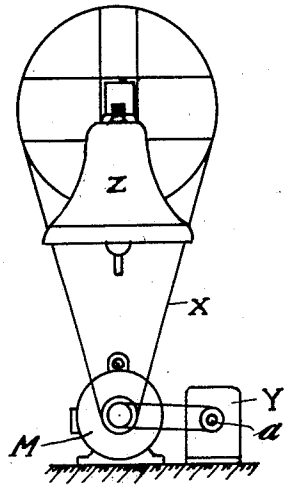
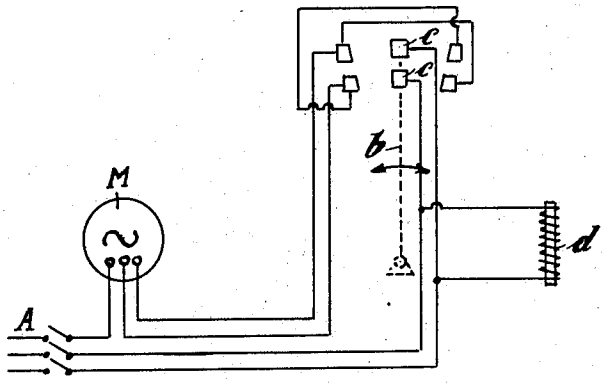


Fig. 5.



Inventor:
Paul MULLER
by: J. Gevers
attorney

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UNITED STATES PATENT OFFICE

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BELL SWINGING DEVICE

Paul Muller, Neuf-Brisach, Haut-Rhin, France

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2 Claims. (Cl. 177—288)

This invention relates to a device for controlling the swinging of bells operated by an electro-motor. Over the devices known in this art, the present invention is characterized by its exceptional simplicity and its easy, adjustable arrangement and suiting any size of bell.

In the accompanying drawings the invention has been illustrated by way of example:

Fig. 1 is a front elevation of the device, showing its main operative parts;

Fig. 2 is a side elevation and

Fig. 3 illustrates the rear side of the contact lever.

Fig. 4 illustrates diagrammatically the bell with its driving and controlling means.

Fig. 5 represents the switch and circuit arrangement.

The driving of the bell axle by means of an electro-motor M is operated in a well known manner, for instance, by means of a pulling element such as a linked Gall's chain X (Fig. 4). The swinging movements of the bell axle are communicated to the shaft *a* of the device Y (Fig. 4) controlling the swings of the bell, which forms the object of the present application. In said device the shaft *a* driven by an endless belt from the motor M supports the freely swivelling contact lever *b*, the upper end of which constitutes a fork-shaped head with contact elements *c* adapted to contact with fixed contacts arranged on the right and the left hand side. The swinging movement of the lever *b* causes a reversal of poles in the motor circuit by means of the contacts *c* engaging the fixed contacts, and by this the direction of rotation of the electro-motor is changed. The oscillation of the contact lever occurs each time when the swinging stroke of the bell Z has reached its maximum value.

When the device is not in operation, the lever *b* is in circuit closing position because of the unsymmetrical distribution of weight of the latter. This effect can be increased by a spring acting on the lever *b*.

The lever *b* supports an electromagnet *d*, the armature *e* of which operates an axially sliding rod *g* arranged at the rear side of the lever *b*, the disposition being such that said rod is moved downwardly when the armature *e* is attracted. By interrupting the current in the electromagnet, a spring *f* brings the rod *g* back to its inoperative position. The magnet *d* is connected in the circuit of the driving motor. When the circuit is closed in the latter, the armature *e* is attracted and thereby the lower end g_1 of the rod *g* engages in one of the notches *i* provided at the periphery of a disc *h* and so the coupling of the contact lever *b* with the disc *h* supported by the shaft *a* will be obtained. The disc *h* is loosely mounted and resiliently connected to the shaft *a* by means of a friction clutch formed of a sleeve *j* keyed on said shaft *a* and one or more spring operated brake shoes *k* acting on said sleeve.

For the purpose of securing a free swinging of the bell and obtaining a uniform beating of the striker and in view of maintaining the swing of the bell in predetermined limits, the arrangement has been made that, for a determined amplitude of the swing of the bell, the contact lever *b* is brought in an intermediate inoperative position and remains out of its contact position until the swinging will be brought below its normal amplitude.

For this purpose, the device supports a pinion *m*, to which is imparted a reciprocating rotary movement by means of a pinion *n* fixed on the shaft *a*. A disc *p* frictionally held against the pinion *m* under the pressure of a spring *o* and moving with same, supports two adjustable segments q_1 and q_2, which afford a groove r_1 and r_2, so shaped that the widened ends of their guiding walls present a cam-shaped track. The contact lever *b* supports a roller *s*, so arranged that when overreaching a determined swinging stroke, said roller will engage the segment q_1 or q_2. When the shaft *a* will rotate in the right hand direction (Fig. 1) and thereby the pinion *m* will rotate in an anti-clockwise direction, the widened edge of the inner guiding wall of the segment q_1 will lift the roller *s*, whereas the widened edge simultaneously acts as an inclined plane to bring the lever *b* from its right hand contact position in the medium upright position. During the immediately following rotation in the left hand direction, the lever *b* will be brought from its left hand contact position in the medium position, by means of the widened end *v* of the outer guiding wall of the segment q_2.

