Sept. 19, 1950 M. COLEMAN 2,522,664

ELECTRIC BELL WITH MOMENTUM ACTION GONG STRIKER

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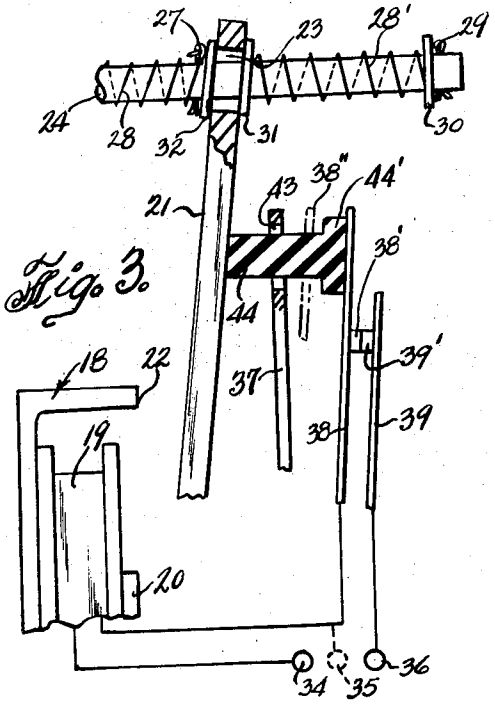

Fig. 3.

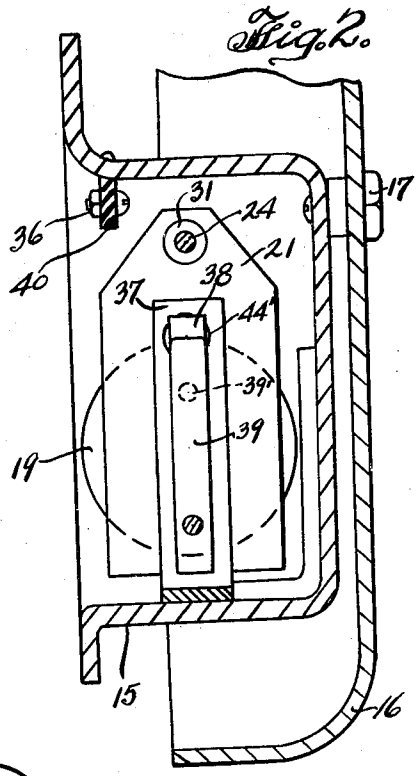

Fig. 2.

