A. Laroye,

Bell Hanging.

No. 112,932. Patented Mar. 21. 1871.

Fig. 1.

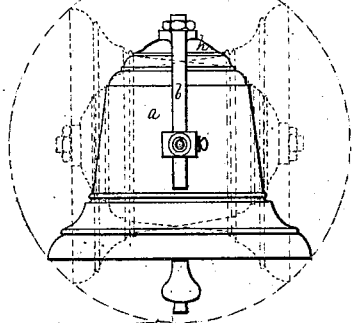

Fig. 2.

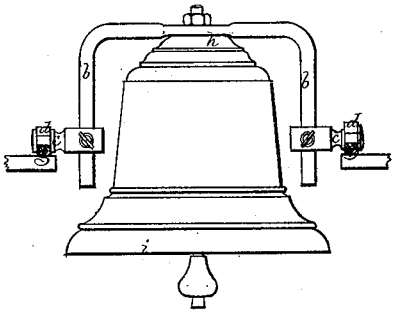

Fig. 4.

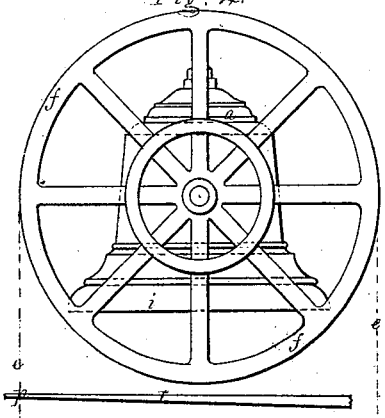

Fig. 5.

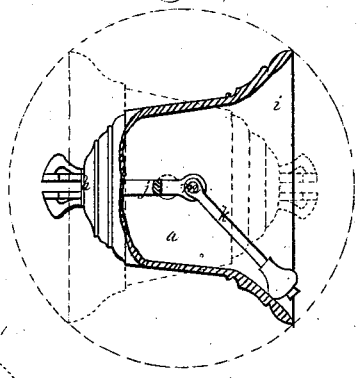

Fig. 3.

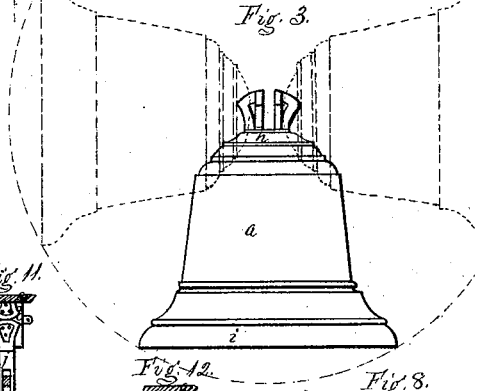

Fig. 7.

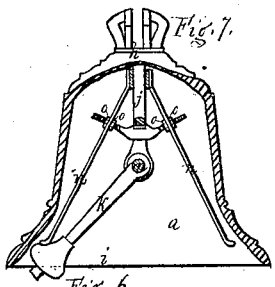

Fig. 11.

Fig. 6.

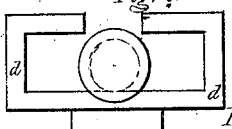

Fig. 10.

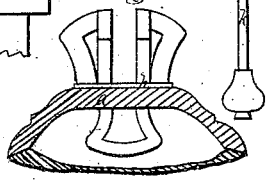

Fig. 12.

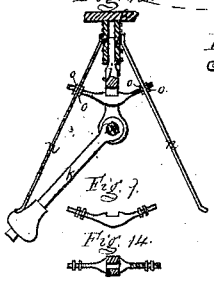

Fig. 13.

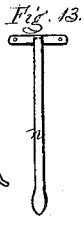

Fig. 8.

Fig. 9.

Fig. 14.

Witnesses { C. Warren Brown. M. W. Frothingham.

Auguste Laroye. by his Atty's. Crosby, Halsted & Gould.

United States Patent Office.

AUGUSTE LAROŸE, OF SAS SLYKENS, NEAR OSTEND, BELGIUM.

Letters Patent No. 112,932, dated March 21, 1871.

IMPROVEMENT IN BELL-HANGING.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, AUGUSTE LAROŸE, of Sas Slykens, near Ostend, in the Kingdom of Belgium, have invented a new System of Hanging Bells; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

The recognized systems of bell-hanging up to this time have the great inconvenience of obliging the bell-ringers to put in action their entire weight without any compensation or deduction, resulting, with large bells, in great fatigue and great labor, besides the vibrations that the full peal or volley gives to the belfry, especially when chimes are rung upon a set of bells, occasion frequent repairs, and are sometimes really dangerous.

Some bells have been mounted on an axis balanced by a counter-weight, to diminish the effort required from the bell-ringers; but this plan has been rarely employed, for it loads the wood-work beyond measure, and thus augments the vibration of the belfry, which it is important to avoid.

Struck by these inconveniences, my researches have led me to try, if it were possible, to find in the bell itself the balance necessary to annul in part, for the ringers, the effect of its weight, and to diminish, as much as possible, the vibration occasioned by the centrifugal force. After many trials I have happily succeeded in lightening it, as to the putting it in motion, in proportions equal at least to eighty per cent. of the total weight, and to diminish the centrifugal force at least ninety per cent.; for the combinations of the flat elongated plummer-blocks, with the rolling trunnions, annul nearly all vibration in the belfry.

