J. MILLER, Jr.

FEED TABLE FOR GRINDING MACHINES.

APPLICATION FILED MAY 7, 1907.

912.593.

Patented Feb. 16, 1909

2 SHEETS—SHEET 1.

Fig. 7

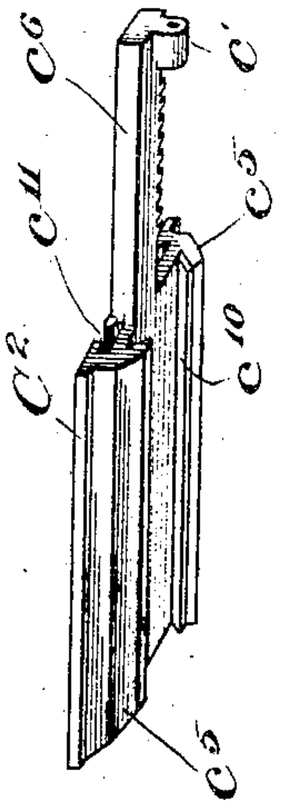

Fig. 8

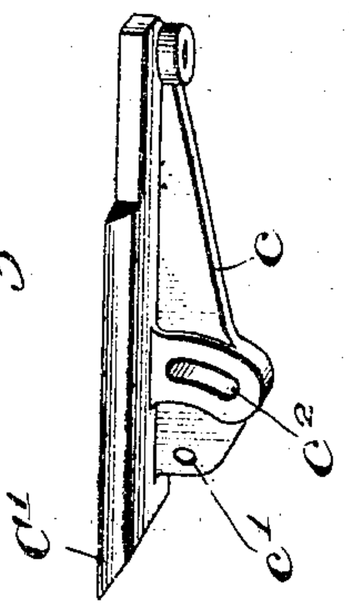

Fig. 9

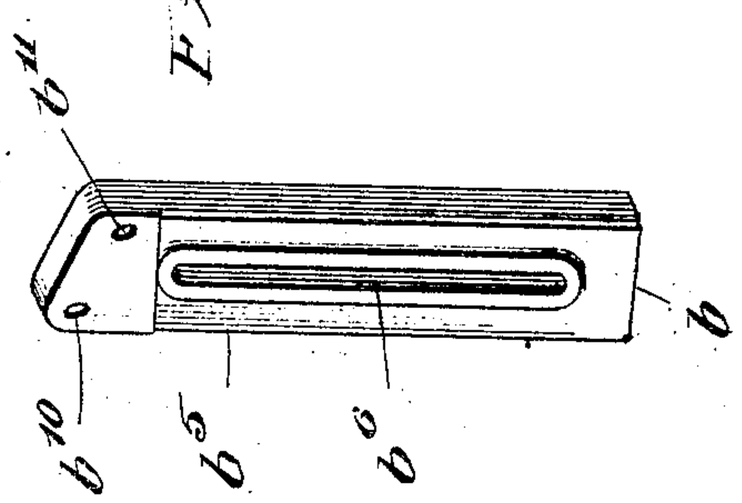

Fig. 1.

Witnesses:

C. O. Shervey

T. H. Fields

Inventor:

John Miller, Jr.;

by Poole & Brown

Attys.

J. MILLER, Jr.

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2 SHEETS—SHEET 2.

Fig. 4.

