June 17, 1958 C. H. HALL 2,838,883

HYPODERMIC NEEDLE SHARPENER

Filed Aug. 20, 1956 2 Sheets-Sheet 1

FIG. 1.

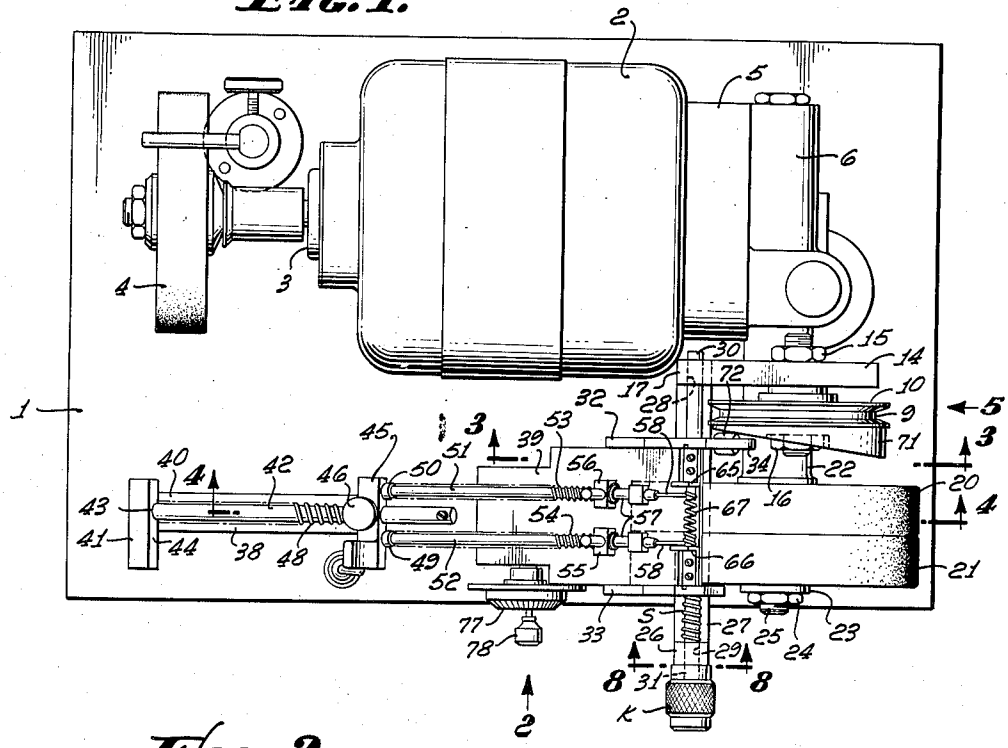
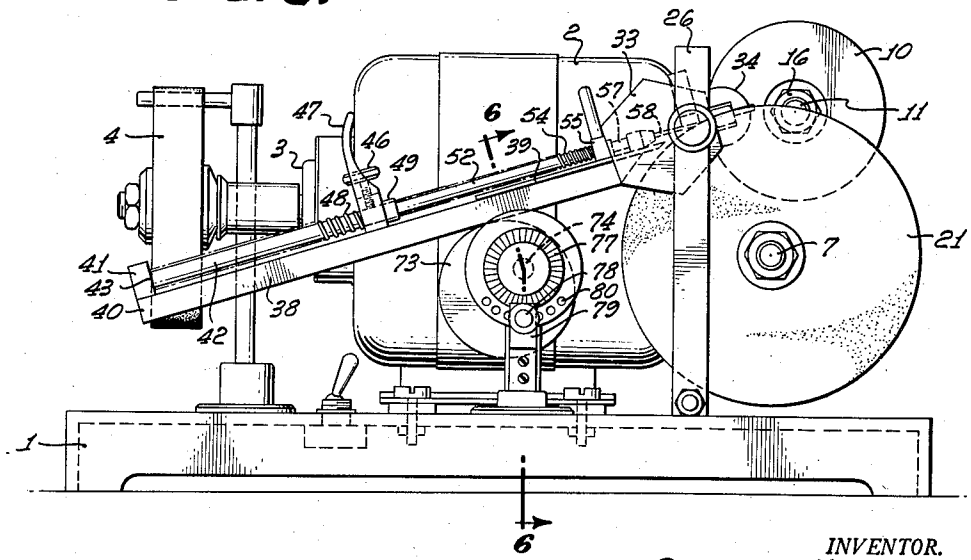


FIG. 2.



