No. 627,558. Patented June 27, 1899.

F. L. WHITE.

DRAWING DIE MECHANISM.

(Application filed Apr. 26, 1898.)

(No Model.)

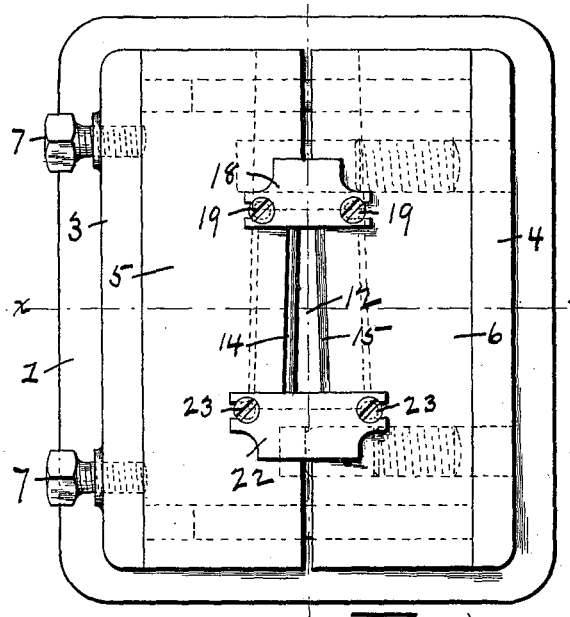

Fig. 1.

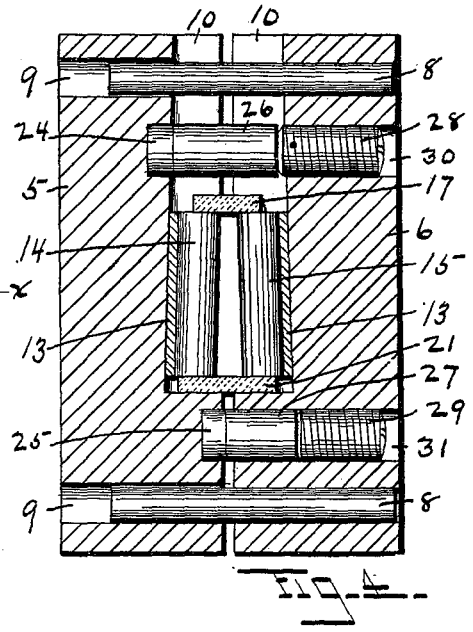

Fig. 4.

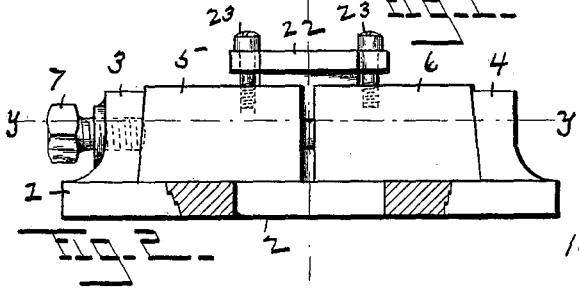

Fig. 2.

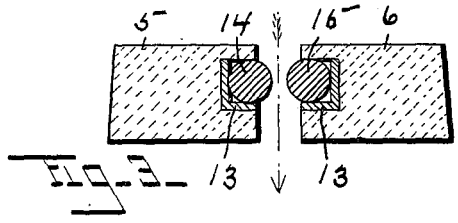

Fig. 3.

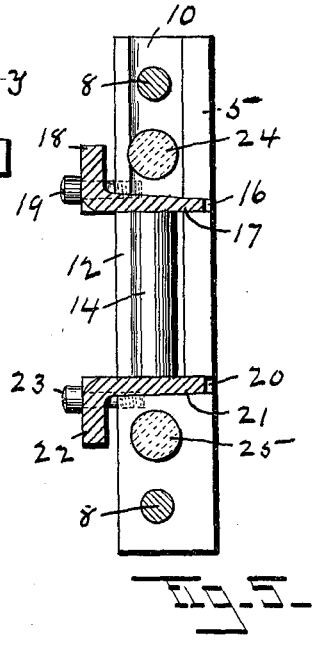

Fig. 5.

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DRAWING-DIE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 627,558, dated June 27, 1899.

