No. 819,439. PATENTED MAY 1, 1906.

R. C. KOCH.

PLIERS.

APPLICATION FILED JULY 3, 1905.

2 SHEETS—SHEET 1.

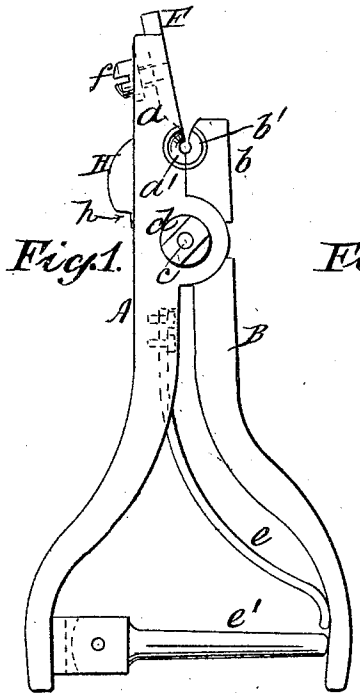


Fig. 1.

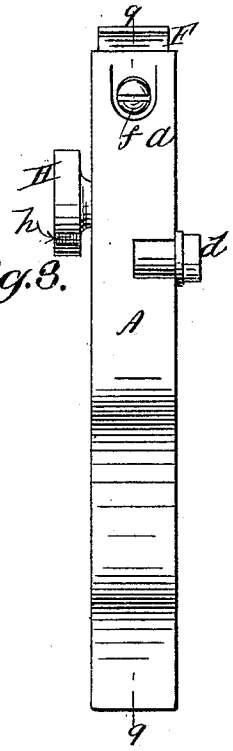


Fig. 3.

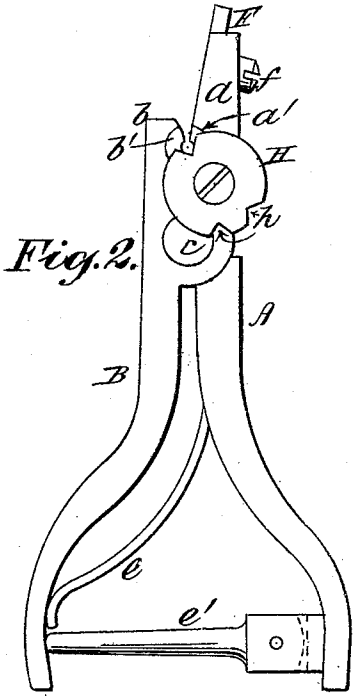


Fig. 2.

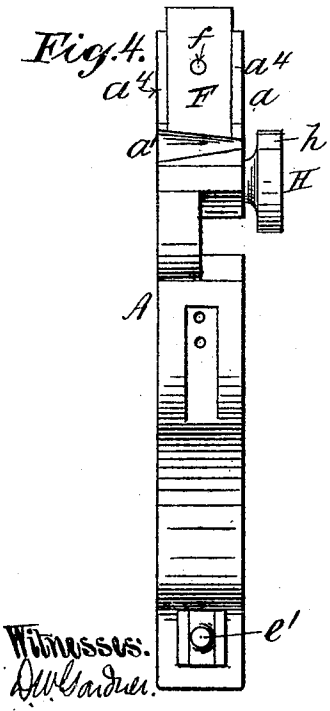


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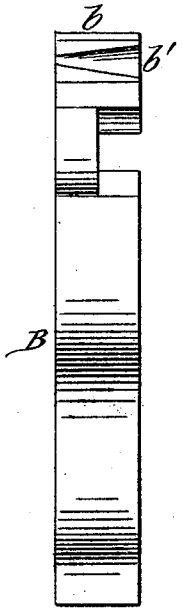


Fig. 7.

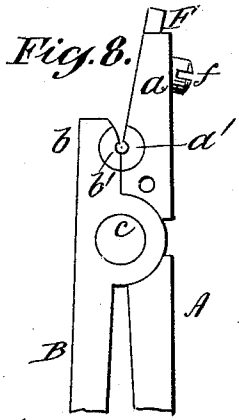


Fig. 8.

Fig. 5.

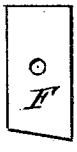
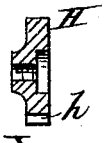


Fig. 6.



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2 SHEETS—SHEET 2.