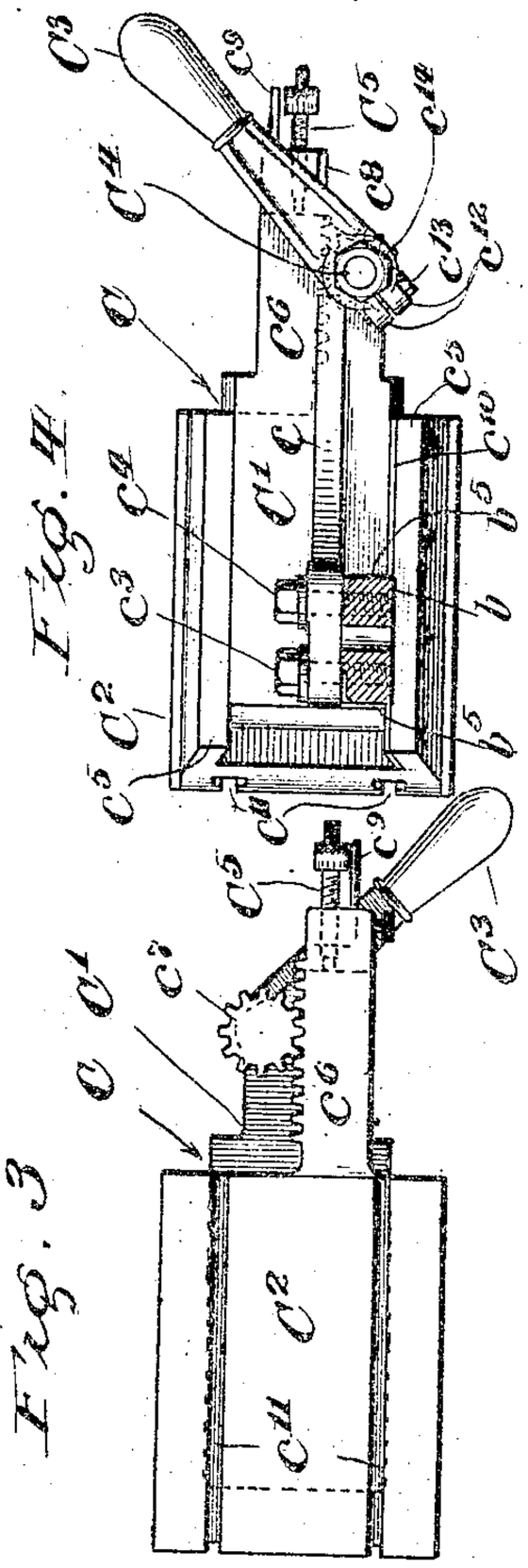


Fig. 3.

Fig. 6.

Fig. 5.

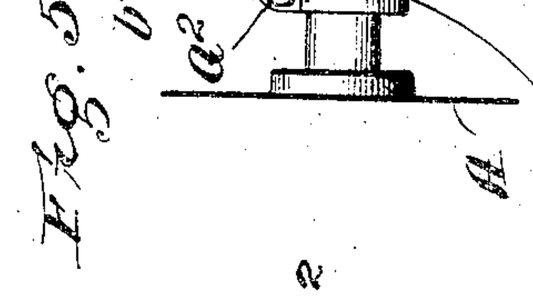
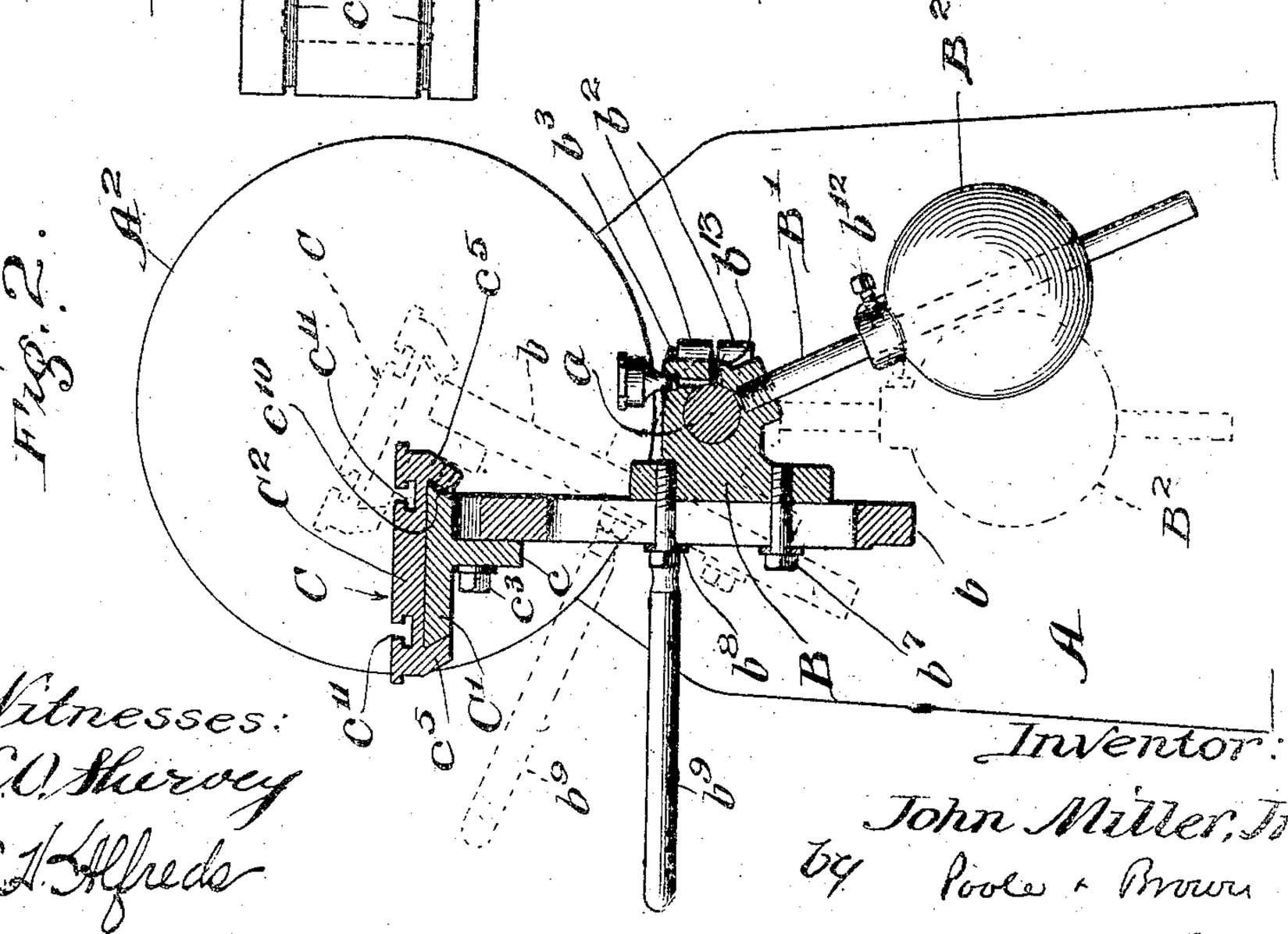


