Feb. 14, 1933. H. J. GAISMAN ET AL 1,897,724

SHARPENING MACHINE

Original Filed Feb. 4, 1927 4 Sheets-Sheet 1

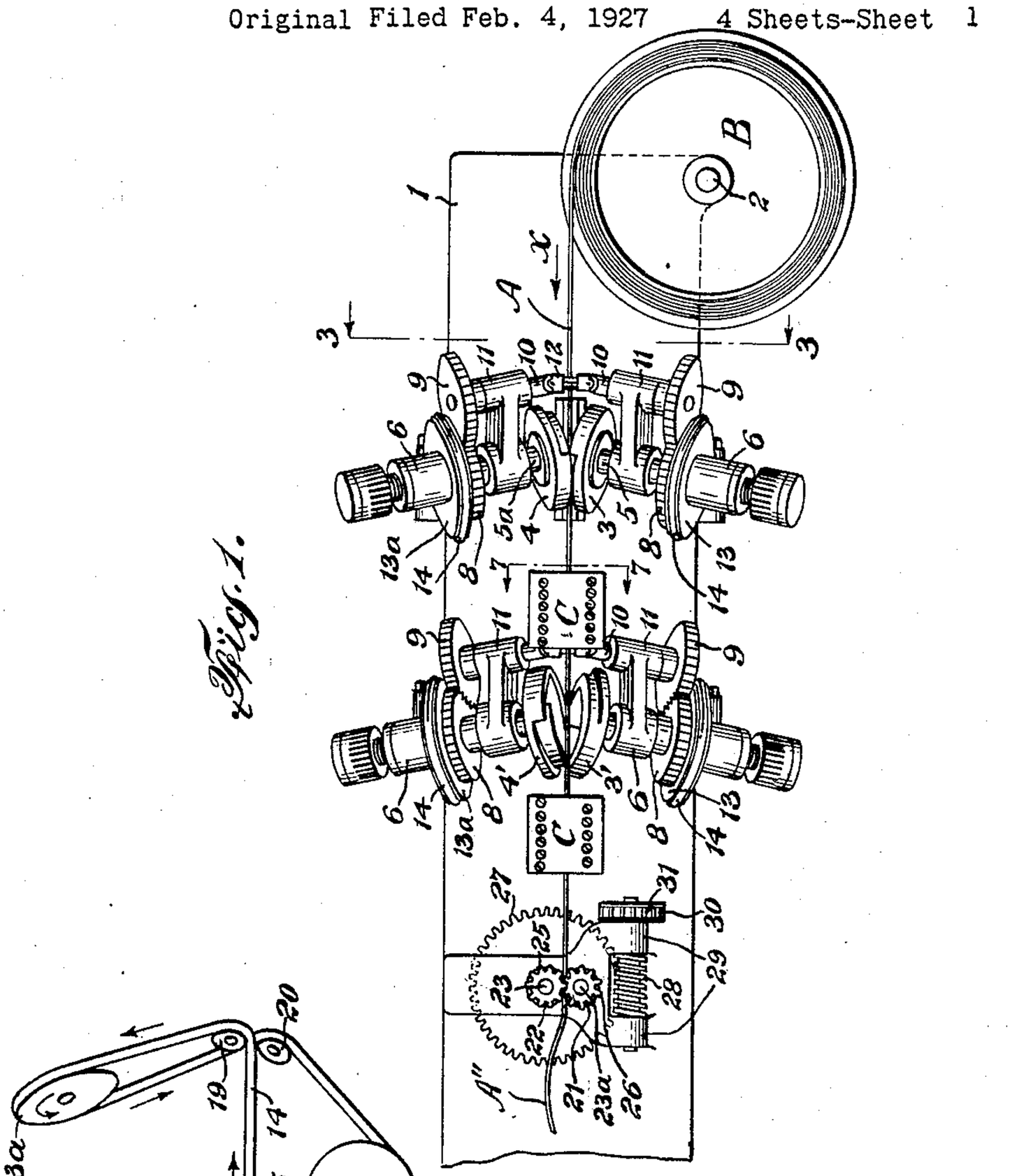

Fig. 1.

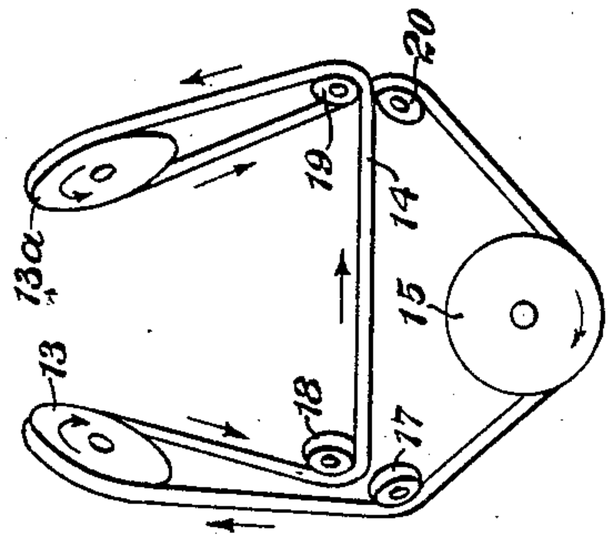

Fig. 1a.