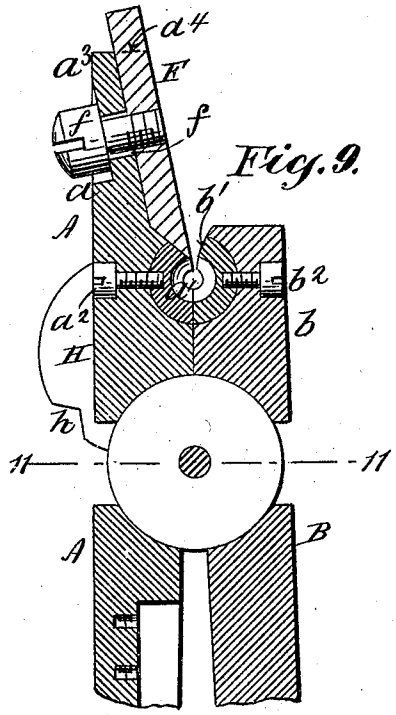


Fig. 9.

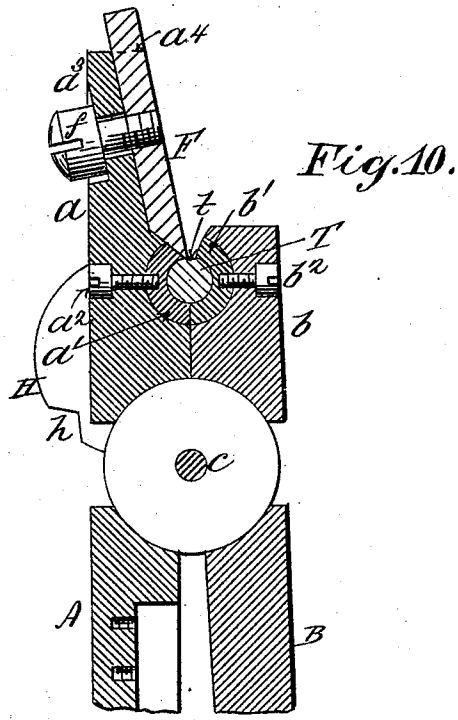
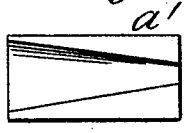


Fig. 10.

Fig. 11.

Fig. 12.



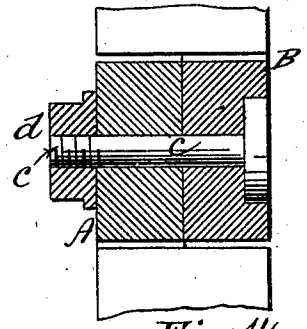


Fig. 13.

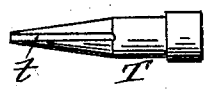


Fig. 14.



Fig. 15.



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UNITED STATES PATENT OFFICE.

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PLIERS.

No. 819,439. Specification of Letters Patent. Patented May 1, 1906.

Application filed July 3, 1905. Serial No. 268,111.

To all whom it may concern:

Be it known that I, RUDOLPH C. KOCH, a citizen of the United States, residing in the city of New York, borough of Richmond, county of Richmond, and State of New York, have invented certain new and useful Improvements in Pliers, of which the following is a specification sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

My invention is designed to afford a simple and effective device by means of which the covering-wires may be rigidly attached to the core-wires of bass piano-strings and the like, as set forth in my concurrent application, Serial No. 267,188, filed June 27, 1905.

Primarily my invention consists in furnishing the plier-jaws with opposed concavo-conical formers, intaglio dies, or compression-surfaces by which the end convolutions of the covering-wire are compressed into conical shape around the core-wire; and, secondarily, the invention consists in the use, in conjunction with said opposed concavo-conical formers, of a knife upon one jaw for trimming and finishing the conical terminus of the covering-wire, in the use of a centralizing-gage, and in certain other special features in the construction and arrangement of parts, hereinafter described and claimed specifically.

In the accompanying drawings, Figures 1 and 2, respectively, represent elevations of opposite sides of my improved implement; and Fig. 3, an edge view of the same. Fig. 4 is an elevation of the inner side of the knife-jaw and lever; Fig. 5, a detail view of the knife; Fig. 6, a detail view of the centralizing-guide; Fig. 7, a view of the inner side of the opposed jaw and lever. Fig. 8 is a side elevation in part similar to Fig. 2, omitting the centralizing-gage; Fig. 9, a sectional elevation, upon an enlarged scale, taken upon plane of 9 9, Fig. 3; Fig. 10, a view similar to Fig. 9, illustrating the use of an adjusting-templet; Fig. 11, a section upon plane of line 11 11, Fig. 9; Fig. 12, a detail view of the inner face of the die on the knife-jaw; Fig. 13, an elevation of an adjusting-templet; Fig. 14, a view of one end of an ordinary wire, and Fig. 15 a similar view of my improved form of terminal.