Fig. 2.



Witnesses:
C. O. Sherrey
F. A. Alfred

Inventor:
John Miller, Jr.,
by Poole & Brown
Attys.

UNITED STATES PATENT OFFICE.

JOHN MILLER, JR., OF BELOIT, WISCONSIN, ASSIGNOR TO CHARLES H. BESLY, OF CHICAGO, ILLINOIS.

FEED-TABLE FOR GRINDING-MACHINES.

No. 912,593. Specification of Letters Patent. Patented Feb. 16, 1909.

Application filed May 7, 1907. Serial No. 372,412.

To all whom it may concern:

Be it known that I, JOHN MILLER, Jr., a citizen of the United States, and a resident of Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Feed-Tables for Grinding-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in grinding or polishing machines, and more particularly to flat surface grinding machines, or what are generally known as "disk" grinders, and more especially to a work-supporting table for use in connection with such machines.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

My invention may be better understood by reference to the accompanying drawings, in which,—

Figure 1 is a side view showing my improved work-table in place upon a grinding machine. Fig. 2 is a vertical section on the line 2—2 of Fig. 1. Fig. 3 is a plan view of the work-table. Fig. 4 is a horizontal section, on the line 4—4 of Fig. 1. Fig. 5 is a horizontal section, on the line 5—5 of Fig. 1. Fig. 6 is a view showing the side opposite to the side shown in Fig. 1. Fig. 7 is a perspective view of the table-top detached from its mountings. Fig. 8 is a perspective view of the base member of the work-table. Fig. 9 is a perspective view of the vertical arm on which is mounted said work-table.

As shown in said drawings, A indicates the pedestal of a grinding machine provided with a head-stock A^1 in which is journaled a spindle or rotary arbor carrying the grinding disk A^2. Below the disk A^2 is rigidly fixed a cylindrical shaft *a* which extends outwardly from the pedestal parallel to the said rotary arbor. Upon said shaft *a* is mounted a hub B carrying an upright arm *b* upon the upper end of which is mounted the work-table C. Said hub B is adapted to be either turned upon said shaft, permitting the table to oscillate in a plane parallel to the face of the grinding disk, or to be clamped or secured to the shaft in various positions of angular adjustment by which the table C may be held rigidly in various positions with respect to the grinding disk, one of such positions being indicated by the dotted lines in Fig. 2. For the latter purpose, said hub B is provided with a longitudinal radial slot b^1 and opposite each other on the margins of said radial slot are two pairs of outwardly extending lugs b^2 b^2. Said lugs are tangentially pierced and adapted to be engaged by clamping bolts b^3 b^3, by means of which the split hub B may be peripherally contracted upon the shaft *a*, thereby clamping said hub to said shaft *a*. The outer portion of the said slot in the hub is occupied by a strip of soft wood or other resilient material b^{13} which prevents oil from escaping and also prevents dust from entering the bearing. The inner portion of the slot which is not filled by the wood strip forms an oil groove. When the clamping bolts are tightened the soft wood strip is compressed between the margins of the longitudinal slot, permitting the hub to be contracted upon the shaft *a*, and when the bolts are loosened and the hub allowed to expand, said strip expands and fills the slot. The hub B is secured against endwise movement on the shaft *a* by means of two collars a^1 a^1, likewise radially slotted or split and peripherally contracted upon the shaft *a* by means of tangential bolts a^2 a^2.

