No. 753,911. PATENTED MAR. 8, 1904.

G. J. & H. G. PELSTRING.

GRINDING MACHINE.

APPLICATION FILED OCT. 3, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

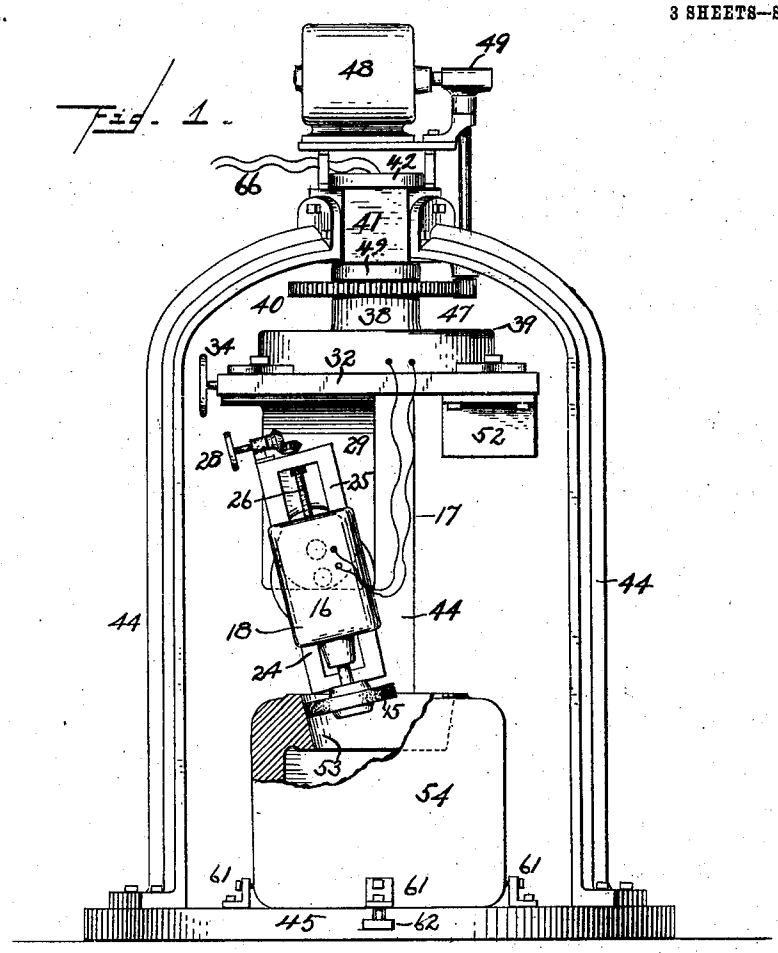
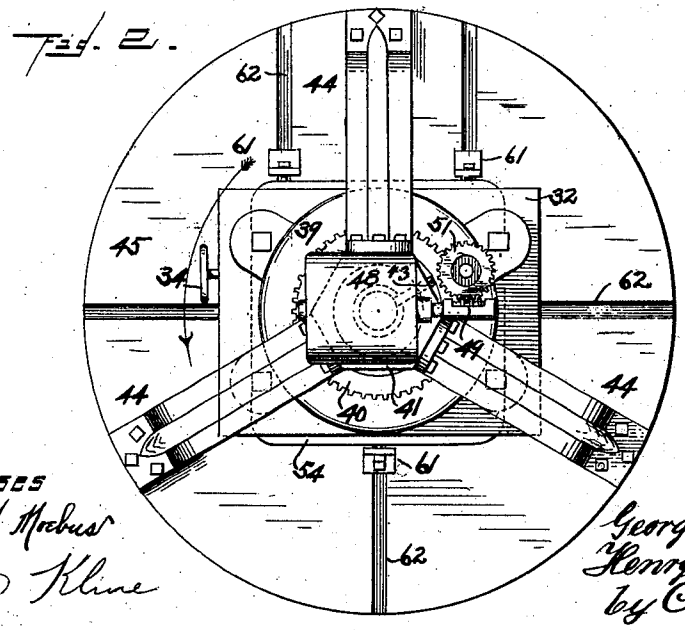


Fig. 2.



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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.

