Sept. 27, 1932. J. L. HAIL 1,879,211

MACHINE

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Fig. 2.

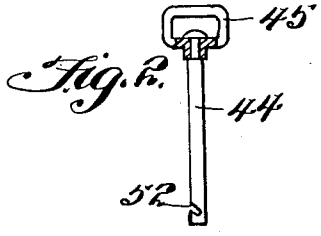


Fig. 3.

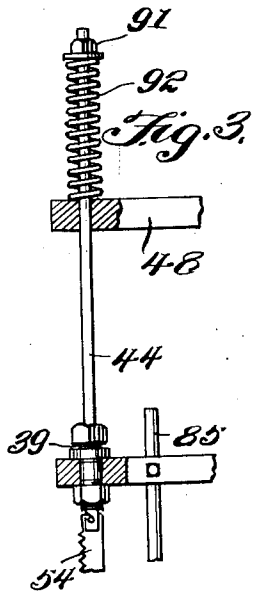


Fig. 1.

J. L. Hail INVENTOR

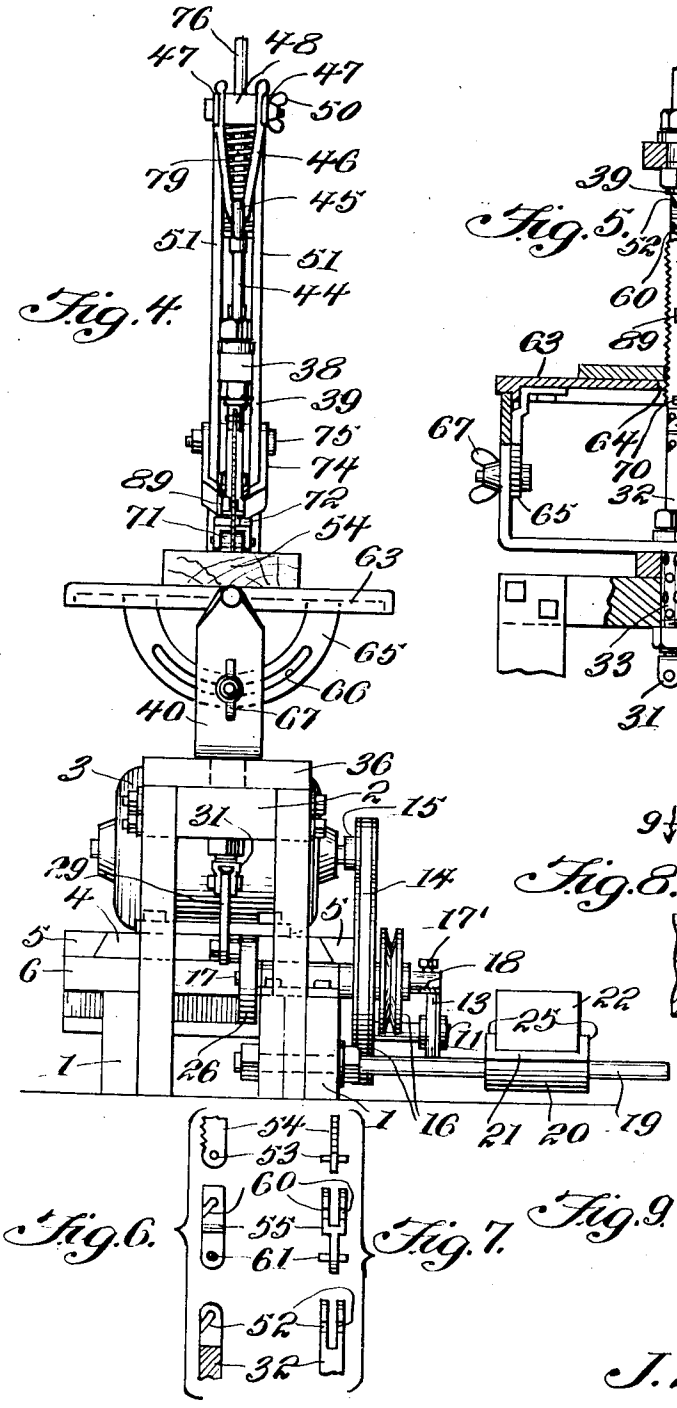
BY Victor J. Evans and Co. ATTORNEY

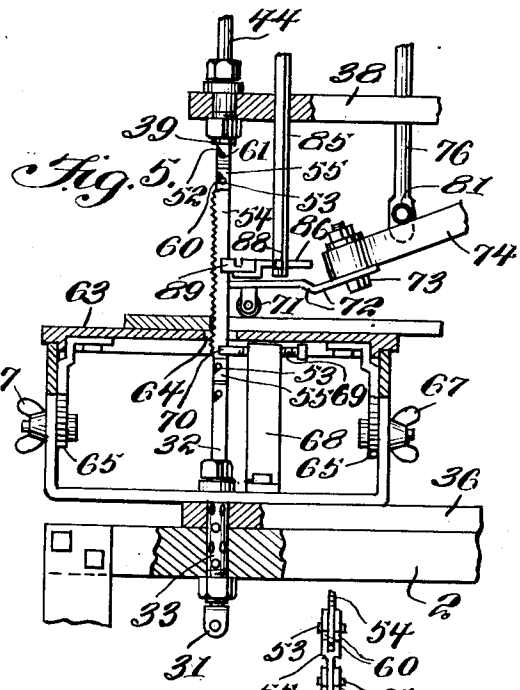
WITNESS: J. L. Wright

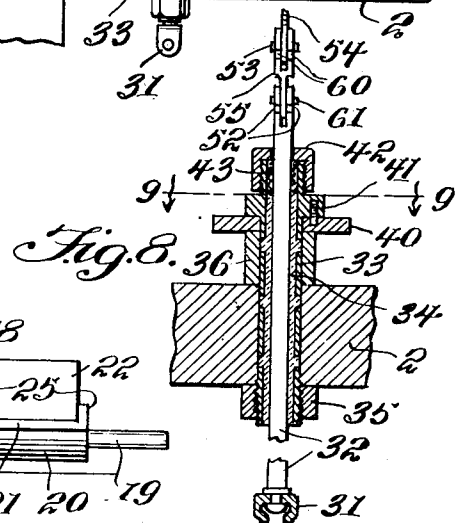