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SHARPENING MACHINE

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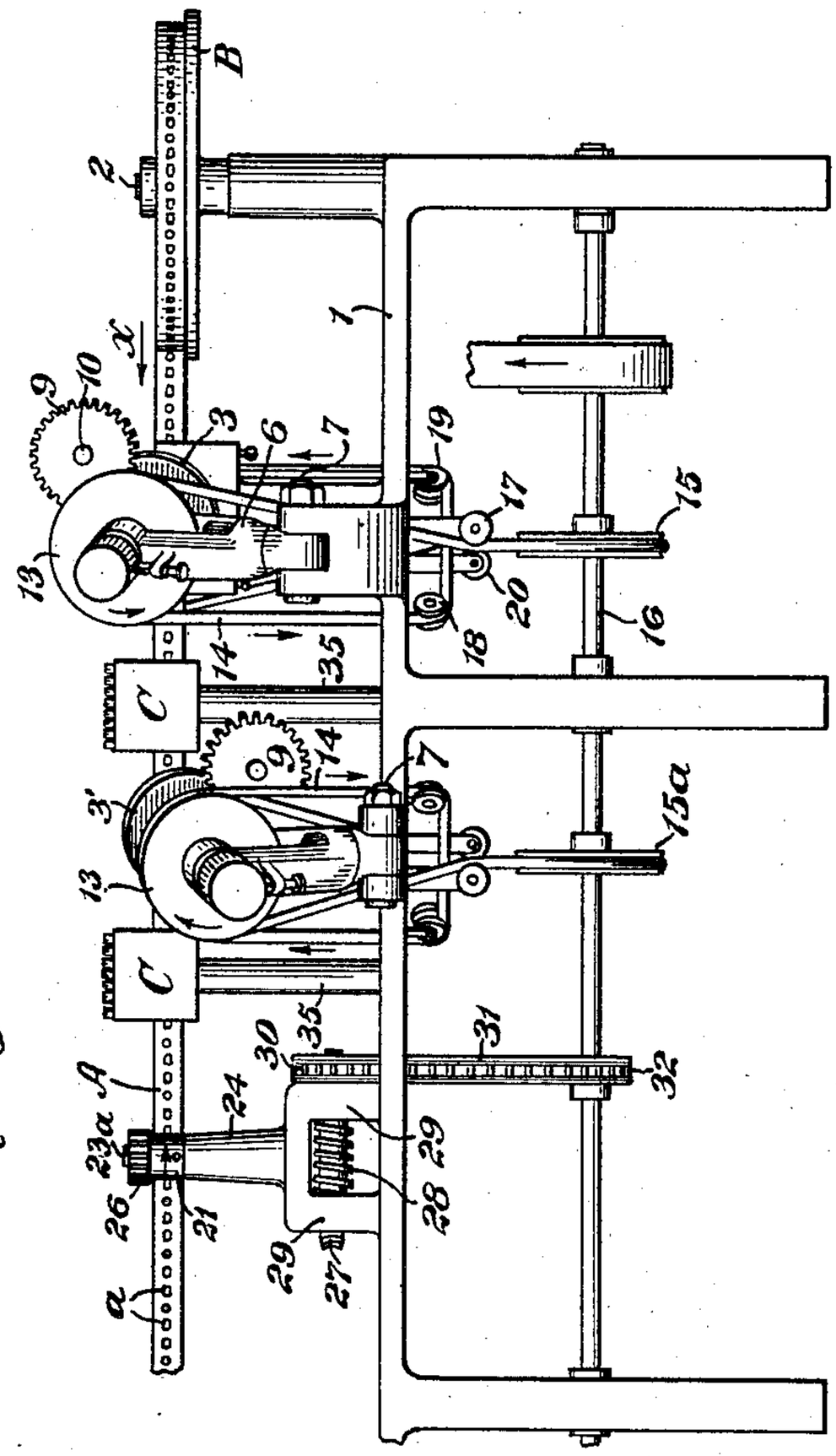

Fig. 2.

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Fig. 3.

