May 10, 1932. A. S. BOEHM 1,857,349

SOLENOID

Filed July 24, 1931

Fig. 1.

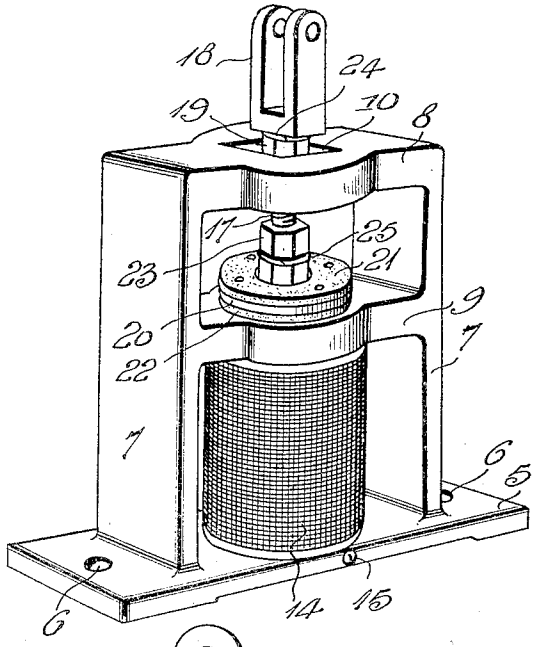
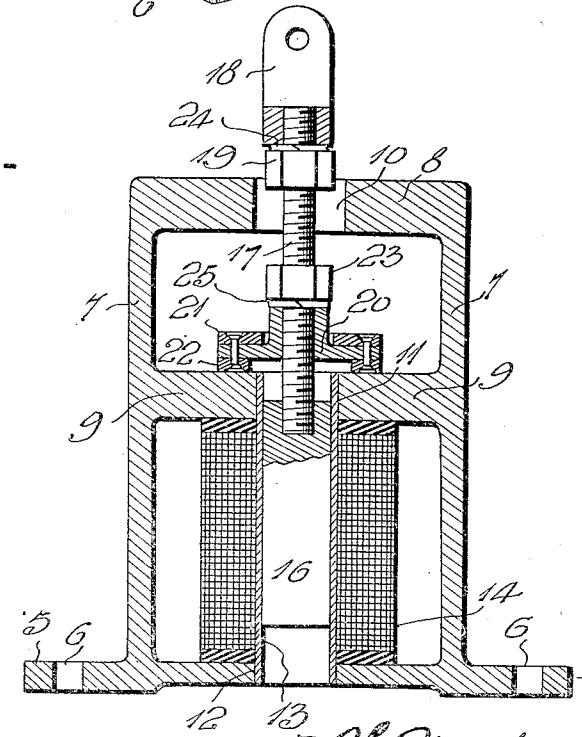


Fig. 2.



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SOLENOID

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The invention relates to solenoids in general but more particularly to those used for actuating the hammers of church and similar chimes. The cores of such solenoids must have uniform strokes to obtain proper hammer actuation but it is necessary to regulate the strength of the pull which said cores exert upon the hammer operating chains or the like, in order that the hammers will strike their respective chimes only with proper force. Heretofore, stop means independent of the solenoids have been used to limit the movement of the solenoid cores and coils of different sizes and strengths have been employed for actuating said cores to cause the latter to pull with the desired strength upon the hammer operating chains. It is the aim of my invention, however, to provide new and improved means formed as a single unit with each solenoid for limiting the ascent and descent of the core and for so adjusting the latter with respect to the coil that the strength of the pull which said coil will exert upon the core, may be varied to cause said core to pull with any desired force upon the hammer operating chain or the like connected therewith. Thus, with the improved construction, I dispense with extraneous stops and all of the solenoid coils may be of uniform strength, thereby effecting simplifications of merit both with regard to manufacture and installation.

With the foregoing in view, the invention resides in the novel subject matter hereinafter described and claimed, description being accomplished by reference to the accompanying drawings.

Fig. 1 a perspective view of a solenoid constructed in accordance with the invention.

Fig. 2 is a central vertical sectional view, partly in elevation.

A preferred construction has been illustrated and while such construction will be herein specifically described, it is to be understood that within the scope of the invention as claimed, variations may be made.

The numeral 5 denotes a horizontally elongated base plate having openings 6 to receive attaching fasteners. Integral with the opposite end portions of the base plate 5 and rising rigidly from said base plate, are two horizontally spaced standards or posts 7, the upper ends of said posts being integrally connected by a horizontal upper cross member 8, while the intermediate portions of said posts are integrally connected by a lower cross member 9. The cross members 8 and 9 are formed with alined central openings 10 and 11, respectively, and the base plate 5 is provided with a similar opening 12. A tube 13 around which the solenoid core 14 is wound, has its ends snugly received in the openings 11 and 12, said tube being held in place by a screw 15.

A solenoid core 16 is loosely slidable in the tube 13 and is provided with a rigidly attached upstanding rod 17 which passes loosely within the openings 10 and 11, the upper end of said rod being provided with a vertically adjustable yoke 18 for connecting it with a hammer-actuating chain or the like (not shown in the drawings). A lock-nut 19 is provided on the rod 17 for locking the yoke 18 in adjusted position.