Sept. 27, 1932. J. L. HAIL 1,879,211

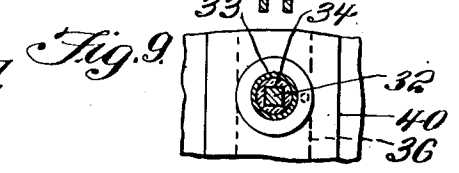
MACHINE

Filed Sept. 10, 1931 3 Sheets-Sheet 2









J. L. Hail
INVENTOR

BY Victor J. Evans and Co. ATTORNEY

WITNESS J. L. Wright

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MACHINE

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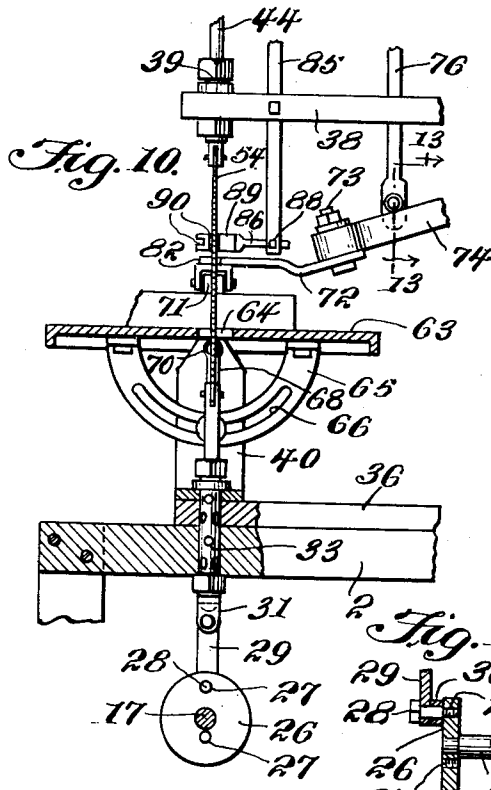


Fig. 10.

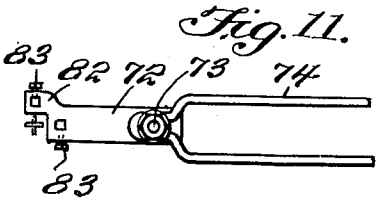


Fig. 11.