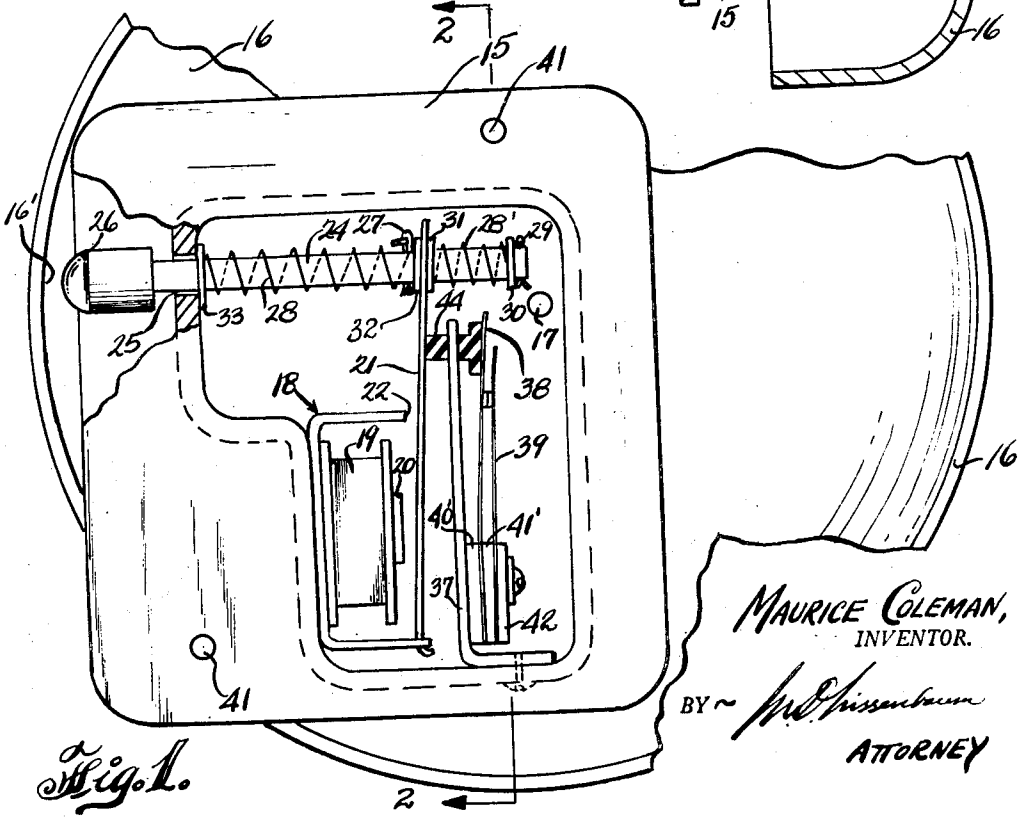

Fig. 1.

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ELECTRIC BELL WITH MOMENTUM ACTION GONG STRIKER

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3 Claims. (Cl. 177—7)

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The present invention relates to electric bells and in particular to the type where the gong shields the operating mechanism which includes a slidably mounted hammer or striker adapted to hit the interior surface of the gong near rim region.

Heretofore, in bells of the character and construction mentioned, the scope of movement of the striker towards the gong, was directly determined by the movement of the armature which is actuated by the electro-magnet. In fact, the armature actually brought the striker all the way from rest position, into contact with the gong. Unless the extent of movement of the armature movement was properly adjusted and then remained constant, the striker would either tap the gong slightly, or else the striker would upon contact with the gong, press thereon and destroy the gong's vibration. The former condition would yield a ring of little audibility, while the latter, would give a "dead" sound.

It is therefore an object of this invention to provide an electric bell of the class described, of novel and improved construction, which will avoid the objectionable incidents mentioned, and which will operate to give clear and "alive" gong ring.

Another object hereof is to provide an electric bell of the kind set forth, of novel and improved construction, having a new mode of operation which may be particularly stated that instead of having the armature carry the striker to the gong for contact, this invention teaches a construction where the armature hits the striker, thereby throwing it towards the gong. Further, means are provided to prevent the striker from deadening the gong's vibration, after the bell is struck, so that the result is a good, loud, clear and "alive" ring, adaptable to bells of the single stroke or continuously ringing type.

In bell wiring systems using ground connection in the circuit, and in bells operating in circuits where one of the power source terminals is grounded, it is essential in continuously ringing, or as commonly called "vibrating" type of bells, that the circuit breaker components be insulated from frame. It has been usual to have one of the circuit breaker contacts, carried by the armature directly. Hence either said contact or else the armature had to be insulated from the bell frame.

Another object of this invention is to provide a novel and improved vibrating electric bell whose armature carries none of the breaker contacts, but is called upon to operate the circuit

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breaker by use of novel and improved construction operating in a novel manner.

A further object of this invention is to provide the said novel and improved electric bell, which is reasonably cheap to manufacture, simple in construction, positive in operation and efficient in carrying out the purposes for which it is designed.

Other objects and advantages will become apparent as this disclosure proceeds.

In the accompanying drawings forming part of this specification, similar characters of reference indicate corresponding parts in all the views.

Fig. 1 is a rear view of a vibrating type electric bell, embodying the teachings of this invention. The gong is here shown, broken away in parts.

Fig. 2 is a section taken at line 2—2 in Fig. 1.