INVENTOR.
CARLTON H. HALL
BY
Calvin Brown
ATTORNEY.

June 17, 1958 C. H. HALL 2,838,883

HYPODERMIC NEEDLE SHARPENER

Filed Aug. 20, 1956 2 Sheets-Sheet 2

FIG. 3.

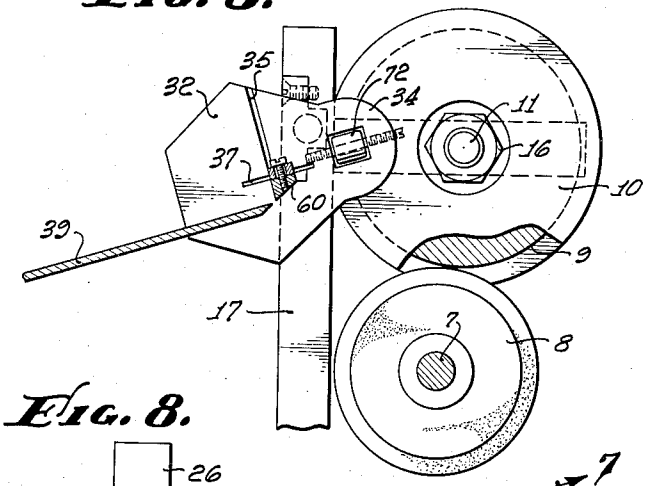


FIG. 5.

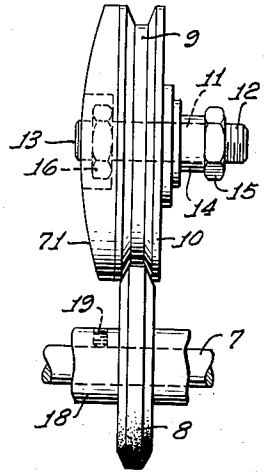


FIG. 8.

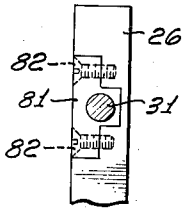


FIG. 4.

FIG. 6.

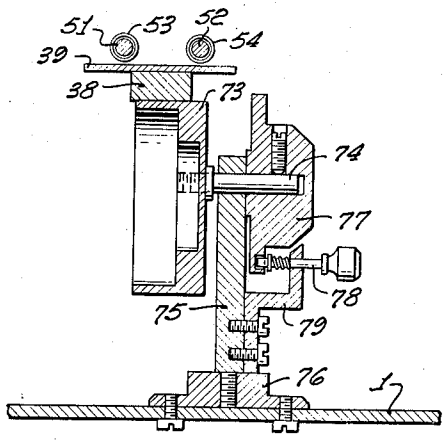
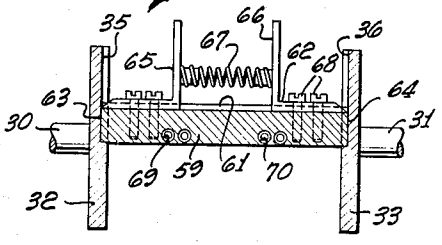


FIG. 7.



INVENTOR.
CARLTON H. HALL
BY
Jalom Brown
ATTORNEY.

United States Patent Office 2,838,883
Patented June 17, 1958

2,838,883

HYPODERMIC NEEDLE SHARPENER

Carlton H. Hall, Glendale, Calif., assignor of one-fourth to Stephen S. Thomas and Ethyl F. Thomas, Bellflower, Calif. (jointly)

Application August 20, 1956, Serial No. 605,076

3 Claims. (Cl. 51—92)

The present invention relates to a device for sharpening hypodermic needles.