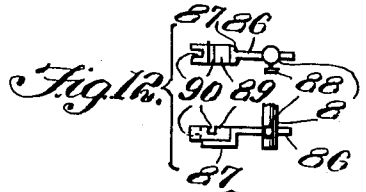


Fig. 12.

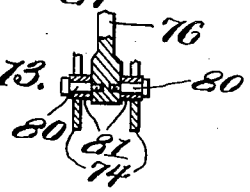


Fig. 13.

Fig. 17.

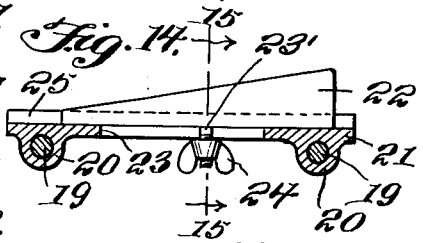


Fig. 14.

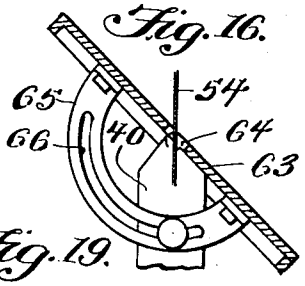


Fig. 16.

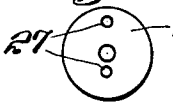


Fig. 18.

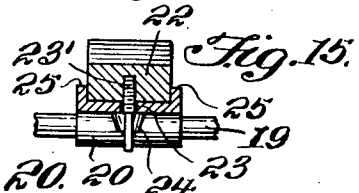


Fig. 15.

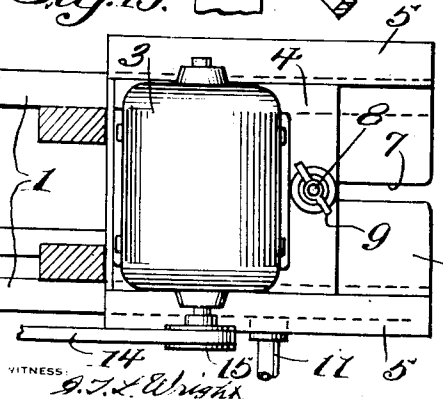


Fig. 19.

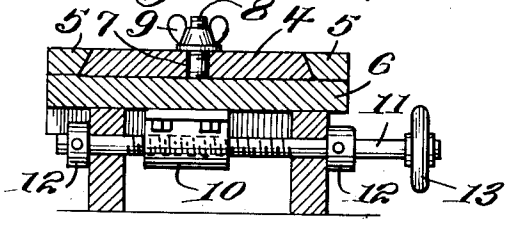


Fig. 20.

WITNESS:
G. T. L. Wright

J. L. Hail INVENTOR

BY Victor J. Evans and Co. ATTORNEY

Patented Sept. 27, 1932

1,879,211

UNITED STATES PATENT OFFICE

JAMES L. HAIL, OF CROCKETT, TEXAS, ASSIGNOR OF ONE-HALF TO SIDNOR L. MURCHISON, OF CROCKETT, TEXAS

MACHINE

Application filed September 10, 1931. Serial No. 562,157.

My present invention has reference to a simple, novel and useful machine for use by cabinet makers, pattern makers, light metal workers, etc., and my object is the provision of a machine of this character which will successfully perform a plurality of operations required in the wood working or light metal working arts, and which may be accurately operated by either a skilled or a non-skilled mechanic.

The invention will be fully and comprehensively understood from a consideration of the following detailed description when read in connection with the accompanying drawings which form part of the application, with the understanding, however, that the improvement is capable of extended application and is not confined to the exact showing of the drawings nor to the precise construction described and, therefore, such changes and modifications may be made therefrom as do not affect the spirit of the invention nor exceed the scope thereof as expressed in the appended claim.

In the drawings:

Figure 1 is a side elevation of my improved machine.

Figure 2 is a plan view of the upper shaft with parts in section.

Figure 3 is a fragmentary elevation of the upper part of the machine showing the upper shaft for the saw influenced in one direction by a spring.

Figure 4 is a front elevation of the machine.

Figure 5 is a detail elevation with parts in section to better illustrate the guide for the saw and the presser for the work operated on by the saw.