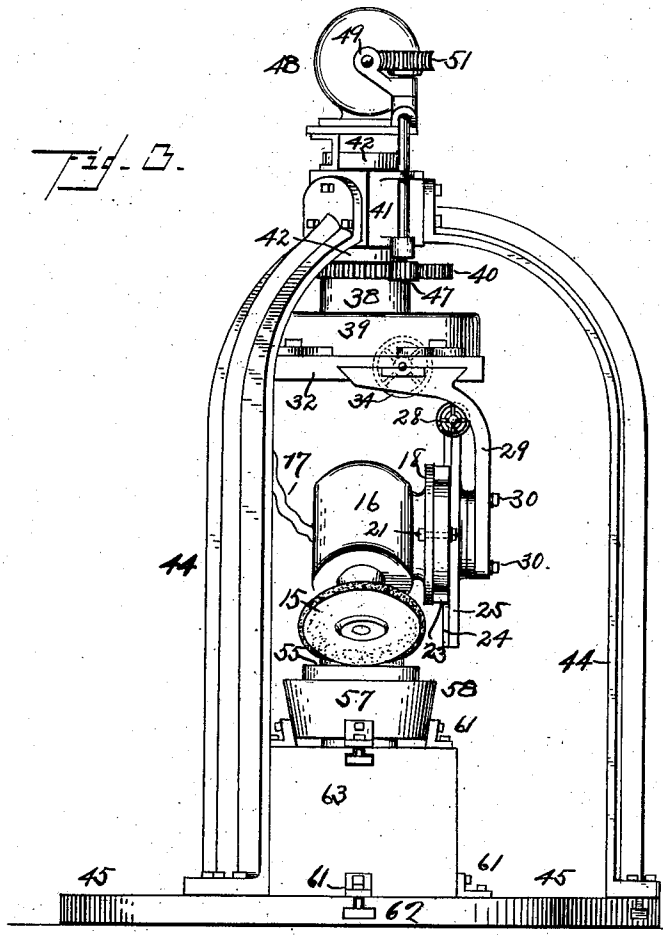


Fig. 11.

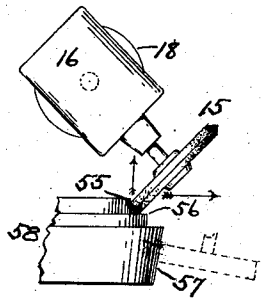


Fig. 4.

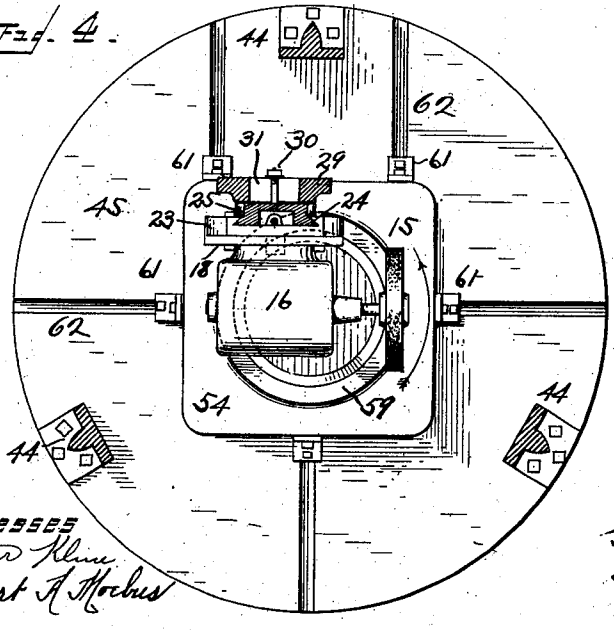
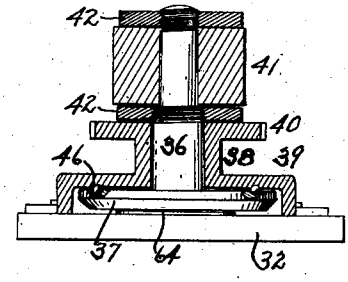


Fig. 5.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 6.