Fig. 3 is a magnified diagrammatic view, to aid in explaining the circuit breaker.

In the drawings, the numeral 15 designates a casing which holds the operating mechanism. The gong 16 is relatively large, has the casing 15 behind it, and both are maintained in assembly by means of a screw 17. A C-shaped bracket 18, made of strip material, straddles the electro-magnet 19, housed in the casing. The numeral 20 denotes the core of said magnet, opposite which and spaced therefrom, is the armature 21, in upright position. The armature at its lower end, is in any suitable manner, swingably mounted near the free end of the lower arm of the piece 18. The upper arm of said piece, acts to limit the movement of the armature 21 towards the magnet 19, at edge 22. Through the upper region of the armature, there is an opening or hole 23, which clears the striker rod 24 lying therethrough. Said striker rod is mounted for horizontal slidable movement through said hole 23, and through loose slide-fit hole 25 in the wall of the casing 15. Between the exterior of the casing and the interior surface of the gong 16, said striker rod 24 terminates in a striker head 26, of some weight. In rest position, the striker head 26 is at a distance from the bell surface region it is to hit.

It is necessary, that when the armature 21 is attracted by the magnet core 20, such movement of the armature shall shift the striker rod 24, so that striker 26 shall move towards the gong 16. For such purpose, said striker rod 24 carries for instance a cotter pin 27, very near the armature, between the armature and the striker head 26. It is to be noted that the striker rod 24 is always free for movement towards the region of

the gong to be struck by the striker **26**, and that upon reverse movement of said rod, the pin **27**, will cause the armature **21** to return to initial rest position. Spring means is provided to return the striker rod **24** to initial rest position. This may be for instance, the compression coil spring **28**, anchored at one end to said pin **27**, and carried about the rod **24** to make contact with the frame at the region of the hole **25**. To accomplish sudden recoil of the striker head **26** after it has struck the gong **16**, the striker rod **24** is provided about itself with a compression spring **28'**, acting between the armature **21** and the other remote end of the striker rod **24**, where said spring **28'** is stopped or anchored by means of the pin **29**. For convenience, washers **30**, **31**, **32** and **33**, may be carried on the striker rod, as shown.

The bell construction above described would be of the single stroke type, operated by the application of a source of electrical energy to the terminals **34** and **35**, which are the terminals of the magnet **19**.

It may be noted, that by comparison, spring **28** is a strong spring, while spring **28'** is a relatively weak spring, and in practice, are of course chosen to be suitable to accomplish their purpose. Size of the parts and friction, will determine the size of the springs.

For continuous ringing, a circuit breaker is included in the bell structure, and interposed in the circuit. A preferred embodiment of such will now be described. The frame **15**, carries a standard **37**, which has mounted on it the springy metal blade members **38** and **39**. These blades are spaced and insulated by insulative washers or tabs **40'**, **41'** and **42**. These blades and the standard extend in the same direction with and with faces parallel to the armature **21**. Through a hole **43** in the standard **37**, is loosely positioned a headed shank **44** of insulative material; the head **44'** thereof, being free for movement in its position between the blade **38** and the standard **37**. The parts are so dimensioned, that when the armature **21** is in normal rest position as in Fig. 1, the contact point **38'** carried on blade **38**, and the contact point **39'** carried on blade **39**, are in contact with each other. When the armature **21** is attracted by the magnet, the blade **38** will assume unstressed position at **38''**, whereupon the contact points **38'** and **39'** will separate. When the blade **38** so moves, it will shift the insulated member **44** through hole **43**, a bit towards or maintain its contact with the armature. Upon return of the armature to normal rest position as in Fig. 1, is will cause member **44** to shift and stress the blade **38**, whereby contact of the points **38'** and **39'** will be resumed. Interposition of the circuit breaker in the circuit is empirical as shown in Fig. 3, where the bell terminals become those shown as **34** and **36**. Operation of the electrical circuits mentioned, is well known, and needs no further explanation.