Figure 6 is a view to illustrate the manner in which short saw blades may be coupled to the shafts, the parts being separated.

Figure 7 is a front elevation thereof.

Figure 8 is an enlarged sectional view through the bearing for the lower shaft, the bearing for the upper shaft being of a similar construction.

Figure 9 is a sectional view approximately on the line 9—9 of Figure 8.

Figure 10 is a fragmentary elevation with parts in section to better illustrate the upper bed and the mount therefor.

Figure 11 is a top plan view of the front portion of the work presser.

Figure 12 illustrates respectively a top plan and a side elevation of the saw guide.

Figure 13 is a sectional view approximately on the line 13—13 of Figure 10.

Figure 14 is a longitudinal sectional view through the lower slidable table.

Figure 15 is a sectional view approximately on the line 15—15 of Figure 14.

Figure 16 is a detail sectional view through the tiltable table.

Figure 17 is a detail sectional view through the motor driven wheel to which the lower shaft is adjustably connected.

Figure 18 is a front elevation of the wheel.

Figure 19 is a plan view of the support or bed for the motor.

Figure 20 is a sectional view approximately on the line 20—20 of Figure 1.

The bed 1 of the improvement is preferably constructed of timbers and has at its forward end an elevated substantially rectangular portion whose upper part is indicated for distinction by the numeral 2. The elevated portion is in the nature of an open frame and directly to the rear of the said portion 2 there is mounted on the bed 1 a support for the operating motor 3 for the machine. The motor has its base fixed on a plate 4 which is slidable between rails 5. The confronting edges of the plate 4 and the rails 5 are beveled in opposite directions, as clearly disclosed by Figure 20 of the drawings and the rails 5 are secured upon a bottom plate 6. The plate 6, from its outer end is provided with a central longitudinally extending slot 7 that receives therethrough the shank of a headed bolt 8 which passes through the plate 4 and which is engaged by a winged nut 9. By this arrangement it will be noted that the motor can be moved longitudinally on its bed. The bed or motor support is also susceptible to lateral movement and to accomplish this I fix upon the under face of the plate 6 a member 10 that has a threaded bore, and there is screwed through this bore the threaded portion of a shaft 11. The

shaft is held from longitudinal movement by collars or like elements 12 that are fixed thereon and are in contact with the opposite sides of the bed 1, and the outer end of the shaft 11 is provided with a turning wheel 13. The lateral and longitudinal adjustment of the motor 2 is highly desirable and is in fact necessary in order that an endless belt 14 which is trained over a pulley wheel 15 on the shaft of the motor 3 be sustained taut when the said belt is trained over any one of a plurality of pulley wheels 16 that are arranged face to face and are fixed on a shaft 17 journaled in suitable bearings which are fixed on the bed 1, adjacent to the forward end thereof. The shaft 17 is arranged transversely with respect to the longitudinal plane of the bed 1, and the outer end of the shaft is hollow to provide a socket 18. Threaded into the socket end of the shaft there is a short bolt 17'. The socket end 18 of the shaft is thus in the nature of a chuck and the said chuck is designed to receive therein the shafts or mandrels for different types of tools such, for instance, as a rotary saw, a drill bit, sanding wheel, an emery or grinding wheel, etc.

The side of the bed 1, adjacent which the chuck and the pulley wheels 16 are arranged has fixed thereon a pair of spaced outwardly directed parallel rods 19, respectively, and these rods are received through openings in depending ears 20 on the base or bed 21 for a slidable table 22. The member 21 (see Fig. 14) is provided with a central longitudinally arranged slot 23 through which passes a bolt 23' fixed to the bottom of the table 22, the said bolt being engaged by a wing nut 24. The sides of the table are provided with upstanding flanges 25 to contact with the sides of the table 22 and serve as guides to prevent the lateral movement of the table on the bed plate 21. The table 22 may have its upper face inclined, as disclosed by the drawings, but the said table may be in the nature of a box-like member which has its top slotted and one of its sides open to receive the short shaft or mandrel for the rotary saw, or the grinding or sanding wheels or discs.

