

Sept. 20, 1960

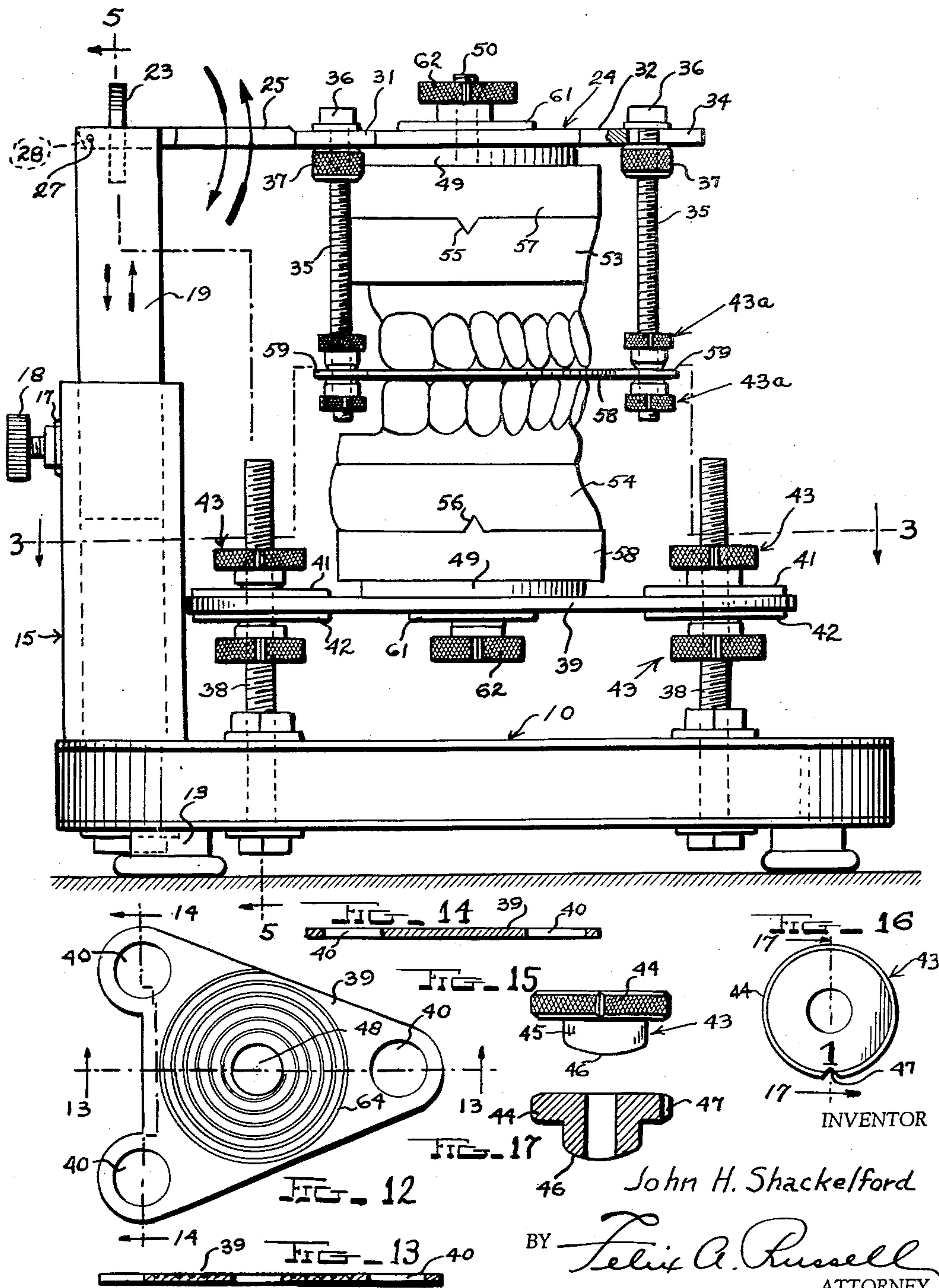
J. H. SHACKELFORD
ARTICULATOR FOR THE CORRECTION OF MALFUNCTIONING
MUSCLES OF MASTICATION