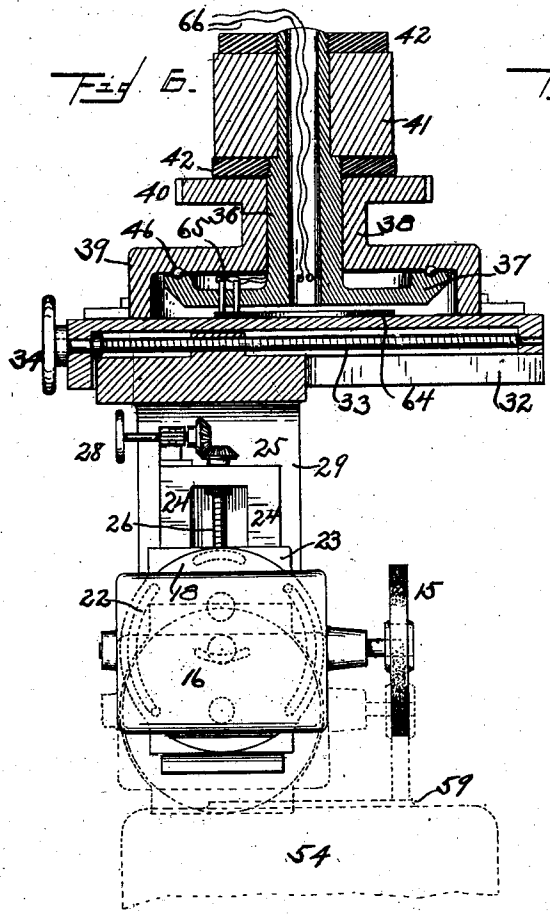


Fig. 7.

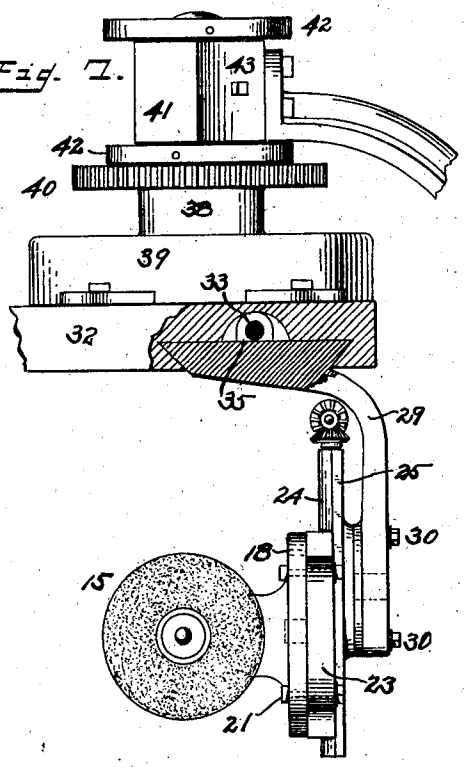


Fig. 8.

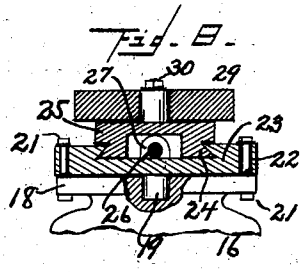


Fig. 10.

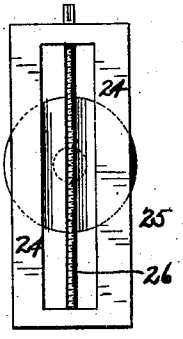
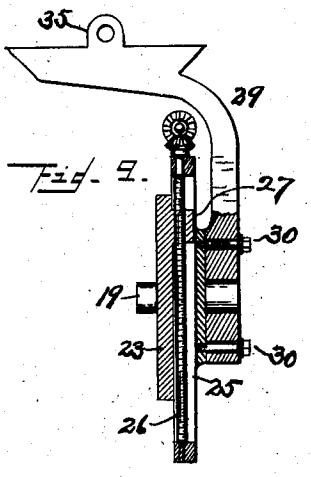


Fig. 9.



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No. 753,911. Patented March 8, 1904.

UNITED STATES PATENT OFFICE.

GEORGE J. PELSTRING, OF CINCINNATI, OHIO, AND HENRY G. PELSTRING, OF COVINGTON, KENTUCKY, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE VICTOR SAFE & LOCK CO., OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 753,911, dated March 8, 1904.

Application filed October 3, 1903. Serial No. 175,539. (No model.)