Application filed April 26, 1898. Serial No. 678,354. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK L. WHITE, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Drawing-Die Mechanism, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to dies for use in draw-benches for drawing metal into strip or plate form, and it has especial reference to dies for drawing copper into strips having converging faces for making commutator-bars.

The object of the invention is to provide a die mechanism for this purpose which will possess great strength and durability, which is capable of ready adjustment to vary the thickness of the strip formed thereby and also the angle of inclination of its two faces, and in which the parts most exposed to wear can be readily renewed to compensate for reduction of their acting faces by such wear.

To these ends my invention consists in the die mechanism hereinafter fully described, and particularly pointed out in the claims.

Referring to the drawings, in which like numerals designate like parts in the several views, Figure 1 is a front elevation of a die mechanism embodying the invention. Fig. 2 is an end view thereof with the bed partly broken away to show the central opening therein. Fig. 3 is a cross-section of the die-blocks, taken at line $x\ x$ of Fig. 1. Fig. 4 is a transverse vertical section taken at line $y\ y$ of Fig. 2. Fig. 5 is an inner side view of one of the die-blocks and a cross-section of the two end die-plates and the guiding-pins.

The numeral 1 designates the bed or frame which supports the die-blocks, said bed being adapted to be secured in a vertical position in the head of a draw-bench and being provided with a central opening 2 and with two parallel flanges 3 4 on its front face.

The numerals 5 and 6 designate the two die-blocks, which are adapted to rest against the face of said bed between said flanges, where they are retained by clamping-screws 7, passing through the flange 3 against the block 5. To maintain said blocks in alinement while affording freedom for a slight adjusting movement thereof, two guide-pins 8, which are seated in the block 6, project within holes 9 in the block 5 near the top and bottom thereof, respectively, said pins fitting somewhat loosely in said holes 9, as shown in Fig. 4. Each of said blocks is provided with a recess 10 in its inner edge, extending from the upper end thereof to a point beyond the center line of said edge, the bottom walls of which recesses diverge slightly from each other from the upper end of the blocks downwardly, as shown in Fig. 4. At the center line of the blocks the walls of said recesses 10 are cut away to form the opening 12, the walls of which are oppositely inclined and which register with the opening 2 in the bed. Within said recesses 10, adjacent to said opening 12, are located two shoes 13, covering the bottom and rear walls of the recesses, as shown in Fig. 3, said shoes being of L shape in cross-section and being composed of hardened steel. Supported by said shoes within said recesses are two rolls 14 15, also of hardened steel, which rolls project beyond the edges of the blocks into the opening 12, as shown in Figs. 1 and 3, and are free to revolve about their axes. At the upper end of the opening 12 the blocks are provided with a transverse opening 16 to receive the end die-plate 17, which plate carries at its outer end the upwardly-turned head 18, having recesses to engage the adjusting-screws 19, passing into tapped holes in the blocks, by which the plate is held in any position of adjustment. The lower or acting face of said upper die-plate forms a plane surface, while its upper or inner face is slightly inclined relatively to said acting face, as shown in Fig. 5, and the wall of the opening 16, against which it bears, is correspondingly inclined. At the lower end of said opening 12 the blocks are provided with a similar transverse opening 20 to receive the lower end die-plate 21, which has a plane upper or acting face, an inclined lower face, and a downwardly-turned head 22, which is recessed to engage the adjusting-screws 23. To secure the desired degree of separation of the blocks, the block 5 is provided with two buttons 24 25, of hardened steel, seated within its inner edge above and below the opening 12, respectively, against which buttons

hardened pins 26 27 are pressed by adjusting-screws 28 29, located within tapped holes 30 31 in block 6. The interposition of the pins 26 27 between the adjusting-screws and the opposite block provides for a tilting adjustment of the blocks relatively to each other without causing any torsional strain upon said screws.

The parts are assembled by placing the shoes 13 and the rolls 14 15 within the recesses in the blocks, inserting the guide-pins 8 in the holes 9 of block 5, and by means of the pins 26 27 and adjusting-screws 28 29 securing the desired degree of separation between said blocks, after which the blocks are placed between the flanges 3 4 of bed 1 and are secured in such position by means of the screws 7. The end die-plates 17 21 are then inserted within the openings 16 20 and are secured by the screws 19 23 and the mechanism is ready for use.