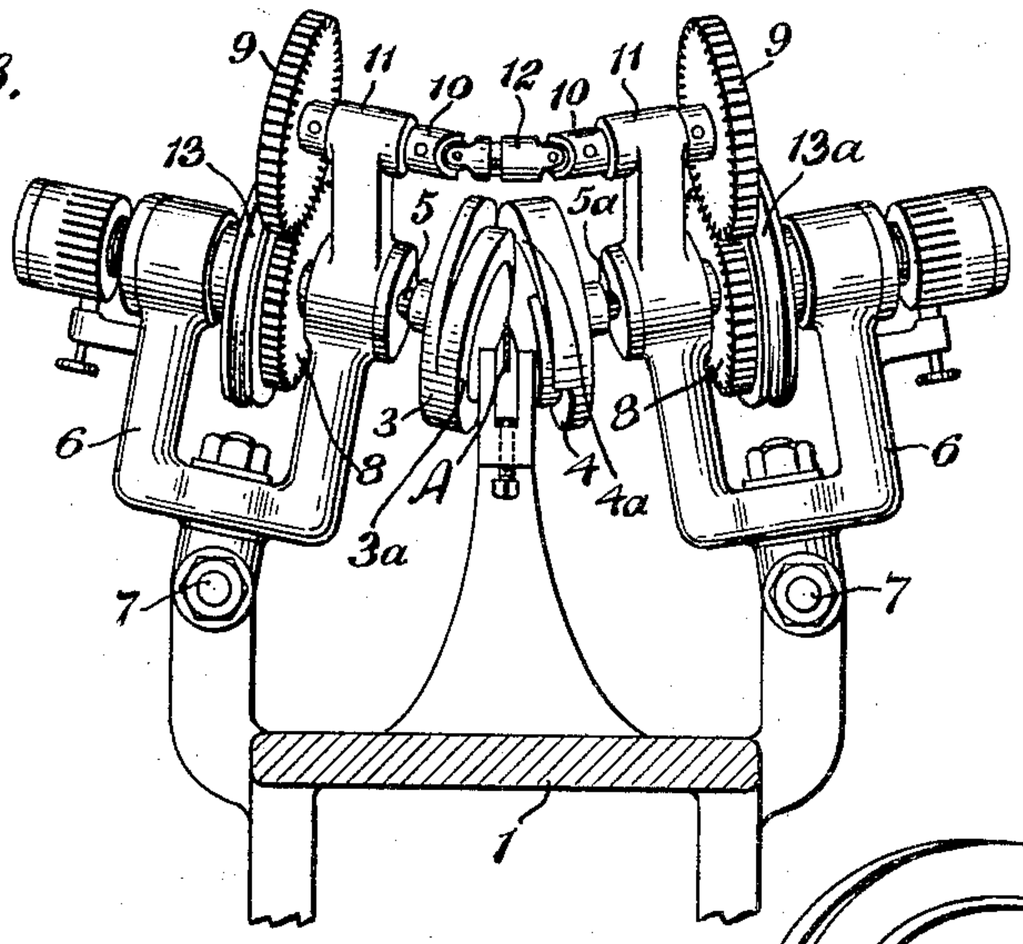


Fig. 4.

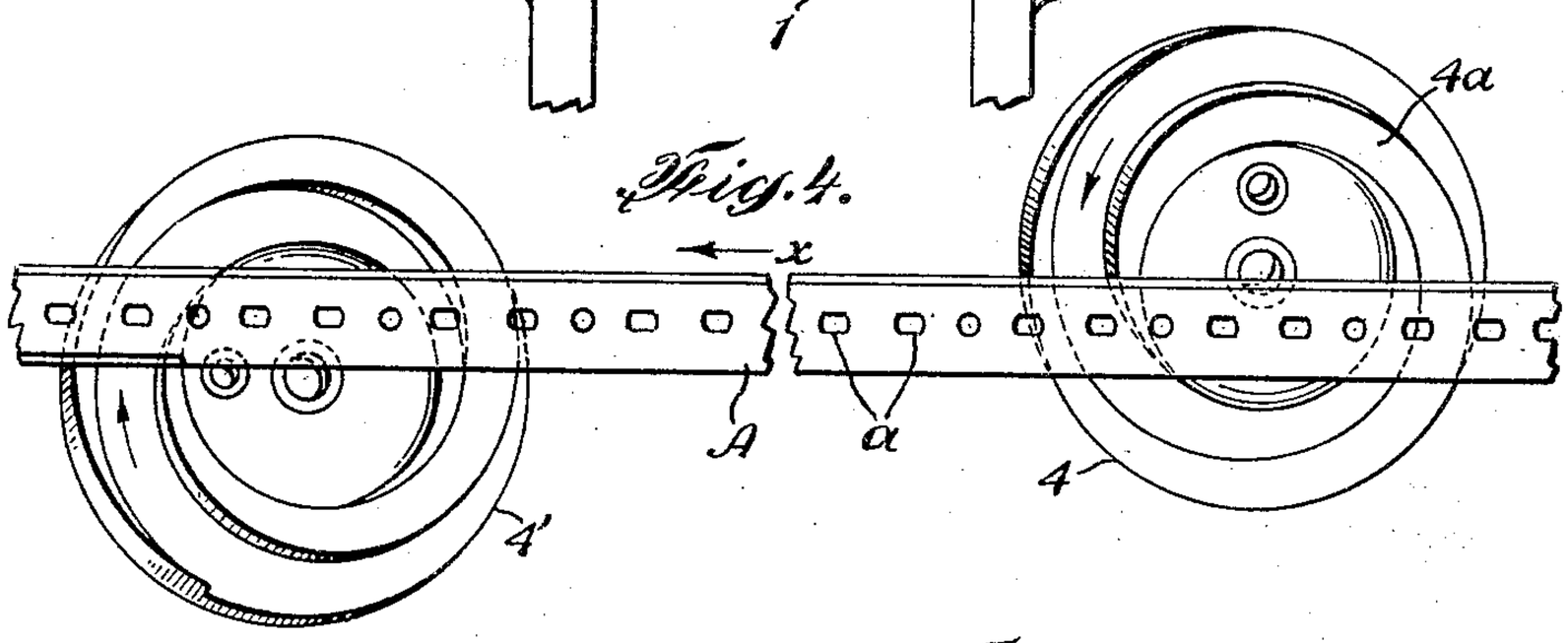


Fig. 5.