To all whom it may concern:

Be it known that we, GEORGE J. PELSTRING, of Cincinnati, Hamilton county, State of Ohio, and HENRY G. PELSTRING, of Covington, Kenton county, State of Kentucky, have invented certain new and useful Improvements in Grinding-Machines; and we do declare the following to be a clear, full, and exact description thereof, attention being called to the accompanying three sheets of drawings, with the reference characters marked thereon, which form also a part of this specification.

This invention relates to a machine for grinding and polishing surfaces, more particularly such of metal. It is designed for use on heavy and bulky work which cannot be readily manipulated or swung—like, for instance, safes and articles of similar size and weight.

The machine is more particularly constructed to meet requirements for grinding the body and door of screw-door safes, the most important work in connection with such use being the grinding of the tapering edge around the door and the corresponding surface around the opening in the safe-body which receives this door. It is obvious that in work of such size and weight the various motions—such as, for instance, the adjustment whereby the grinding-wheel and the work are brought in contact with each other, the rotation for grinding and the advance over the work in such adjusted position, and finally the change of position for feeding—must all be performed by the grinding-wheel exclusively, while the work remains stationary.

One of the features of our invention is therefore a construction in which a grinding-wheel may be adjusted to the position of the work and whereby in this adjusted position it may be rotated for grinding and while so rotating be advanced at the same time over the work and also be fed over and across the surface to be ground. The grinding to be done being mostly on circular surfaces—as, for instance, around the edges of the door and the opening for it—the advance of the grinding-wheel while so rotating, as above referred to, must be accordingly—that is, it is carried around and over the work in a circular path. The construction whereby this gyratory movement is accomplished forms another feature of the invention.

As still another feature we mention the means whereby it is rendered possible to carry a single rotating grinding-spindle around in a circular path—that is, whereby it is given a compound rotary motion, such being by electrical motive-power.

In the following specification, and particularly pointed out in the claims, is found a full description of the invention, together with its operation, parts, and construction, which latter is also illustrated in the accompanying drawings, in which—

Figure 1 shows an elevation of our grinding-machine, it being adjusted for doing work around the inner side or jamb of the door-opening in the body of a safe. Fig. 2 is a top view of the machine. Fig. 3 is another elevation of the machine and at right angles to the one shown in Fig. 1, it being shown as arranged for grinding the edges of a circular door to be received by the opening in the safe-body shown in Fig. 1. Fig. 4 is a horizontal section of the machine, taken below the top and showing it as doing work on the outer side of the safe-body. Fig. 5 is a vertical section of the upper part of the machine. Fig. 6, at an enlarged scale, the upper part being in section, shows the operating parts of the machine adjusted to do work as shown in Fig. 4—that is, on the outside of the safe. Fig. 7 is a view partly in section and at right angles to the preceding figure, showing the same parts again. Fig. 8 is a horizontal section through the upper part of Fig. 6. Fig. 9 is an edge view of the adjustable bracket which carries the grinding-wheel and the means for its adjustment. Fig. 10 is a front view of one of the parts carried

by this bracket and required for this adjustment. Fig. 11 is a view complementary to Fig. 3, showing the grinding-wheel in edge view.

15 is the grinding-wheel, mounted upon the free projecting end of the armature-shaft of an electric motor 16, fed by wires 17. At one side the housing of the motor is enlarged to form a flat base 18, which has a socket-hole to receive a pivot 19, around which the motor may be adjusted to meet the work as to angular relation, so that it may be adjusted from a position shown in Fig. 1 to one shown in Fig. 6 or to an intermediate one, as shown in Figs. 3 and 11. The motor is held in its adjusted position by bolts 21 passing through slots 22 in a slide 23, from which also pivot 19 projects. As shown, the range of the rotary adjustment is ninety degrees, which may, however, be readily changed to suit circumstances, all that is required being the arrangement of slots 22 accordingly.