The annexed drawing allows me to describe my system.

Figure 1 is a lateral elevation of a bell, with the trace of its motion in dotted lines.

Figure 2, front elevation of a bell, showing the bent axle serving for suspension, and allowing the trunnions, upon which the bell swings, to be brought the nearest possible to the center of the bell.

Figure 3, elevation of bell hung on the old plan, showing the larger oscillations that it makes.

Figure 4, front elevation of the traction-pulley, with regulator, of a bell hung after my system.

Figure 5, section of a bell, with the clapper in two parts.

Figure 6, elevation on an enlarged scale of my elongated plummer-block.

Figure 7, sectional elevation of bell, showing attachments of clapper.

Figure 8, a lateral elevation of the said attachment.

Figure 9, a front elevation of the yoke for the clapper-springs.

Figure 10, fractional section of the crown.

Figure 11, lateral elevation of clapper and fittings, showing the ring with which all bells are provided, and to which I bolt the plates, indicated at *l l l*, forming cheeks or jaws and supporting the springs and the rigid portion of the clapper.

Figure 12, front elevation of the same, showing also the position of the springs at repose.

Figure 13, iron bar supporting the springs, which may consist of one or two plates according to the weight of the clapper, and be made of steel or brass or any other metal.

Figure 14, plan of yoke for determining the position of the clapper-springs.

The inspection of these figures shows clearly the mechanism of my plan of hanging, and explains at first sight its advantages.

In effect, the oscillation taking place at the center of the bell, one-half always balances or nearly balances the other, it being understood that the base should be left a little the heavier, so as to bring the bell back after each movement to its vertical position. The stroke of the oscillations is also diminished about half, as is shown by the figs. 1 and 3, in consequence of the points of rotation of the bell *a*, suspended at the summit of a bent axle, *b*, turning round two trunnions, *c c*, placed a little higher than the center of the bell in brass or steel bearings *g*, held by the plummer-blocks *d d*, or placed upon bearings constructed for that purpose.

The movement can be given to the bell by a rope, *e*, fitted upon the periphery of a fly-wheel, *f*, placed between the bell *a* and the plummer-block *d*, or outside of this latter, and on the prolongation of the trunnion *c*, or in other ways appropriate to the space at command. The movement can also be given by the foot acting upon pedals occupying the same place.

It follows from this arrangement that the ringer has to move but a small fraction of the weight of the bell, which allows of one man working constantly to replace the three or four men actually employed for the great bell, (for example, in a system or chime of bells,) and who require relieving every twenty or twenty-five minutes by three or four fresh men. Moreover, the effect of the centrifugal force developed by the motion of the bell, as ordinarily hung, strains the axis of suspension and gives to all the framing of the belfry vibrations damaging to the strength of the tower. This is avoided by my system in the proportion of at least ninety per cent. by the contrary direction relative to the points of suspension followed by the crown *h* and the base *i* of the bell *a*.

The bent axle *b*, to which the bell is hung, can be ı iron or other material and of any appropriate form, rovided it is strong enough. Those which I prefer are -shaped or duplicate I-shaped.

The trunnions *c c* can be fixed or movable; that is o say, formed by the prolongation of the bent axle *b*, nd being part of it, or else independent and bolted, s desired, upon the vertical arms of the axle *b*.

The movement of the bell *a* can be given by hand hrough a fly-wheel, *f*, of a suitable diameter, or by he foot with pedals, or by any other mechanical ieans.

The form of the plummer-blocks *d* and of the bear- ıgs *g* may vary as desired, but I claim the exclusive ight to use the long flat stationary bearing indicated t fig. 6, whereby all friction and consequent heating f the trunnions *c* are avoided, the contrary move- aents of the crown *h* and base *i* of the bell effectually reventing any sliding motion taking place.

In order to obviate the effects of the rebound of the lapper *k* upon the bell after the first stroke, and to revent the clapper from remaining in contact with he sides of the bell, which detracts greatly from the ntensity of the sound, I place between the jaws *l l* of he fixed part of the clapper two plates of steel, *n n*, naking springs, and adjustable, as regards their posi- ion, by four nuts, *o o o o*, between which they are held t about the middle of their length, (see figs. 7 and 12.)

These springs *n n* are intended to bend under the troke of the clapper and to disengage it immediately rom the bell, so as to prevent its oscillations.

I have also discovered a means for regulating the volley of the bells with a view to enabling several to be rung at the same time without producing any false or irregular time between the sound or stroke of each individual bell.

With this end I pass a rope, *e*, (which is wrapped round the fly-wheel *f* and gives the oscillating motion to the bell *a*,) through a hole, *p*, pierced at each end of a piece of wood, *r*, making a spring under the pressure of stops, *s*, placed at the desired distance, in order to prevent the bell exceeding the course which it ought to make. Fig. 4 explains this arrangement.

If the bell is worked by means of pedals, this result will be attained by simply placing tappets provided with felt or caoutchouc.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a bell having a clapper or hammer divided into two nearly equal lengths, one fixed rigid and the other pendent from it, swinging such pendent part from a point in line with the axis or center of gyration of the bell when such axis or center is between the crown and the lower part of the bell.

2. The long flat stationary bearings for the trunnions to roll upon, as described.

3. The arrangement, described and shown in fig. 4, or its equivalent, for limiting the volley of bells, for the purpose of preserving the harmony desired.

A. LAROŸE.

Witnesses:

PARMENT,

J. DUBOIS.