The inner end of the shaft 17 has fixedly secured thereon a disc wheel 26 (see Figures 17 and 18) provided with any desired number of threaded openings 27 arranged at varying distances from the axial center of the wheel or disc 26, and any one of these openings is designed to have threaded therein a bolt member 28 that is also threaded through the lower end of an arm or link 29, the said link being held from contact with the disc or wheel 26 by a sleeve 30 that is arranged around the bolt 28. The upper end of the link 29 has pivotally fixed thereto the parallel arms of the substantially U-shaped member or yoke 31, and in this yoke there is pivoted the lower end of a shaft 32.

The shaft 32 is square in cross section and is mounted for slidable movement through a bearing in the part 2 of the bed 1. The bearing is of a particular and peculiar construction, the same including a perforated sleeve 33 that has an inner liner 34 of Babbitt metal and the liner when poured into the sleeve will have parts thereof passed through the apertures in the said sleeve to thereby interlock the liner to the sleeve. The bore of the liner is square to correspond to the cross sectional contour of the shaft 32. A nut 35 is screwed on the lower end of the sleeve 33 and contacts with the under face of the part 2 of the bed and the sleeve also passes through and affords a support for the lower arm 36 of a substantially U-shaped frame 37. The upper arm 38 for the frame 37 has passed therethrough the sleeve portion 39 of a bearing similar to that just described, the upper bearing however, being shorter than the lower bearing.

The sleeve 33 for the lower bearing also passes through and provides a pivot for the base or bottom of a cradle 40 for the swingable saw table which will hereinafter be described in detail. A disc or like element 41 which is fixed to the lower arm 36 of the frame 37 is arranged around the upper portion of the sleeve 33 and the outer end of the said sleeve is closed by a cap nut 42 that affords a packing box for a lubricant saturated waste 43, the said waste being in direct contact with the shaft 32, the upper bearing 39 being provided with a like packing box.

The shaft 32 provides the lower shaft of the improvement. The upper shaft, indicated by the numeral 44, passes through the upper bearing 39. The upper shaft is also square in cross section and has swivelly secured to its outer end a yoke 45. Threaded through this yoke there is an elastic strap 46 and the ends of the strap are clamped by removable plates 47 against the opposite sides of the upper angle arm 48 of a standard 49. The plates 47 have passed therethrough suitable bolts which are engaged by wing nuts 50, the said bolts also passing through the upper arm 48 of the standard 49.

The standard 49 has its lower end provided with a stub shaft extension which is journaled through a bearing opening in the part 2 of the bed 1, the said extension being threaded and being engaged by a nut and the portion of the shaft which contacts with the part 2 of the bed is formed with a bearing enlargement 50'. Secured to the vertical and to the horizontal arm of the standard 49 there are angle brace members 51 that receive therebetween the frame 37, and with a construction as above described it will be noted that the frame 37 is so arranged and supported that

the same is subjected to only the slightest amount of strain.

The shafts 44 and 32 have their confronting ends bifurcated and provided with alining angularly arranged slots 52, respectively, that receive therein laterally extending pins 53 on the ends of hack saw or like toothed blades 54. The yieldable means, comprising the elastic element 46, will hold the saw on the shafts, and when it is desired that saw blades of different lengths be employed I make use of one or more couplers, such as disclosed by Figures 6 and 7 of the drawings. The couplers are in the nature of strips or plates 55 that have one of their ends bifurcated and provided with angle slots 60 and their second ends provided with laterally extending pins 61. The slots receive therein the pins 53 on the short saw blades and the pins 61 are received in the angle slots in one or in both of the shafts 32—44. The cradle 40 is in the nature of a substantially U-shaped member whose parallel sides are provided with notches to receive therein trunnions at the ends of the saw table 63. The saw table is provided with a central opening 64 for the passage of the saw blade, and the under face of the table has fixed thereon or formed therewith arched or segmental members 65 provided with central slots 66. Passed through these slots there are headed bolts which also pass through the sides of the table. These bolts have screwed thereon winged nuts 67 for holding the table when tilted to desired angles.

Fixed to the bottom of the cradle there is an upstanding element or arm 68 that has threaded through its upper end a bolt member 69 that carries on its outer end an angularly notched guide 70 to contact with the straight back of the saw blade 54 and thus serve as a guide for the said blade.