Upon a vertical side face of the hub B are two parallel vertical flanges b^4 b^4 adapted for sliding engagement with the parallel edges b^5 b^5 of the vertical arm *b*. Said arm is provided with a longitudinal slot b^6, through which pass cap-screws b^7 b^8, said cap-screws extending into and having screw-threaded engagement with the hub B and serving to adjustably secure the said arm to said hub B. One of said cap-screws b^8 is extended outwardly to form a handle b^9 by means of which the hub B and table supported thereby may be oscillated about the shaft *a* when the hub is loose on the shaft.

The work-table C is mounted upon the upper end of said vertical arm *b*. Said work-table consists of a horizontal base member C^1 and a table top C^2 having horizontally sliding engagement therewith. The base member is pivoted to the upper end of said arm *b* so as to swing on an axis parallel with the face of the grinding disk and is thereby adapted to be tilted into positions of varying angularity with respect to the

plane of the grinding disk. For this purpose said base member C^1 is provided with a longitudinally arranged, vertical depending flange c provided with a transverse hole c^1 and a curved slot c^2 having concentric relation to said hole. The upper end of said vertical arm b is provided with two horizontal holes b^{10} b^{11} internally screw-threaded and adapted to receive studs or cap-screws c^3 c^4. Said cap-screws extend through the hole c^1 and the slot c^2 in the flange of said base member C^1 and are screwed into said holes b^{10} b^{11}. Said base member C^1 can be tilted about said cap-screw c^3 as a pivot, as indicated by the dotted lines in Fig. 1, and can be clamped to the arm in any desired position by tightening said cap-screw c^4. Said base-member C^1 is narrower than the table top C^2 and is formed with its side edges inwardly and downwardly beveled, giving dovetail form thereto. The side margins of the said base member engage the oblique inner faces of two longitudinal flanges c^5 c^5 on the under surface of said table-top C^2. On the inner face of one of said flanges is a thin strip of metal c^{10}, held in place by means of screws engaging internally threaded holes in said flange. By means of said screws, the strip c^{10} can be held in contact with the adjacent beveled edge of the table-top C^2 in order to compensate for wear of the beveled edges of the table-top C^2. On the rear end of the table-top C^2, or that remote from the face of the grinding disk, is an arm or extension c^6 provided with laterally facing rack-teeth adapted to intermesh with a gear pinion c^7 mounted upon the rear end of the base member C^1, which latter is extended rearwardly beneath the path of said arm c^6. Said pinion c^7 is mounted on and affixed to the upper end of a vertical shaft C^4 having bearing in the rear end of said base member C^1. To the lower end of said shaft C^4, beneath the base member, is attached a horizontal swinging hand lever C^3. Said lever C^3 has a hub at one end provided with an opening adapted to receive the lower end of said shaft C^4 and said hub is radially slotted or split and provided with lugs c^{12} c^{12} adapted to receive a clamping bolt c^{13} by means of which said hub may be contracted upon and rigidly secured to the lower end of said shaft. The end of said shaft C^4 which projects below said hub is externally screw-threaded and provided with a nut c^{14} by means of which said hub may be securely clamped between said nut and a flange or shoulder upon said shaft. By the operation of said lever C^3, the pinion c^7 is rotated and the table-top C^2 is caused to approach or recede from the face of the grinding disk.

The arm c^6 on the table-top C^2 is arranged at one side of the longitudinal center line of said table, and the rack-teeth on the side margins of said arm c^6 are arranged on said center line, the axis of rotation of the pinion c^7 being correspondingly located so that the endwise pressure on the table-top due to the turning of the pinion will be exerted on said center line, and the action of the pinion will therefore have no tendency to shift the table in its bearings in a manner to throw it out of line. At the outer end of said arm c^6 on the table-top is a depending lug c^8 in which is mounted a micrometer screw C^5 arranged in the path of and adapted for contact with the outer end of the base member C^1. Said screw constitutes an adjustable stop for accurately stopping the forward movement of the table-top C^2 at any predetermined point. For this purpose said micrometer screw is conveniently provided with a scale-plate c^9 fixed to said lug c^8. Said table-top may also be provided on its upper surface with keyways and grooves c^{11} having the shape in cross-section of an inverted letter T and adapted to receive the heads of clamps of common form for securing the work to said table-top.