Slide 23, by the usual dovetail connection, is mounted on ways 24, which form a connected frame structure 25 and on which said slide, with the motor, may be moved either for adjusting or for feeding the adjusted grinding-wheel. After adjusted, as shown in Figs. 1 or 3 and 11, this movement may be utilized as a feed-motion and whereby the grinding-wheel after having acted in a certain position over the entire length of the work may be moved laterally with reference to its face a sufficient number of times, so as to gradually cover the entire width of the surface to be ground in case such width exceeds the width of the grinding-wheel. This movement of slide 23, with the motor on ways 24, whether for adjusting or feeding the grinding-wheel, is accomplished by means of a screw 26, fixedly mounted in frame structure 25 and engaging a nut 27, projecting from the rear side of the slide and into the space between ways 24. This screw is manipulated by a hand-wheel 28, arranged for the sake of convenience to be accessible from the side.

Frame 25, with slide, motor, and grinding-wheel, are carried on a bracket 29, the connection being a pivotal one, so that said frame may be adjusted to a position as shown in Fig. 1. For such purpose there is a boss on one and an opening in the other to receive it, the adjusted position being secured by locking-bolts 30, projecting rearwardly from frame 25 and passing through slots 31 in the lower part of the bracket. This latter depends from the under side of a platform 32, to which it is adjustably secured by means of a dovetail connection, as shown.

The adjustment is by means of a screw 33, operated by a hand-wheel 34 and engaging a nut 35 on the upper part of the bracket. Platform 32 is suspended from an upright spindle 36, the lower end of which has a head 37, the connection being by means of a sleeve 38, fitted around said spindle 36, and by a flange 39, fitted over and around head 37, said flange being bolted and secured to the upper side of the platform 32 with head 37 between the two. This platform, with bracket 29 on its under side carrying all the parts described, may be rotated around spindle 36, for which purpose a gear-wheel 40 is mounted on sleeve 38. Spindle 36 is supported in a bearing 41, being confined between nuts 42 and held therein against rotation by means of set-screws 43.

Bearing 42 is supported by a suitable frame, which may be in form of three legs 44, rising from a bed-plate 45. The adjustable connection of bracket 29 to the under side of platform 32 is such as to arrangement and location that the center of the grinding-wheel and the center of rotation of platform 32 lie in one plane, vertically considered, the adjustment of the grinding-wheel being to and from the center of rotation of the platform, but always in the same plane mentioned, this adjustment being the radial adjustment of the grinding-wheel with reference to the work—that is, as to the size of the circular surface thereon to be ground.

To reduce the friction between flange 39 and head 37, friction-reducing balls 46 are interposed between the two.

Gear-wheel 40, which rotates platform 32, is operated by a pinion 47, which may be driven in any way. As shown, we use an electric motor 48, supported above the machine, the connection being made by means of a worm 49 on the armature-shaft and a worm-wheel 51 on the pinion-shaft.

If found necessary, a balance-weight 52 may be used to distribute more evenly the weight of the parts suspended from platform 32.

It will now be seen that the adjustable grinding-wheel while rotating is also advanced or gyrated at the same time in a circular path around and over the work. If the width of the work is exceeding the width of the face of the grinding-wheel, this latter is shifted after each rotation around its circular path until the entire width of the circular surface to be ground is gone over. As before stated, this machine is designed particularly for grinding-surfaces on safes and their doors, and the machine is illustrated as so used, it being shown in Fig. 1 to grind the inner surface 53 around the door-opening of a cast-metal safe 54.

In Figs. 3 and 11 it is shown grinding around edges 55, 56, and 57 of the door 58 thereof. In Figs. 4 and 6 it is shown as grinding a flat surface 59 on the front of the safe and around the door-opening therein. In the case of the safe-body this latter may rest directly upon bed-plate 45, held by dogs 61, ad-

justably secured in grooves 62. In case of the door an intermediate support 63 is used to bring up the height. The machine is of course not confined to this class of work.

Referring now to Fig. 1, the grinding-wheel is adjusted for this particular work shown there, as follows: The motor is pivotally adjusted on slide 23, so as to have the face of the grinding-wheel or, what is the same, its shaft parallel to surface 53. Slide 23 and frame 25 are adjusted on bracket 29, so as to bring feed-screw 26 also parallel to the motor-shaft and to surface 53, so that the grinding-wheel may be fed in proper direction. Hand-wheel 34 is next manipulated, so as to cause bracket 29, with the adjusted grinding-wheel, to move outwardly and in full grinding contact against surface 53, so as to obtain a proper start. The grinding-wheel, so adjusted and having been started to rotate, is now ready to proceed on its annular travel around surface 53, whereby it is carried over the entire length of the work. After the particular annular strip or zone has been ground the grinding-wheel is moved on surface 53 laterally—that is, with reference to its face—to an extent equaling nearly the width of this latter, so as to cover an adjoining part of surface 53. This movement is the feed-motion and is by moving slide 23 with the motor on frame 25, hand-wheel 28 being used for such purpose.