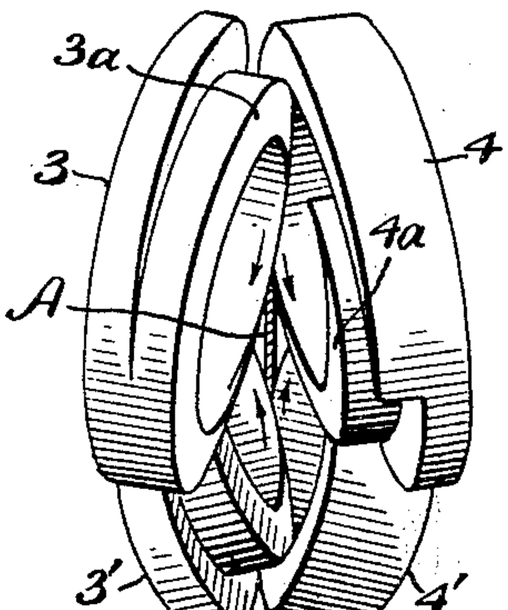
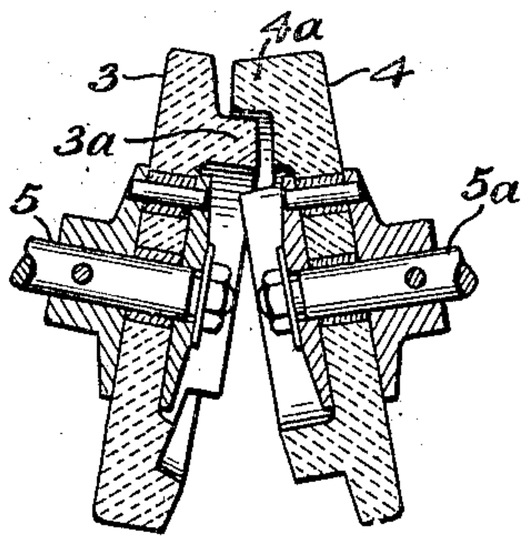


Fig. 6.



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SHARPENING MACHINE

Original Filed Feb. 4, 1927 4 Sheets-Sheet 4

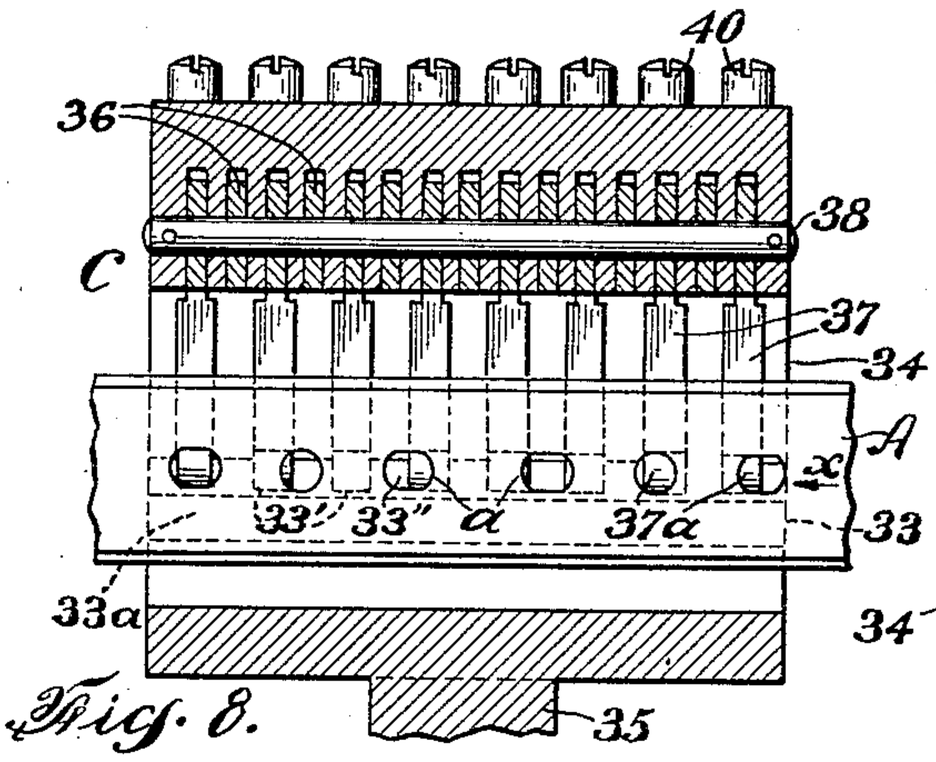

Fig. 8.