Of importance to be noted in the operation of the mechanical structure, is that when the armature **21** is attracted to the core **20** upon actuation of the magnet **20**, the armature will cause the striker rod **24** to receive a blow at pin or stop means **27**, with a force which actually throws the said rod, so that its striker **26** is impelled towards the gong region **16'**. The momentum of the mass **26**, causes it to move ahead of armature movement, thus stressing spring **28'** which has a thrust action to cause recoil of the striker rod **24**. Armature movement will cause spring **28** to be stressed, but it is only the increment of rod movement caused by the momentum of the mass **26**, which will cause the spring **28'** to be stressed. Both said springs insure return of all of the mechanism to normal rest position as illustrated in Fig. 1, upon cessation of current in the magnet **19**. To insure thrust action, the armature **21** is stopped at **22** to impart a sharp blow from the armature **21**, for giving the propelling force to move the striker rod **24**.

The terminals of the bell may be mounted on an insulative block **40**, carried on the frame **15**. Holes **41** are provided for mounting the bell onto a surface. No current flows through any part of the frame. The mass **26** is made just heavy enough so that its momentum will act against spring **28'** and yet give the striker rod **24**, adequate movement independent of the action of the armature **21**, so that the action shall be that the striker **26** is thrown against the gong **16**, rather than carried to the gong dependent entirely upon extent of armature movement as if connected to the armature.

This invention is capable of numerous forms and various applications without departing from the essential features herein disclosed. It is therefore intended and desired that the embodiment herein shall be deemed illustrative and not restrictive and that the patent shall cover all patentable novelty herein set forth; reference being had to the following claims rather than to the specific description herein, to indicate the scope of this invention.

I claim:

1. In an electric bell having a frame carrying a gong, an electro-magnet and a movably mounted armature adapted to be moved by the magnet in a predetermined direction upon actuation of said magnet, in combination with a striker rod, longitudinally slidably mounted on the frame along the line of said direction; one end of said striker rod being adapted to strike a certain region of the gong, means on and intermediate the ends of the striker rod, positioned to be intercepted by the armature when the latter moves in said certain direction, whereby the striker rod is moved towards the mentioned gong region; the striker rod being free for movement in said mentioned direction independent of movement imparted to it by the armature, a spring to urge the striker rod to a predetermined rest position and a comparatively weaker spring acting to urge the striker rod in a direction opposite to said mentioned certain direction and also acting to urge apart, the armature and the other end of the striker rod; the striker rod being of sufficient mass, whereby when moved by the armature, the momentum of the striker rod will give it movement independent of the armature whereupon the weaker spring will be stressed; the action of armature movement upon actuation of the magnet, being to impart a blow or push on the said means which is intercepted.

2. An electric bell as defined in claim 1, wherein both springs are compression coil springs positioned about the striker rod at opposite sides of the armature.

3. In an electric bell having a frame carrying a gong, an electro-magnet and a movably mounted armature adapted to be moved by the magnet in a predetermined direction upon actuation of said magnet, a striker member adapted to be moved by the armature a region of the gong upon actuation of the magnet and spring means to urge the armature and striker member to a predeter-

mined normal rest position respectively, in combination with a pair of normally spaced springy metal strips insulatively secured on the frame at one of their ends and extending in one direction spaced from the armature and movable in the same directions as the armature, a slidably mounted insulative element on the frame, positioned between and in contact with the armature and the first springly strip which is nearest the armature; the length of said element being such that when the armature is in normal rest position, the said first springy strip will be flexed and in contact with the other spring strip, and when the armature has moved a predetermined distance upon actuation of the magnet, said springy strips will be out of contact; said element being of insulative nature at least between the

armature and the first strip; one terminal of the magnet being in electrical connection with one of the strips; the other strip and the other terminal of the magnet, constituting the terminals of the bell.

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