The inventor has found in actual practice that the average nurse in a hospital or doctor in a doctor's office is unable to satisfactorily sharpen a hypodermic needle. Supposedly new hypodermic needles are sharp. However, ease of penetration of the skin and ofttimes veins of a patient varies from patient to patient, and if the needle is not razor sharp, injury to the patient often results. The average doctor or nurse, in an attempt to keep needle points sharp will use a small stone, but this often does more damage than good, resulting in actually blunting the needle tip. All hypodermic needles are ground originally so as to provide a beveled tip, and the angularity or bevel must be maintained.

The present invention has for an object a device which will securely hold a needle to the end that the original bevel of the needle is maintained during a sharpening operation.

A further object is the provision of a device for sharpening needles, which is fully automatic in its operation, and is power driven.

A further object is the provision of a hypodermic needle point sharpener wherein the point of the needle during a sharpening operation is prevented from bending so that the bevel of the needle tip is maintained.

A further object of the invention is the provision of a device for sharpening hypodermic needles which is adjustable to different degrees of bevel for the needle tip.

A further object is the provision of means for the sharpening of hypodermic needles which allows ease of operation, rapid insertion and release of needles to be sharpened, wherein the results obtained are positive and efficient, and which does not require an expert technician for operation of the device.

The device is simple of construction, positive in operation, of few parts, inexpensive in cost of manufacture, and generally superior to devices for the sharpening of hypodermic needles now known to the inventor.

With the above mentioned and other objects in view, the invention consists in the novel and useful provision, formation, construction, association, and relative arrangement of parts, members and features, all as shown in a certain embodiment in the accompanying drawings, described generally, and more particularly pointed out in the claims.

In the drawings:

Figure 1 is a top plan view of the invention as an entirety,

Figure 2 is a side elevation of the device shown in Figure 1, and looking in the direction of the arrow 2,

Figure 3 is a fragmentary sectional view, on an enlarged scale, taken on the line 3—3 of Figure 1,

Figure 4 is a fragmentary, enlarged, partially sectional view on the line 4—4 of Figure 1,

Figure 5 is an enlarged, fragmentary end elevational

view of drive means used in the invention, and looking substantially in the direction of the arrow 5 of Figure 1,

Figure 6 is a fragmentary enlarged sectional view on the line 6—6 of Figure 2,

Figure 7 is a fragmentary sectional view on the line 7—7 of Figure 4, and,

Figure 8 is a fragmentary sectional view on the line 8—8 of Figure 1.

Referring now with particularity to the drawings, and specifically to Figures 1 and 2, I provide a base 1 of any form best suited to carry the various elements of the invention, and secured to the base in any approved manner is a motor 2. The motor shaft is extended at each end, and the end 3 carries on its extended shaft a buffing wheel 4, while the opposite end 5 of the motor shaft is received within a casing or boxing 6, within which casing or boxing is gearing for both the shaft end 5 of the motor and a jack-shaft at right angles to said motor shaft. The latter shaft is indicated at 7 in Figure 3, the said jack shaft 7 carrying a friction wheel 8, the tread of which is adapted to be received within groove 9 of a wheel 10. The wheel 10 is mounted for rotation upon a shaft 11, the shaft being screw-threaded adjacent its ends at 12 and 13, whereby said shaft may secure both the wheel 10 and be secured to an extension 14, as by means of nuts 15 and 16 carried on the threaded ends of the shaft. The extension 14 is fastened to an upright 17, see Figure 1, mounted on base 1. The friction wheel 8 is provided with a hub, as illustrated at 18 in Figure 5, the hub being secured to the jack-shaft 7, as by means of a set screw 19, or other equivalent means. Mounted on the jack-shaft 7 are a pair of grinding wheels 20 and 21. In the present instance, the grinding wheels are of the same diameter and one of the wheels has a coarse grinding surface while the other wheel has a fine surface. A spacer sleeve or hub 22 surrounds the shaft 7 adjacent the grinding wheel 20 while a washer 23 bears against the side of the wheel 21, and a nut 24, on the threaded end 25 of the shaft 7, secures the wheels in assemblage for rotation with the jack-shaft 7.