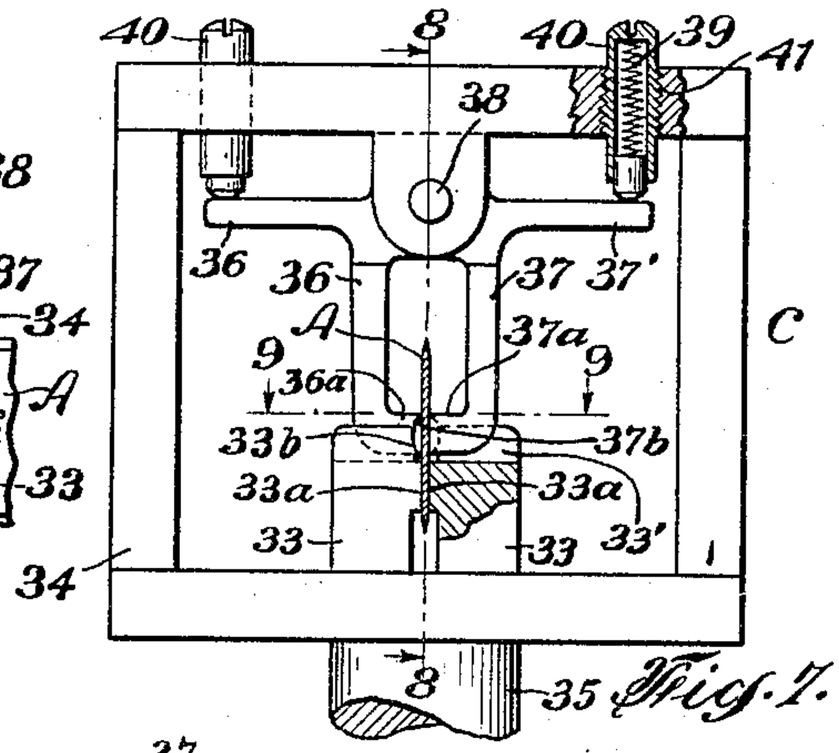

Fig. 7.

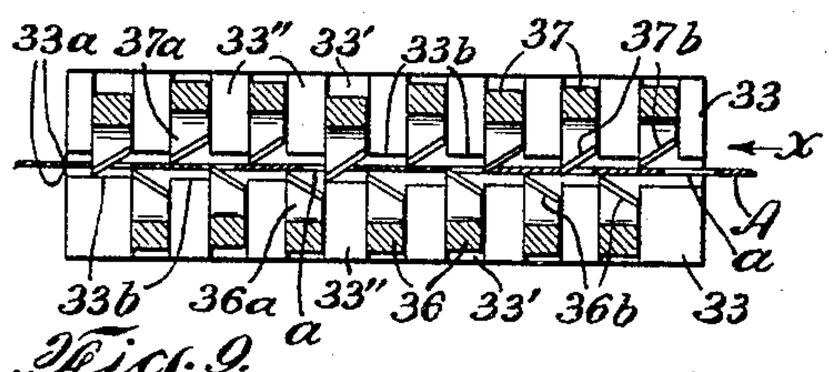

Fig. 9.

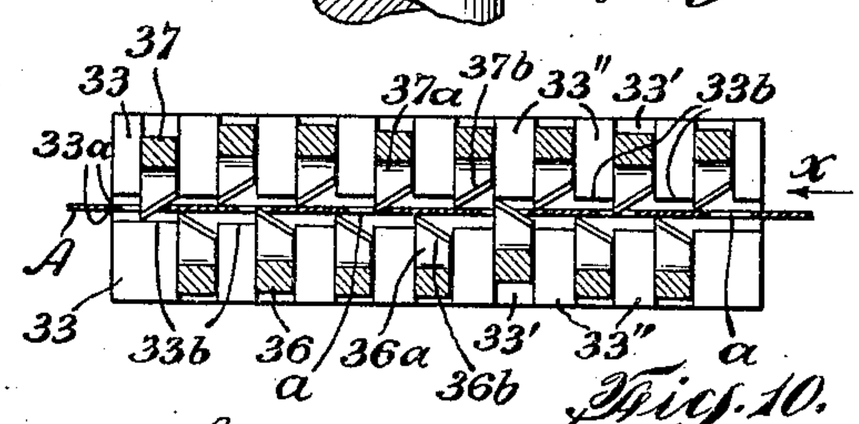

Fig. 10.

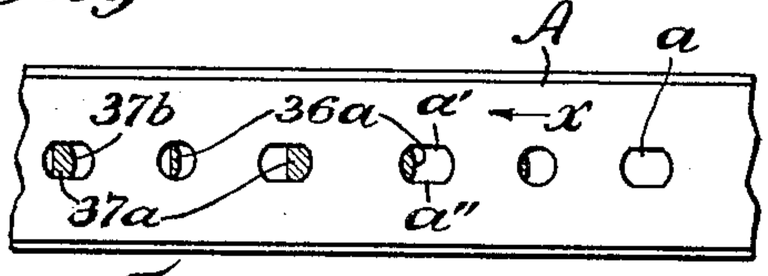

Fig. 11.