The two levers A B are pivotally connected by a bolt *c* and nut *d* and tend constantly to separate by reason of a spring *e*, interposed between them, in which extended position they may be positively locked when desired by a swinging bolt *e'*, as shown in Figs. 1 and 2.

The shorter or jaw arms *a b* of the levers A B are provided with opposed intaglio dies *a'* and *b'*, which together constitute, essentially, a conical concavity for the compression and reduction of the end convolutions *w'* of the wrapping-wire *w*, surrounding the core-wire *x*, Fig. 14, imparting to the same a conical shape, as indicated in Fig. 15.

The intaglio dies *a' b'* preferably consist of chilled-steel cheek-pieces fitted to the jaws *a b* and held therein by screws a^2 b^2. The compression and reduction of the end convolutions *w'* of the covering-wire *w* may be effected by these dies alone, if desired, power being applied to the levers A B to force the jaws *a b* toward each other with sufficient pressure to cause the dies to upset and flow the metal constituting said end convolutions of the covering-wire, which is usually of copper. Where, however, it is desired to remove a possible excess of metal and to trim and finish the conical terminals of the covering-wire with accuracy, I provide upon the jaw A a cutting-blade F, the edge of which is made to coincide with or protude very slightly within the face of the die *a'*, it being understood that the core *x* and wrapping *w* are rotating while being subjected to the action of the pliers.

Since core-wires *x* of different diameters are to be accommodated, I furnish the pliers with a centralizing device H, adapted to the requirements of the several sizes of core-wire. This centralizer consists of a disk formed with peripheral **V**-shaped notches *h h*, the convergent side walls of which meet at different radial distances from the center of the disk, which is pivoted to the jaw *a* in such relation to the conical concavity that by turning the disk H each notch *h* may be successively brought into alinement with the axis of said conical concavity. Hence, owing to the difference in radial depth of the several notches, a larger or smaller core-wire may be centralized and supported, as may be necessary.

In order to compensate for wear or to adapt the knife F to the requirements of different diameters of covering-string, I make it adjustable upon the jaw *a* by any suitable means, as by a set-screw *f*, passing through an enlarged or elongated hole *f''* in the web a^3 of the jaw *a* and engaging a female screw-thread formed in the body of the blade F, as shown in Fig. 9, in which arrangement it will be seen also that the blade F is supported laterally by flanges a^4 a^4, which preserve its

alinement with relation to the conical die concavity.

In order to effect the adjustment of the knife quickly and accurately with relation to said conical die concavity, I insert in the latter temporarily one of a series of conical templets T, each formed with a flat face *t*, against which the edge of the blade F may be lowered to gage the degree of its penetration beyond the inner face of the die, as illustrated in Fig. 10.

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

1. In an implement of the character designated, the combination of pivotally-connected levers having jaws formed with opposed semiconical intaglio dies, and a centralizing-disk pivotally mounted upon one jaw and formed with peripheral notches of different radial depths, for the purpose described.

2. In an implement of the character designated, the combination of pivotally-connected levers having jaws formed with opposed semiconical intaglio dies, the jaw of one of said levers being formed with parallel sustaining-shoulders extending at right angles to the axial line of said opposed conical intaglio die, a cutting-blade mounted upon said latter jaw between said parallel shoulders, whereby the blade is sustained laterally on either side, and means for adjusting said cutting-blade between said parallel shoulders and with relation to the concave surface of the semiconical die upon said jaw, for the purpose described.

3. In an implement of the character designated, the combination of pivotally-connected levers formed with opposed inner recesses in their jaws, steel cheek-pieces secured in said opposed recesses and formed with semiconical intaglio die-surfaces, the jaw of one of said levers being also formed with parallel sustaining-shoulders extending at right angles to the axial line of the said opposed semiconical intaglio die, a cutting-blade mounted upon said latter jaw between said parallel shoulders, and means for adjusting said cutting-blade between the said parallel shoulders and with relation to the concave surface of the semiconical die upon said jaw, for the purpose described.

4. In an implement of the character designated, the combination of pivotally-connected levers having jaws formed with opposed semiconical intaglio dies, and a core-wire-centralizing device on one jaw adapted to sustain the core-wire in axial alinement with the said dies, for the purpose described.

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