The work is held on the table 63 by the roller 71 whose shaft is journaled through lugs that depend from a plate 72 that has an angle end through which is passed a bolt 73 that also passes between the arms of a U-shaped strap 74, the said bolt being engaged by a suitable nut and the arms of the strap, which provide the body of the work presser are pivoted, as at 75, to the angle brace members 51. There is guided through alining openings in the upper arm 38 of the frame 37 and the angle arm 48 of the standard 49 a rod or bar 76 which is provided with spaced apertures through any one of which there is passed a pin 77 to hold on the said rod a disc 78 and the said disc provides a rest for the lower convolution of a coiled pressure spring 79 whose second end contacts with the inner face of the arm 48. The lower end of the rod 76 has screwed therein the reduced ends of oppositely disposed headed stub shafts 80 on which are journaled rollers 81. The lower end of the rod 76 is received between the arms of the member 74 and the rollers 81 are in contact with the upper edges of the said member 74. Thus the spring influenced rod exerts a downward pressure against the member 74 and forces the roller or rollers 71 against the work supported on the table 63.

As the saw is susceptible to being turned to rightangular positions the outer end of the plate 72 is notched but is provided with an angular extension 82, and this extension as well as the outer end of the plate proper are provided with bearing openings for the stud on the mount for the roller 71 and the said stud is designed to be contacted by friction elements in the nature of short bolts 83 which are screwed through the outer edge of the extension and through the opposite edge of the plate 72 for frictional contact with the stud, and consequently holding the roller 71 at opposite or rightangular positions.

Slidable through the top element 38 of the frame 37, but held from free movement by a bolt or like element 84 there is a rod or bar 85 that has a transverse opening adjacent its lower end for the passage of a stem 86 on an offset or angle plate 87. The stem is held adjusted by a binding element 88 on the rod 85, and the member 87 supports thereon a fibre block 89 and the said block has one of its faces and its outer end provided with slots 90, respectively. The rear or non-sharpened edge of the blade 54 is designed to be received in either of the slots 90 in accordance with the angular positions of the blade. To turn the blade from the position disclosed by the drawings it is merely necessary to turn the shafts 32 and 44, as the same have pivot or swivel connections respectively with the link 29 and the yoke 45, and as above stated, the presser roll 71 is arranged at different angle positions on the supporting plate therefor when the blade is turned and likewise the saw guide is brought, by the turning and adjustment of the stem on the rod 85 to bring either of the notches 90 to a position to receive therein the back edge of the blade 54.

In lieu of the elastic yieldable means 46 the upper shaft member 44 may be elongated and may pass through a bearing opening in the arm 48 of the standard 49, as disclosed by Figure 3 of the drawings. In this instance the upper end of the shaft is threaded and has screwed thereon a nut 91 which contacts with a washer, and the said washer is contacted by the outer convolution of a coiled expansion spring 92 whose second end rests on the top of the arm 43, and the spring 92, of course, draws on the shaft section 49 to hold the blade 54 clamped between this shaft section and the lower shaft section.

The length of stroke of the blade is regulated by the adjustment of the link 29 on the wheel or disc 26, and the rate of speed of the chuck carrying shaft as well as that of the vertical reciprocatory saw blade 54 is

regulated by the arrangement of the belt 14 over any one of the pulleys 16, the bed or support for the motor being adjusted as previously described to arrange the motor pulley wheel 15 in proper alinement with the respective pulleys 16 and for tensioning the belt 14.

My improvement is of a comparatively simple nature and, as above stated, will successfully perform a plurality of operations required in either the wood working or light metal working arts. The foregoing description is believed sufficiently ample to enable others skilled in the art to which the invention relates to fully comprehend the construction and advantages of the machine so that further detailed description is not believed necessary.

Having described the invention, I claim:

In combination with upper and lower vertically disposed reciprocatory shafts for a saw blade, of a standard having an angle end carrying a flexible element to which the upper shaft is connected, an angle brace between the standard and the angle end thereof, a strap pivotally secured to the brace, a plate secured by a nut and bolt to the strap, a work-engaging roller on the outer end of the plate, a rod movable through the angle arm of the standard and having rollers journaled thereon adjacent to its lower end to ride on the upper edge of the strap, a spring around the rod in contact with the angle arm of the standard, and an adjustable element on the rod with which the lower end of the spring contacts.

In testimony whereof I affix my signature.

JAMES L. HAIL.