Adjustably threaded on the rod 17, between the cross members 8 and 9, is a collar 20 whose upper and lower sides are preferably provided with coverings 21 and 22, respectively, formed of leather or other yieldable sound-deadening material. The upper side of the collar 21 coacts with the cross member 8 in limiting the ascent of the core 16 and the rod 17, and the lower side of said collar coacts with the cross member 9, limiting the descent of said core and rod, and by providing said collar with the yieldable coverings 21 and 22, the assembly will not be as noisy as if metal were allowed to strike metal.

A lock-nut 23 is provided to hold the col-

lar 20 in the position at which it is set upon the rod 17 and when this lock-nut is loosened, the collar may be vertically adjusted upon the rod. The normal position of this collar, the solenoid coil 14 being then de-energized, is against the upper cross member 8 and when said collar is in this position, it will be seen that the core 16 will project to one extent or another above said coil 14. If the collar be so adjusted as to allow relative great projection of core 16 above the coil 14, said core will be drawn into the coil with a relatively great force, when said coil is energized. If the collar adjustment, however, be such as to allow less projection of the core 16 above the coil 14, energizing of the latter will cause it to exert a weaker pull upon the core. Thus, it will be seen that in addition to coacting with the cross members 8 and 9 in limiting both ascent and descent of the core 16 and the rod 17, the collar 20, by virtue of its adjustment, controls the strength of the pull which the solenoid coil 14 will exert upon said core 16 and rod 17. Hence, without changing the stroke of the solenoid, the latter may be made to cause the connected hammer to strike the co-acting bell or chime, only with the proper force.

It will be seen from the above that I have provided a very simple, yet a highly advantageous, construction which dispenses with the use of extraneous stops to limit the solenoid strokes and overcomes the necessity of using coils of different sizes and strengths in order to regulate the strengths of the blows which the hammers will impart to the bells or chimes. The invention is thus of advantage from both manufacturing and installation standpoints and furthermore, will permit better results to be obtained from the chimes, by allowing more accurate regulation of the strengths of the blows which the hammers impart to the bells or chimes.

As above stated, the details disclosed are preferred, but attention is again invited to the fact that within the scope of the invention as claimed, variations may be made.

The parts 24 and 25 merely denote two lock-washers for the nuts 19 and 23, respectively.

I claim:

1. A solenoid comprising a coil, a core slidable in said coil and having a rigidly attached rod projecting longitudinally therefrom; two fixed stops spaced apart along said rod and secured in fixed relation with each other and in fixed relation with said coil, a third stop on said rod adapted to strike one of said fixed stops to limit movement of said core and rod in one direction and adapted to strike the other of said fixed stops to limit the movement of said core and rod in the other direction, and adjusting means connecting said third stop with said rod, said adjusting means allowing adjustment of said core with respect to said coil to vary the strength of the pull which the coil will exert on the core.

2. A solenoid comprising a base, a post rising rigidly from said base, upper and lower horizontal members rigid with and projecting in the same direction from said post, said members having vertically alined openings, a coil between said base and said lower member in alinement with said openings, a core within said coil having an upstanding rod passing loosely through said openings, a collar around said rod between said upper and lower members, said collar being adapted to strike said upper member to limit the ascent of the core and rod and being adapted to strike said lower member to limit the descent of said core and rod, and adjusting means connecting said collar with said rod, said adjusting means allowing vertical adjustment of said core with respect to said coil to vary the strength of the pull which the coil will exert on the core.

3. A solenoid comprising a horizontal base plate, two posts integral with said base plate and rising therefrom in horizontally spaced relation, an upper horizontal cross member integral with the upper ends of said posts and having a central opening, a lower cross member integral with the intermediate portions of said posts and having a central opening, a coil between said base plate and said lower cross member in alinement with said openings, a core in said coil having an upstanding rod passing loosely through said openings, a collar on said rod between said upper and lower members, said collar being adapted to strike said upper cross member to limit ascent of said core and rod and being adapted to strike said lower cross member to limit descent of said core and rod, and adjusting means connecting said collar with said rod, said adjusting means allowing vertical adjustment of said core with respect to said coil to vary the strength of the pull which the coil will exert on the core.

4. A solenoid comprising a base, a post rising rigidly from said base, upper and lower horizontal members rigid with and projecting in the same direction from said post, said members having vertically alined openings, a coil between said base and said lower member in alinement with said openings, a core within said coil having an upstanding rod passing through said openings, and a collar around said rod between said upper and lower members, said collar being adapted to strike said upper member to limit the ascent of the core and rod and being adapted to strike said lower member to limit the descent of said core and rod.

5. A solenoid comprising a horizontal base plate, two posts integral with said base plate and rising therefrom in horizontally spaced relation, an upper horizontal cross member integral with the upper ends of said posts

and having a central opening, a lower cross member integral with the intermediate portions of said posts and having a central opening, a coil between said base plate and said lower cross member in alinement with said openings, a core in said coil having an upstanding rod passing loosely through said openings, and a collar on said rod between said upper and lower cross members, said collar being adapted to strike said upper cross member to limit ascent of said core and rod and being adapted to strike said lower cross member to limit descent of said core and rod.

In testimony whereof I affix my signature.

ARTHUR SMITH BOEHM.