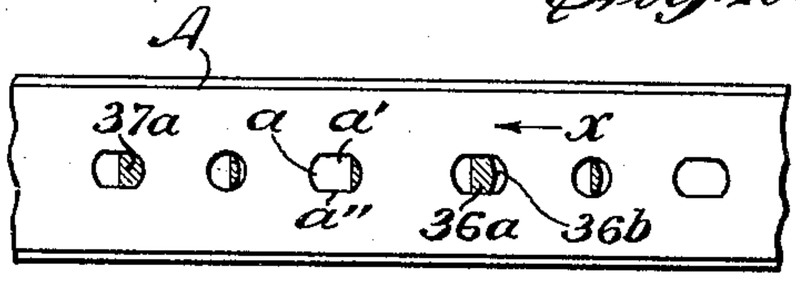

Fig. 12.

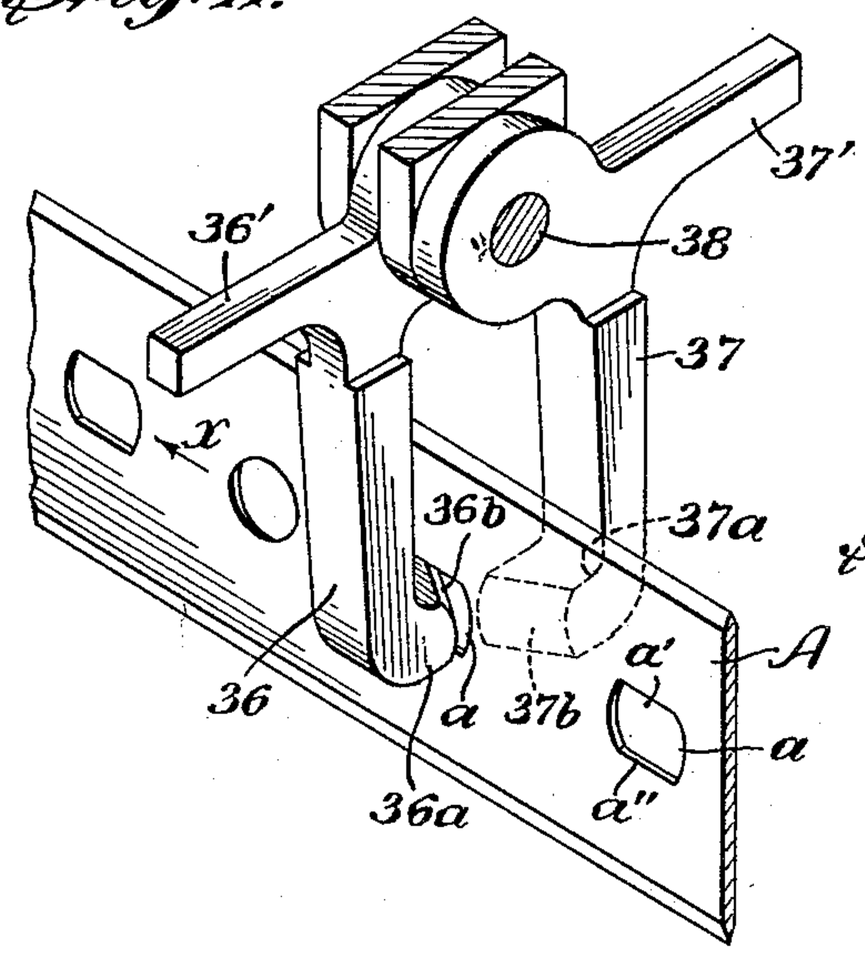

Fig. 13.

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Patented Feb. 14, 1933 1,897,724

UNITED STATES PATENT OFFICE

HENRY J. GAISMAN, OF NEW YORK, AND CONRAD SCHUMACHER, OF LYNNBROOK, NEW YORK, ASSIGNORS, BY MESNE ASSIGNMENTS, TO GILLETTE SAFETY RAZOR COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF DELAWARE

SHARPENING MACHINE

Original application filed February 4, 1927, Serial No. 165,903. Divided and this application filed January 2, 1931. Serial No. 506,148.

This application is a division of our application Serial #165,903, filed February 4, 1927, for sharpening machine, which became Letters Patent No. 1,788,570, issued January 13, 1931.

An object of this invention is to sharpen the edges of metal strips during travel thereof and to utilize perforations of the strip in maintaining the latter in position to be sharpened during travel of the strip.