By the lifting of the lever *b* out of its contacts position in the right or left hand side, the working periods of the driving electro-motor become limited to a constant dimension of the swing of the bell and the bell can swing freely in both directions. The segments q_1 and q_2 regulating the swinging stroke, and the abutments t_1 and t_2 which limit the stroke of the roller *s*, are adjustably arranged with respect to the size of the bells.

The working of the device using a three-phase

alternating current system will be more clearly described hereafter:

1. When the circuit in the motor M is closed by means of the switch A, said motor will rotate in a certain direction. Simultaneously, the electromagnet d will operate the rod g, the end g_1 of which will engage at a given moment one of the notches i of disc h. The disc h rotates with the shaft a of the motor, to which it is frictionally connected by the sleeve j and the brake shoes k. So the lever b is directly coupled with the shaft a of the motor and remains coupled therewith as long as the circuit will not be interrupted in the switch A. The lever b will have an oscillating movement between the fixed contacts, and operate at each abutment with said fixed contacts the reversion of rotation of the motor. When the circuit is interrupted by means of the switch A, the action of the electromagnet d is released and the lever b is disengaged from the disc h and drops freely on one or the other of the fixed contacts.

2. When the swinging motion of the bell reaches a certain amplitude, it becomes necessary to suppress the propulsive action of the motor. For this purpose, the segments q_1 and q_2 have been provided in the arrangement as described herebefore. It is obvious that, when the swinging motion of the bell will be of importance, the rotation of the pinion m will also be considerable. Said rotation is continuously reversed in direction, as obviously understood from the foregoing description. When the roller s will be engaged in one or the other of the segments q_1 and q_2 which are arranged to lift and maintain the lever in the medium position, the motor will be no longer supplied with current and the bell itself, by its swinging motion, will make the motor rotate as a generator. The frictional coupling j, k allows the rotation of shaft a, without said rotation having influence on lever b.

As soon as the amplitude of the swing of the bell is sufficiently decreased, the pinion m supporting the segments q_1 and q_2 will have a small angular displacement from its normal rest position, so that the lever b will again be allowed to abut on the fixed contacts before the roller s will be engaged by the segments q_1 or q_2 upon increased amplitude of swing of the bell in the opposite direction.

Following the size of the bell, the movement of the pinion m will be variable. In order to avoid that the roller s engaged with the segments q_1 or q_2 will escape behind the latter, which would have for effect to allow lever b to drop upon one or the other fixed contact, the abutments t_1 and t_2 have been provided upon said segments.

The frictional coupling o provided between the segment bearing disc p and the pinion m will give up as soon as the rotation of the pinion m will be greater than that wanted to maintain the lever b in the medium position.

By the fact that following the size of the bell producing the movement of the pinion m, the stroke limit of the segments q_1 and q_2 is variable, the abutments t_1 and t_2 are made adjustable, for allowing adjustment of the apparatus.

I claim:

1. In a bell ringing device comprising a motor, a bell adapted to be oscillated by said motor, a shaft, mechanical means connecting the bell and the shaft for oscillating the latter, an electric circuit for the motor and a fixed contact in said circuit, the combination of a freely swivelling contact lever, a contact supported by said lever and arranged to engage the fixed contact of the motor circuit, means to maintain the contact lever in circuit closing position when the circuit of the motor is interrupted, an electromagnet supported by the contact lever and connected in the circuit of the motor, a disc frictionally clutched on the shaft and having peripheral notches, a sliding rod supported by the contact lever and operated by the armature of the magnet to engage with its end one of said notches, a return spring for the rod, a pinion keyed on the shaft, a second pinion meshing with the aforesaid pinion, a disc frictionally held against said second pinion, an adjustable segment upon said disc having a groove with cam-shaped widened guiding walls facing the contact lever, an adjustable abutment in said groove, and a roller supported by the contact lever adapted to engage the groove of said segment when the swing of the bell in one direction exceeds a predetermined amount, substantially as described and for the purpose set forth.

2. In a bell ringing device comprising a motor, a bell adapted to be oscillated by said motor, a shaft, mechanical means connecting the bell and the shaft for oscillating the latter, an electric circuit for the motor and two fixed contacts in said circuit, the combination of a freely swivelling contact lever supported by said shaft, a pair of contacts supported by said lever and arranged to engage the fixed contacts of the motor circuit, means to maintain the contact lever in circuit closing position when the circuit of the motor is interrupted, an electromagnet supported by the contact lever and connected in the circuit of the motor, a disc frictionally clutched on the shaft and having peripheral notches, a sliding rod supported by the contact lever and operated by the armature of the magnet to engage with its end one of said notches, a return spring for the rod, a pinion keyed on the shaft, a second pinion meshing with the aforesaid pinion, a disc frictionally held against said second pinion, two adjustable segments upon said disc each segment having a groove with cam-shaped widened guiding walls facing the contact lever, an adjustable abutment in each groove, and a roller supported by the contact lever adapted to engage alternately the grooves of said segments when the swing of the bell in respective alternate directions exceeds a predetermined amount, substantially as described and for the purpose set forth.

PAUL MULLER.