In the drawing operation the strip of metal having been previously formed into substantially the shape in cross-section of the opening 12 is drawn through said opening and is reduced by the rolls 14 15 at its sides and the die-plates 17 21 at its ends to the exact shape of said opening. The rolls and the shoes 13 being of hardened steel and the rolls being free to revolve and bearing at two points only upon the shoes, the wear of said parts is reduced to a minimum and is evenly distributed throughout their length. Should the surface of the rolls become impaired, they can be readily removed and turned off in a lathe or ground and then replaced in their working position, the blocks being adjusted by loosening the screws 28 29 and advancing the screws 7 to compensate for their reduced diameter. As the acting faces of the plates 17 21 wear away said plates are advanced by means of the screws 19 23, and the inclination of the rear sides of said plates and of the walls of the openings 16 20 in the blocks causes such advance movement of the plates to take up the wear of their acting faces. Furthermore, whenever it becomes necessary said plates can be readily removed for the purpose of regrinding their acting face to a plane surface and then replaced, the adjustment by means of the screws compensating for the diminished thickness of the plates.

By the conjoint action of the screws 7 and 28 29 provision is made for varying the thickness of the drawn strip and also the angle of inclination of its opposite sides.

While I have illustrated my die mechanism as applied to the drawing of strips having inclined sides such as are used in making commutator-bars, it will be obvious that said mechanism is equally applicable to the drawing of strips having parallel sides and all similar work.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a drawing-die mechanism, in combination with a base or frame and two die-blocks having in their adjacent edges a die-opening, of two rolls located within recesses in said blocks and having a portion of their periphery projecting within said opening, two die-plates entering openings in said blocks and forming the end walls of said die-opening, said plates having their rear faces slightly inclined relatively to their acting faces, means for securing an endwise adjustment of said plates, and means for adjusting said blocks toward and away from each other, substantially as described.

2. In a drawing-die mechanism, in combination with a base or frame and two die-blocks having their adjacent edges provided with undercut recesses of a gradually-increasing depth, extending from one end thereof to a point at or beyond the center thereof, where the side walls of said recesses are recessed to form a die-opening having its sides parallel with the bottoms of said recesses, two rolls located within said recesses and having a portion of their periphery projecting within said die-opening, two transversely-disposed die-plates detachably secured within transverse openings in the walls of said recesses at the opposite ends of said die-opening, and means for adjusting said blocks toward and away from each other, substantially as described.

3. In a drawing-die mechanism, the combination with a suitable bed having a central opening and two parallel flanges projecting from the face thereof, of two die-blocks adapted to be superposed upon said bed between said flanges, said blocks being provided with a centrally-disposed die-opening in their adjacent edges and with two rolls located within recesses adjacent to said opening, the peripheries of which project into the latter, adjusting-screws on one of said blocks, located at opposite sides of said die-opening, for forcing said blocks away from each other, and means, as adjusting-screws on one of the flanges on said bed, also located at opposite sides of said die-opening, for forcing said blocks against the opposite flange, substantially as described.

4. The combination with the base or frame 1 and die-blocks 5 6 having the recesses 10 in their adjacent edges and the die-opening 12, of the shoes 13 located within said recesses adjacent to said opening, rolls 14 15 resting upon said shoes and projecting within said opening, and means for adjusting said blocks toward and away from each other, substantially as described.

5. The combination with the base or frame 1 and die-blocks 5 6 provided with the progressively-deepening recesses 10, die-opening 12, and transverse openings 16 20 having their rear walls inclined as described, of rolls 14 15 located within said recesses 10 and projecting within said die-opening, die-plates 17 21 adapted to enter said openings 16 20, said plates having their rear faces inclined, adjusting-screws 19 23 operatively engaging said die-plates, and means for adjusting said blocks

toward and away from each other, substantially as described.

6. The combination with the base or frame 1 and die-block 5 provided with the openings 9, recess 10, and buttons 24 25, of the block 6 provided with the projecting pins 8, recess 10, and adjusting-screws 28 29, pins 26 27 interposed between the screws of said block 6 and the buttons on said block 5, rolls 14 15 located within said recesses 10 and projecting into an opening 12 between said blocks, and means for forcing said blocks toward each other, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK L. WHITE.

Witnesses:
GEORGE E. HALL,
EDW. S. GOODMAN.