The work table C and the vertical arm b on which it is mounted are counterbalanced in such manner that when the hub B is free to rotate upon the shaft a it will automatically assume a position with the arm b vertical. The means for so counterbalancing the work table comprises a rod or lever B^1 depending obliquely downward from the hub B. Said arm passes through a weight B^2, adapted to slide lengthwise upon said rod, and held in place by means of a set-screw b^{12}. By means of said set-screw, the weight B^2 can be secured on the rod B^1 at such distance from the shaft a that its turning moment will balance the turning moment of the other parts of said work-table when said table is in a position with its transverse axis horizontal.

In the operation of a grinding machine equipped with a table such as has been above described, the work is ordinarily held upon the work-table and pressed against the grinding disk by the hands of the operator. During the grinding operation, if the hub be left loose on the supporting shaft, the operator may rock the table back and forth, the weight B^2 assisting him to keep said table upright, with the result that the work is moved radially over the face of said grinding disk. In cases where it is desired not to rock the work-table about its axis a, the bolts b^3 b^3 may be tightened, thereby securing the table rigidly in position with respect to the grinding disk. In either case the work may be held upon the table by pressure of the operator's hands, or it may be held upon the table by clamps having heads inserted in the grooves c^{11}. Where it is desired to grind off accurately a predetermined amount of material, the work may be clamped upon

the table, the micrometer screw properly set, and the table-top C^2 fed toward the face of the grinding disk by means of the rack and pinion device until the inner end of the micrometer screw comes in contact with the outer end of the base member C^1 and stops the horizontal movement of said table-top C^2.

The rack and pinion actuating connection between the table-top and base member has the advantage of giving motion to the table-top at uniform speed, relatively to the turning movement of the hand lever, in all positions of the latter, while at the same time it is of simple construction and is durable because its wearing parts are not liable to receive between them dust or grit arising from the grinding operation.

I claim as my invention:—

1. In a grinding machine, the combination with a grinding disk, of a work-table comprising a base member and a table top having sliding movement on said base member toward and from the grinding disk, said table-top having a longitudinal, rearwardly extending arm provided with laterally facing upright rack-teeth arranged on the center longitudinal line of the table, an upright shaft mounted on the base member at the rear of the table-top, a gear-pinion attached to said shaft above the base member and intermeshing with said rack-teeth, and a hand-lever attached to the lower end of said shaft for turning the latter and said pinion.

2. In a grinding machine, the combination with a grinding disk, of a work-table comprising a base member and a table-top adapted to slide on said base member toward and from the grinding disk, an upright supporting arm sustaining said base member, said base member consisting of a horizontal plate having an integral, vertical, depending, longitudinal flange and the supporting arm having a flat upper end which is arranged parallel with and in overlapping relation to said flange, a pivot pin inserted through said vertical flange and the upper end of the supporting arm, for pivotally connecting said base member with the supporting arm, said flange being provided with a slot arranged concentrically with said pivot pin, and a clamping bolt engaging said slot and the supporting arm for securing the table in various angular positions relatively to the supporting arm.

3. In a grinding machine, the combination with a grinding disk, of a work-table comprising a base member and a table-top adapted to slide on said base member toward and from the grinding disk, said base-member being narrower than the table-top and the table-top being provided with lateral, depending flanges engaging the side margins of said base member and with a longitudinally arranged arm which extends rearwardly from the table-top over the rear portion of the said base member, and is provided with laterally facing rack-teeth, a gear pinion located above the base member at the rear of the table-top and intermeshing with the said rack teeth, an upright pinion shaft having bearing in the rear end of the base member, and a horizontally swinging hand lever attached to said shaft beneath the base member for turning said pinion.

4. In a grinding machine, the combination with a grinding disk, of a work-table comprising an elongated base-member and a table-top adapted to slide endwise on the base member toward and from the face of the grinding disk, said base member being narrower than the table-top and provided between its side margins with a longitudinal, depending flange, and the table-top having lateral flanges extending downwardly over and engaging the side margins of said base member, an upright supporting arm for sustaining the base member, the upper end of which is in overlapping relation to the said flange on the base member, a pivot pin inserted transversely through said flange on the base member and the supporting arm, for pivotally connecting said parts, and clamping means engaging the said flange and the supporting arm for holding the base member in various angular positions with respect to the supporting arm.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 19th day of March A. D. 1907.

JOHN MILLER, Jr.

Witnesses:
A. F. Spaulding,
W. O. Hanson.