The invention comprises novel details of improvement that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part hereof, wherein:—

Fig. 1 is a plan view and

Fig. 1*a* is a diagrammatic view illustrating driving means for the sharpening or grinding disks;

Fig. 2 is a side elevation of strip sharpening machine;

Fig. 3 is an enlarged cross-section on line 3, 3 in Fig. 1;

Fig. 4 is a diagrammatic view illustrating the strip in grinding position, showing one grinding wheel of each pair of wheels in position;

Fig. 5 is a diagrammatic view looking in the direction of travel of the strip and illustrating two pairs of wheels in grinding position as if mounted;

Fig. 6 is a sectional detail of a pair of grinding wheels illustrating the interengagement thereof for operating along the upper edge of the strip;

Fig. 7 is a detail view on the plane of line 7, 7 in Fig. 1 illustrating strip supporting and aligning devices;

Fig. 8 is a section on line 8, 8 in Fig. 7;

Figs. 9 and 10 are sections on the plane of line 9, 9, in Fig. 7, illustrating the strip in different positions relatively to the supporting or aligning fingers;

Figs. 11 and 12 are side elevations of the strip, corresponding respectively to Figs. 9 and 10, showing the relation of the aligning fingers to the perforations in the strip, and

Fig. 13 is an enlarged perspective detail illustrating two supporting or aligning fingers operative on opposite sides of the strip.

Similar numerals of reference indicate corresponding parts in the several views:

The numeral 1 indicates a main frame which may be of any suitable construction. At A is indicated a perforated strip to be sharpened along one or both edges, which is shown supplied in a coil upon a reel B journaled to rotate upon a stud 2 on the main frame. The strip passes from the reel to sharpening devices. At 3 and 4 grinding disks are indicated, operative upon opposite sides of the strip along the upper edge thereof. Said disks are shown mounted upon spindles 5, 5*a* journaled in bearings in forked brackets 6 adjustably carried upon bolts 7 supported by the main frame in such a manner that the disks may operate in an angular relation with respect to the edges of strip A. The disks are shown provided with spirally disposed or convolute projecting operating surfaces 3*a*, 4*a*, so spaced as to intermesh one with another during rotation of the disks, whereby opposing portions of the disks will engage opposite sides of the same edge of strip A for grinding or sharpening it, as illustrated in Figs. 3 and 5. The spindles 5, 5*a* are to rotate at the same speed in the same direction and are shown provided with gears 8 in mesh with gears 9 carried by shafts 10 journaled in bearings 11 and connected by a universal joint device at 12. The spindles 5, 5*a*, are shown provided with pulleys 13, 13*a* receiving endless belt 14, (Figs. 1*a* and 2). To operate the belt the same passes from a pulley 15 on drive shaft 16, journaled on the main frame, thence over pulley 17 to pulley 13, thence over a pulley 18 to a pulley 19, thence over pulley 13*a*, returning to pulley 20 and thence to pulley 15 in such a way that both disks 3 and 4 will be driven uniformly. To sharpen the lower edge of the strip a corresponding pair of disks 3′, 4′ with corresponding gearing, pulleys and belts are arranged, the belt being operative by pulley 15*a* on shaft 16, (Figs. 1 and 2), said disks being arranged on a level lower than the disks 3 and 4 and

spaced therefrom a suitable distance, whereby as the strip travels through the machine its upper and lower edges may be simultaneously sharpened or ground along opposite sides of said edges. Any suitable means may be provided for propelling the strip. A pair of feeding rolls is indicated at 21, 22, (Figs. 1 and 2), carried by shafts 23, 23*a* journaled in bearings in uprights 24 on the main frame. The shafts 23, 23*a* are geared together for uniform rotation by means of gears 25, 26 and the shaft 23 is shown provided with a worm wheel 27 in mesh with a worm 28 journaled in bearings at 29, the worm having a sprocket wheel 30 receiving a chain 31 from a sprocket wheel 32 on shaft 16, (Fig. 2), whereby as said shaft is rotated the strip will be fed, in the direction of the arrow *x* in Fig. 2, with respect to the grinding disks. Any other desired means may be provided for traversing the strip A through the machine.