Thus far, I have described a motor, the shaft of which is extended to carry a buffing wheel at one end and to mesh, by means of gears, with a jack-shaft at its opposite end, which jack-shaft drives, through the medium of a friction wheel, a grooved wheel and which shaft also carries a pair of grinding wheels. It is obvious that the gear relationship between the motor shaft and the jack-shaft may be at any desired reduced revolution speed.

In alignment with the upright 17 is a further upright 26, which is mounted upon a cross bar 27, the cross bar extending to and joining with the upright 17. The cross bar is secured to the base 1. The uprights 17 and 26 are transversely bored at 28 and 29, respectively, the bores being in axial alignment. Each bore 28 and 29 receives a cylindrical rod as 30 and 31, and the said rods are axially movable within the said bores. The rods 30 and 31 are respectively secured to plates 32 and 33, the plates being substantially parallel and spaced apart. In the present instance, the plate 33 is hexagonal in outline, while the plate 32 is provided with an extension 34 on one of its sides; otherwise, the said plate would be hexagonal and substantially of the same size as the plate 33. The inner or facing surfaces of the plates are grooved (see Figure 7) at 35 and 36, which grooves are parallel and in alignment and the plates are provided likewise with intersecting grooves 37 (see Figure 4). The intersecting groove on the plate 33 is not shown in the drawings, but is identical with groove 37.

I provide a table or support 38 of rectangular form, which table carries on its top surface a sub-table 39, the sub-table extending between the side plates 32 and

33 and joined or secured thereto in any appropriate manner. The subtable 39 is adapted to extend, at its outermost end, to a zone closely adjacent the periphery of the grinding wheels 20 and 21, as see Figure 4. This sub-table lies below the slots 37 in the side plates. The table 38, at its inner end, is spaced from the grinding wheels, while its outermost end 40 carries a transverse piece 41. An elongated rod 42, which may be tubular, has one end 43 abutting the transverse piece 41 within an elongated groove 44, as shown in Figure 1. The opposite end of said rod 42 is passed through a transverse bore in bar 45 and secured thereto by means of a screw 46, as see Figures 2 and 4. The bar 45 is adapted to rest transversely upon the top surface of the table 38, and said bar 45 is provided with an upstanding finger piece 47. As shown, the rod 42 is surrounded by a helical spring 48 which extends between the members 41 and 45. The slide adjustment permitted the bar 45 regulates the compression of the spring 48. Secured to the bar 45 are a pair of substantially parallel tubular extensions 49 and 50. These extensions house ends of rods 51 and 52, and each rod is provided with a helical compression spring 53 and 54. The compression springs are adapted to bear at one end against extensions 49 and 50, while the opposite ends of said springs bear against handled collars or sleeves 55 and 56, slidable upon said rods.

The said handled sleeves or collars 55 and 56 are adapted to bear against the outermost ends of the needle shanks 57, as shown in Figures 1 and 4, and constantly urge the needles to move forwardly. In this respect, the needle shank is usually provided with a pair of parallel flat faces, and one of the faces of each shank is adapted to rest upon the sub-table 39. To stabilize the needle, and particularly the capillary tube 58 thereof, I have provided a needle holder, here designated as 59. This holder comprises a block having a concave face 60 conforming to the curvature of the grinding wheels, with said face 60 spaced slightly from the grinding wheel surface. This block is provided with an elongated tongue 61 received in the groove of a suitable carrier 62. The block is provided at each end with a vertical flange 63 and 64, for reception in the grooves 35 and 36 of the side plates 32 and 33. On top of the carrier 62 are a pair of angle pieces 65 and 66, which pieces are normally separated by a compression spring 67 extending between the vertical legs thereof, with the base legs of said angle pieces slotted and secured by means, such as screws 68 passed through said slots, to the holder 59. The base legs of the angle pieces 65 and 66 have beveled ends for reception within the grooves 37 of the side plates (see Figure 7). The needle holder or block 59 is provided with transverse apertures 69 and 70 which allow passage therethrough of the capillary tubes of said needles. It is to be observed upon reference to Figure 4 that these particular apertures 69 and 70 extend through the curved surface 60 adjacent the peripheries of the grinding wheels. Thus, a portion of the capillary tube, which is to be ground, is at all times supported by the needle holder or block 59, and the needle is prevented from springing or bending which would occur if the beveled end of the needle was unsupported. So far as the inventor is aware, this feature is new, as the average needle sharpening device does not provide a support for the capillary tube, or if a support is provided, the capillary tube passes therethrough, with an extended portion thereof engaging the grinding wheel which permits the tube to spring, and in so springing in its engagement with the grinding wheel, to cause damage to the tip of the tube. In any event, the tip of the tube is not properly sharpened nor is the bevel maintained. It is evident that the angular members 65 and 66 may be caused to approach by compressing the spring 67 and thereby release the beveled ends of the base portions of said members from the slots 37. An upward pull upon the angular pieces will then release the tongues 63 and 64 from the grooves 35 and 36.