For doing work as shown in Figs. 3 and 11 the motor alone is adjusted to proper angular position by means of its pivotal connection on slide 23. This latter and frame 25 remain in vertical position on bracket 29, the same as also shown in Fig. 6. A grinding-wheel shaped at its face as shown in Fig. 11 is used. For grinding surface 55 the grinding-wheel is fed vertically, hand-wheel 28 being manipulated. For grinding surface 56 the grinding-wheel is fed horizontally, hand-wheel 34 being used. For grinding surface 57 the operation is substantially like the one described for surface 53, the wheel occupying a position with reference to the surface, as shown in dotted lines in Fig. 11, or the door may be turned around, when all conditions will be the same as shown in Fig. 1.

For doing work as shown in Figs. 4 and 6 the motor is swung around on slide 23 to a position as best shown in Figs. 6 and 7. It is next lowered down on frame 25 to the work, as shown in dotted lines in Fig. 6, hand-wheel 28 being manipulated. For feeding it horizontally across the work hand-wheel 34 is operated. The annular or gyratory motion whereby the rotating grinding-wheel is longitudinally advanced in a circular path over the work is the same in all these cases and as first described, it being by the rotating platform 32.

To overcome the extraordinary difficulties which the operation of such a grinding-wheel would present if to be accomplished mechanically, considering the many adjustments required and the annular movement of it while rotating, and such mechanical operation being, in fact, impossible as to a single grinding-spindle, we use, as shown, electric motive power. In view of the bodily motion of the motor electrical connection is accomplished and maintained by complementary contact-pieces, one set being carried by rotating parts, the other by stationary ones. The first set consists of rings 64 on the upper surface of platform 32, preferably insulated therefrom. The other consists of brushes 65 in head 37, all so located that these latter maintain contact with the rings while the platform rotates. Wires 17 receive the current from these rings 64. Feed-wires 66 supply the current to brushes 65. They may enter, by preference, through the hollow spindle 36.

Having described our invention, we claim as new—

1. In a grinding-machine, the combination of a grinding-wheel, means to rotate it, a bracket to which it is adjustably connected, a platform from which this bracket depends and means to rotate the platform.

2. In a grinding-machine, the combination of an electrical motor, a grinding-wheel rotated by the armature-shaft of the same, a support to which the motor is adjustably connected and means for moving the grinding-wheel and its actuating-motor in a circular path.

3. In a grinding-machine, the combination of an electrical motor, a grinding-wheel rotated by the armature-shaft of the same, a slide on which this motor is supported so as to have a pivotal adjustment, a frame to which this slide is connected with a sliding adjustment, a bracket to which this frame is connected with a pivotal adjustment, a platform from which this bracket depends and means to rotate the platform.

4. In a grinding-machine, the combination of a grinding-wheel, means to rotate it, a bracket to which it is adjustably connected, a platform from which this bracket depends, a vertical spindle on which this platform is suspended and means to rotate the platform about the spindle.

5. In a grinding-machine, the combination of a rotary carrier and a single motor-operated grinding-wheel adjustably suspended thereon.

6. In a grinding-machine, the combination of a motor-operated grinding-wheel, and a rotary carrier on which it is suspended and whereby it is moved in a circular path.

7. In a grinding-machine, the combination of a motor-operated grinding-wheel, a bracket

on which it is supported, a platform to the under side of which this bracket is adjustably connected and means to rotate the platform.

8. In a grinding-machine, the combination of a grinding-wheel, a base on which it is supported, a slide to which this base is pivotally attached and a frame on which this slide is held with a longitudinal adjustment.

In testimony whereof we hereunto set our signatures in the presence of two witnesses.

GEORGE J. PELSTRING.
HENRY G. PELSTRING.

Witnesses:
C. SPENGEL,
ARTHUR KLINE.