In order to support and align the perforated strip A in proper position respecting the grinding disks so that the ground or sharpened edges of the strip will be maintained out of contact with any object, supporting and aligning devices are provided which cooperate with the perforations *a* in the strip. Any desired number of such supporting and aligning devices may be provided, indicated generally at C, and as each set of such devices is similar a description of one will suffice. Referring to Figures 7 to 13, the sharpened strip travels in the space between spaced faces 33*a* of blocks 33 secured in a frame 34 supported by post 35 on the main frame, (Figs. 1, 2 and 7). The strip supporting and aligning devices are shown comprising fingers 36, 37 pivotally supported and operative at their inwardly extending opposing ends against strip A, and into the perforations *a* therein, said fingers being pivotally supported above the strip upon a rod 38 carried by frame 34. A suitable number of fingers 36, 37 may be located in series along opposite sides of the strip A so as to enter the perforations or apertures of the strip as the latter travels between the fingers to sustain and align the strip. The lateral or inwardly projecting lower end portions 36*a* and 37*a* of the fingers 36, 37 are flat on top and bottom to cooperate with correspondingly flat upper and lower edges *a'*, *a''* of the apertures *a* of the strip to fit closely to said edges, (Fig. 11), and the inner ends of the portions 36*a*, 37*a* of the fingers are beveled or tapered and curved at 36*b*, 37*b* so as to incline in the direction of travel of the strip so that only the tips of the fingers will be in contact with the face of the strip and will readily enter the perforations in the strip. The fingers are normally pressed against the strip, which may be by gravity or by springs 39 bearing against laterally extending arms 36', 37', of the fingers, (Fig. 7). The springs 39 are shown contained in adjustable housings or tubes 40 connected with frame 34 by screw threads 41, whereby the tension of the springs may be regulated since the springs abut against the housings 40. As the strip travels between the supporting and aligning fingers one or another of the fingers will enter a registering perforation or aperture *a* of strip A temporarily, and as the strip travels and engages the beveled or inclined portion 36*b*, 37*b* of a finger it will cause the latter to move back to rest against the strip, the fingers acting alternately as may be required according to the positions of the perforations *a* of the strip. The perforations are preferably made in the strip before it is hardened and while such perforations are formed accurately in spaced relation in the strip the hardening process of the strip may cause adjacent perforations to be more or less displaced respecting the original relative positions. Therefore, a series of fingers 36, 37 are provided in spaced relation, the fingers 36 being alternately disposed respecting the fingers 37, such as in line with spaces therebetween, and vice versa, (Figs. 9 and 10), so that one more of the fingers will always be present in a perforation *a* of the strip to a greater or less extent. In Figs. 11 and 12 the fingers 37 are illustrated in various positions respecting the perforations or apertures *a* of the strip. To limit the movement of the fingers into the apertures of the strip the lower ends of the fingers are adapted to engage the adjacent stop or shoulder 33*b* on the corresponding block 33, (Fig. 7). The blocks are shown provided with recesses 33' receiving the fingers and providing abutments 33'' on opposite sides of the fingers to resist lateral movement thereof by the strip, (Figs. 9 and 10). In accordance with the supporting and aligning devices described, although the fingers operate intermittently with respect to the perforations or apertures of strip A the latter will be free to travel suspended by the fingers with its sharpened edges out of contact with any parts of the machine and the edges of the strip will be properly maintained with respect to the grinding or sharpening devices so as not to be injured. Insofar as the strip supporting and aligning devices described are concerned any other suitable sharpening or grinding means may be provided for the edge of strip A.

The sharpened perforated strip A may pass from the mechanism described to any desired means, such as set forth in our aforesaid application, for cutting the strip into definite lengths to form razor blades or for desired purposes, or the sharpened perforated strip may be delivered in any other de-

sired way or may be wound upon a reel for further use.

Having now described our invention what we claim is:—

1. Means for supporting and aligning a perforated strip of metal while traveling comprising independently movably supported spaced fingers adapted to enter perforations in the strip, means to propel the strip, and means supporting said fingers and retaining them permanently from traveling with the strip to support the latter, said fingers having portions arranged to engage the strip at edges of its perforations during travel of the strip to cause the fingers to recede from the strip.

2. Means for supporting and aligning a perforated strip of metal as set forth in claim 1, in which the strip-engaging portions of the fingers are inclined to cause the fingers to recede from the strip as it travels.

3. Means for supporting and aligning a perforated strip of metal while traveling comprising a plurality of independently movable fingers spaced apart along the strip and having portions adapted to enter perforations in the strip, means to propel the strip, and means supporting said fingers and retaining them permanently from traveling with the strip to support the latter, said portions of the fingers being arranged to engage edges of the strip at the perforations to cause the fingers to recede from the perforations during travel of the strip.

4. Means for supporting and aligning a perforated strip of metal as set forth in claim 3, in which the portions of the fingers that enter the apertures of the strip are tapering and inclined to permit the fingers to enter the perforations of the strip and recede therefrom.

5. Means for supporting and aligning a perforated strip of metal comprising spaced fingers adapted to enter perforations in the strip, means to propel the strip, means pivotally supporting said fingers and retaining them permanently from traveling with the strip to move only toward and from the strip, and stop means to engage the fingers to limit the extent of movement thereof into the perforations of the strip.

6. Means for aligning a perforated strip of metal comprising spaced fingers adapted to enter perforations in the strip, said fingers being pivotally supported to move toward and from the strip, and a block having a portion opposed to the fingers on the side of the strip opposite the fingers to limit their movement into the perforations of the strip.

7. Means for aligning a perforated strip of metal comprising spaced fingers adapted to enter perforations in the strip, said fingers being pivotally supported to move toward and from the strip, and a block having recesses receiving the fingers and providing abutments on opposite sides of the fingers to resist lateral movement thereof by the strip.

8. Means for aligning a perforated strip of metal comprising fingers pivotally supported in spaced relation along the strip having inwardly extending portions adapted to enter perforations in the strip, and spring means cooperative with the fingers tending normally to push them toward the strip and permit the fingers to recede from the strip, the fingers being operative independently of one another to enter perforations in the strip during travel of the latter, the fingers having portions to engage the strip to cause the fingers to recede therefrom during travel of the strip.

9. Means for aligning a perforated strip of metal comprising a series of spaced fingers on opposite sides of the strip each adapted to enter perforations in the strip, the fingers of one series being out of register with the fingers of another series, said fingers having means to cause them to recede from the strip by contact therewith during travel of the strip.

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