I desire to reciprocate the needles across the peripheries of the grinding wheels and to accomplish this, the wheel 10 is provided on one side face with a crown or plate cam 71. The cam engages a follower roller 72 provided on the extended portion 34 of the side plate 32. This roller, as shown, is mounted within a transverse slot in said portion 34, and bears against the cam face and when the wheel 9 is rotated, the side plate 32 is reciprocated which also reciprocates side plate 33 and the tables 38 and 39. As shown in Figure 1, a coil spring *s* surrounds rod 31 and is interposed between post 29 and side plate 33, whereby the cam follower is at all times urged into engagement with the cam 71.

I adjust the bevel on the needle tip or maintain the same bevel of said needle tip during a grinding operation by the means illustrated in Figure 6, and wherein I provide a cam wheel 73, the periphery of which engages the lower surface of the table 38, which cam is carried upon stud shaft 74, the shaft being passed through a support 75, fastened to the base 1 by means 76, the said shaft carrying a dial knob 77 which may be turned to rotate the shaft and consequently rotate the cam 73, there being a spring actuated release pin 78 carried by a bracket 79 secured to member 75. The release pin is adapted for reception in selected spaced bores, designated generally as 80, in the face of dial knob 77. In this manner, the table 38 may be rocked upwardly or downwardly on rods 30 and 31 to adjust the degree of bevel on the hypodermic needle, during a grinding operation.

In Figure 8, I have shown an inset 81 for upright 26, which is bored for reception of the member 31. The contour of the inset and the contour of the cut-out in member 26 are identical, the inset being held within the cut-out in any appropriate manner, such as by screws shown at 82.

The operation, uses and advantages of the invention just described are as follows:

The present machine, while it shows two grinding wheels 20 and 21, may incorporate a plurality of wheels, if desired. In any event, the operator desiring to resharpen a needle tip may initially release the screw 46 from engagement with tube 42 and move the block 45 rearwardly to compress the spring 48. The tubes or rods 51 and 52 will also move with movement of the block 45, whereupon the operator places one or more needles in position upon the sub-table 39. The needles may be of different lengths. However, generally the needles are labeled as "long," "medium," "short," and if the needles do not vary too greatly as to length, the device is easily adjusted to accommodate different length needles. Assuming, however, that the needles are identical, the flat faces of the needles are laid upon the subtable so that the bevel is downward for engagement with the grinding and polishing wheels. Of course, in the present instance, the needle is first sharpened on the coarse wheel and then transferred for finishing on the polishing wheel. The capillary tubes of the needles are passed through the needle receiving openings in the needle holder 59, and as this holder has an arcuate surface, such as 60, conforming to the curvature of the wheels 20 and 21, both needles, if two are used, will assume the position shown in Figure 4. The adjustment is such that the spring 48 will move the rods 51 and 52 forwardly so that members 55 and 56 engage the needles, as shown in Figure 1, sufficiently to move the needles forwardly through the needle receiving openings 69, 70 provided therefor in the needle holder 59. Ordinarily, the spring 48 would be of a length sufficient to move the block 45 forwardly upon the table approximately three-quarters of the length of said table. The springs 53 and 54 are comparatively weak, being sufficient to maintain the handled blocks 55 and 56 in engagement with the ends of the needle shanks 57 and so that the needles may be

readily released when the handle portions of collars **55** and **56** are grasped and moved backwardly on the tubes **51** and **52** to compress said springs **53** and **54**. When the motor **2** is energized, the cam **71** is rotated which will reciprocate the cam follower due to the presence of the spring *s* which constantly urges the cam follower into engagement with the cam. Thus, the needle holder between the plates **32** and **33** is reciprocated across the peripheries of the grinding wheels **20** and **21** to sharpen the ends of the capillary tubes. Some capillary tubes have different bevels. The bevel will be known for any given set of needles, and by adjusting the dial knob **77** upon releasing of the pin **78** from spaced holes **80** in said knob, the cam **73** is rotated to raise or lower the table **38**. As a result, the needle tip bevel is not disturbed but the same bevel is maintained during a grinding operation. As shown in Figure 1, the rod **31** carries a knob *k* on the end thereof so that the spring *s* may be compressed upon pulling the knob outwardly, which will carry with it the side plates and intermediate structure adapted to hold the needle, thereby releasing the cam follower from the cam. The buffing wheel **4** is adapted to remove any burrs that may be on the needle or tip after a sharpening operation.

The needle block and holder are accurately positioned between the side plates **32** and **33** due to the presence of the intersecting grooves on the inner faces of said plates, to-wit, the grooves **35**, **36** and **37**. The flanges of the needle holder shown at **63** and **64** move within the grooves **35** and **36** while the ends of the angle members **65** and **66** enter the grooves **37** to securely lock and position the needle holder between the said side plates. It is apparent that the angle members **65** and **66** are caused to approach by grasping the upright legs thereof and causing them to approach by compressing the spring **67**. Upon release of the upright legs, the base legs move outwardly or separate so that the ends may enter the said grooves **37**.

I have by this invention provided an efficient simply constructed sharpening device for needles which does not require a trained technician to operate, and wherein the results to be obtained are highly satisfactory.

I claim:

1. A device for sharpening the beveled tip of the capillary tube of a hypodermic needle, including a rotatable abrasive wheel, an elongated support rockably mounted for movement about an axis parallel to the axis of rotation of the wheel, means for adjusting the degree of rocking movement of the support, means for reciprocating said support in a direction parallel to the axis of rotation of the wheel, a capillary tube holder adapted to be reciprocated in step with movement of the support, the said holder having an arcuate surface adjacent to and conforming to the curvature of the wheel and the said arcuate surface being positioned adjacent to the periphery of said wheel, the needle resting on said support, and means constantly urging movement of the needle toward the capillary tube holder, the said holder provided with a capillary tube receiving bore to position the beveled tube tip in engagement with the periphery of said wheel, the tube holder supporting the tube tip against flexing.

2. A device as set forth in claim 1, the said tube holder comprising an elongated block having parallel end flanges, there being a pair of side plates joined to said needle support, the said side plates being provided with grooves for receiving the flanges on the end of the elongated block to guide the said block to a given position therebetween, and further means carried by the said block, releasable for engagement with grooves, intersecting the first named grooves of the side plates for locking the block against movement between said side plates.

3. A device for sharpening the beveled tip of the capillary tube of a hypodermic needle including a rotatable abrasive wheel, an elongated table rockably mounted for movement about an axis parallel to the axis of rotation of the wheel, means for adjusting the degree of rocking movement of said table, means for reciprocating said table in a direction parallel to the axis of rotation of the wheel, a capillary tube holder adapted to be reciprocated in step with movement of the table, the said holder having an arcuate surface adjacent to and conforming to the curvature of the abrasive wheel, a block transversely positioned on said table, means resiliently urging said block for movement toward the capillary tube holder, a rod secured to the said block, a sleeve movable on said rod, and resilient means carried by the said rod urging the said sleeve in one direction, the shank of said hypodermic needle engaging the said sleeve for constantly urging the capillary tube of the said hypodermic needle toward and in engagement with the capillary tube holder.

References Cited in the file of this patent

UNITED STATES PATENTS

2,088,056	Foster	July 27, 1937
2,429,357	Jacoby	Oct. 21, 1947
2,635,398	Sohn	Apr. 21, 1953
2,730,844	Lea	Jan. 17, 1956