2,952,914

Filed April 7, 1958

5 Sheets-Sheet 1

FIG. 1



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60 J. H. SHACKELFORD 2,9
ARTICULATOR FOR THE CORRECTION OF MALFUNCTIONING
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FIG. 2

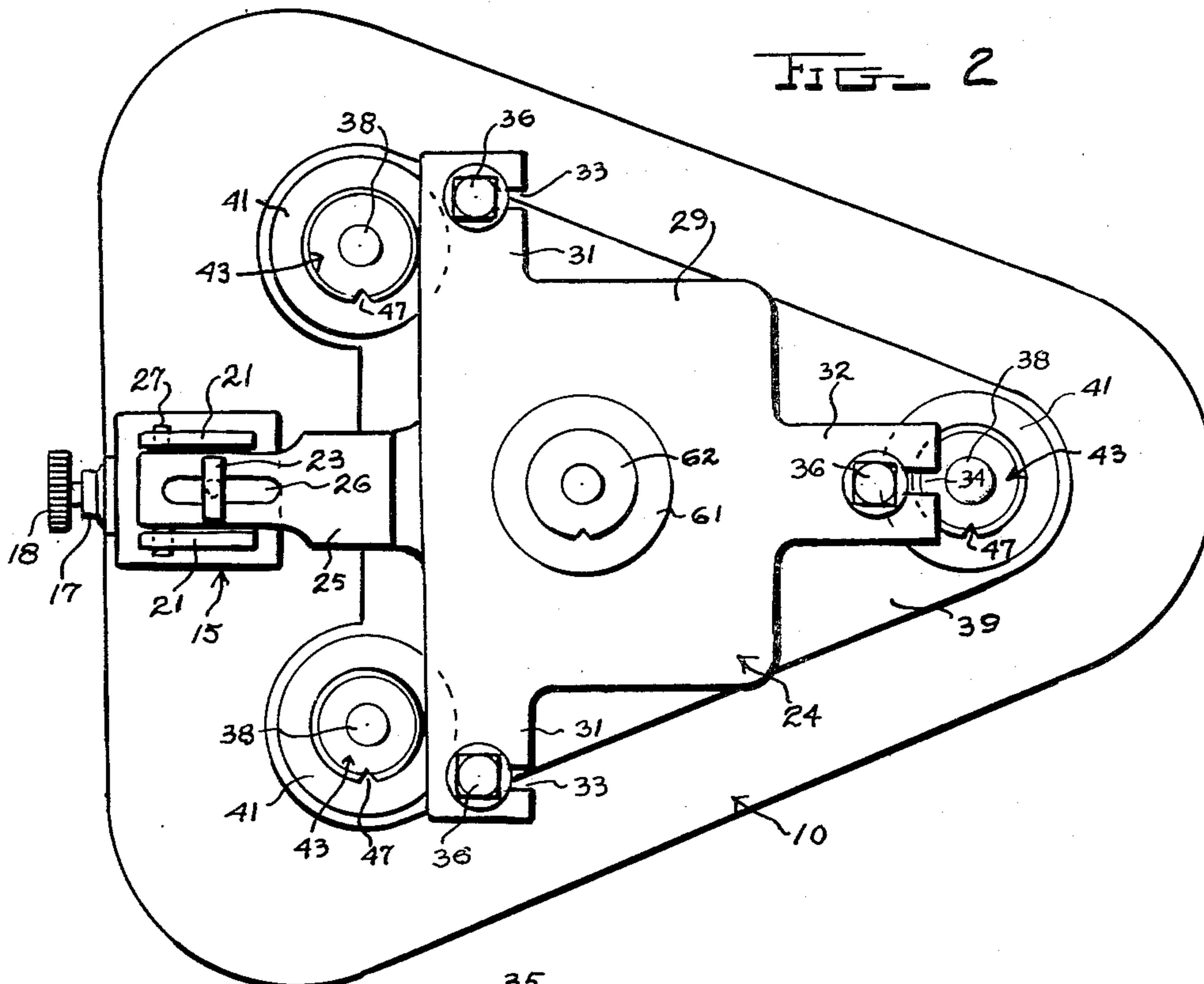
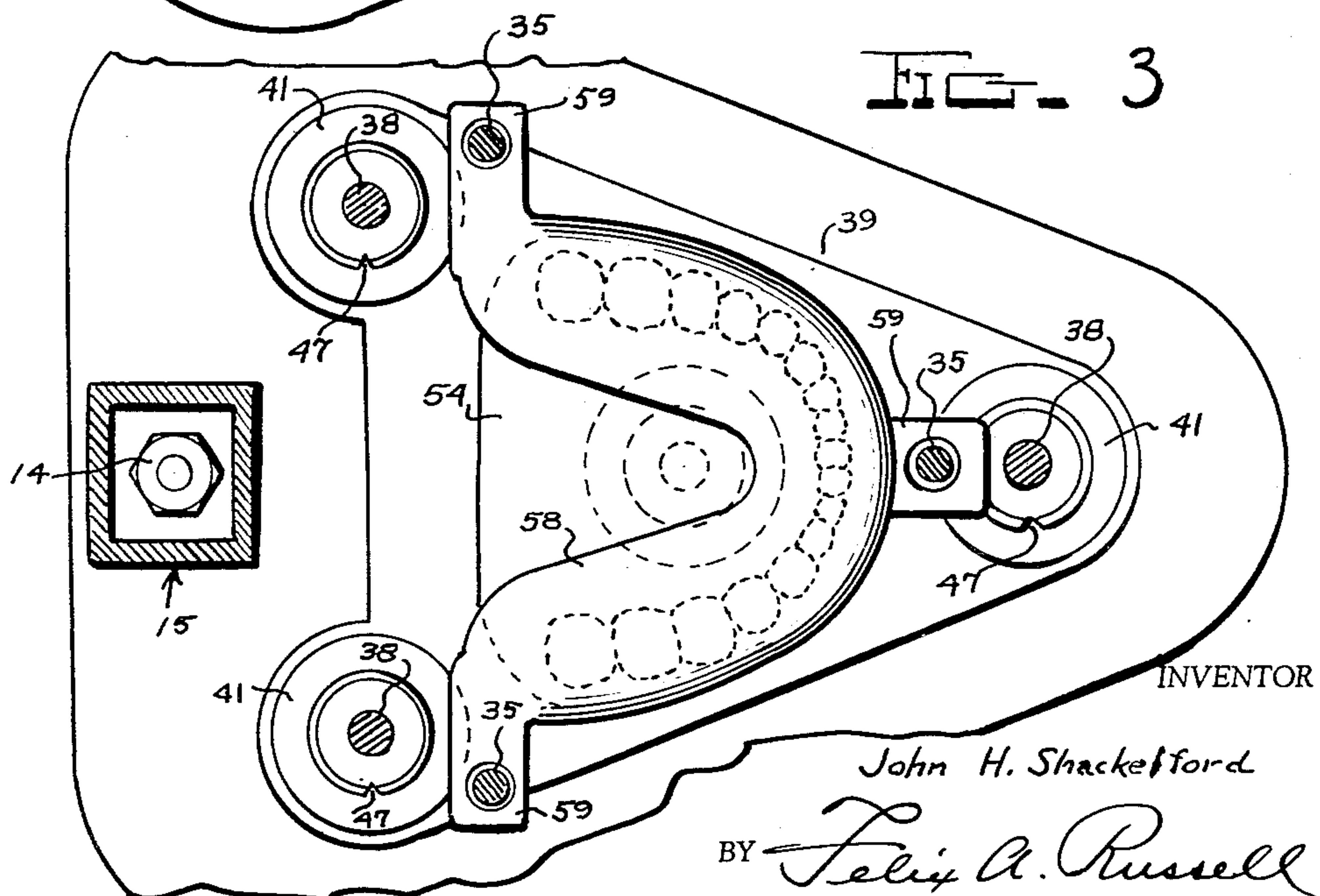


FIG. 3



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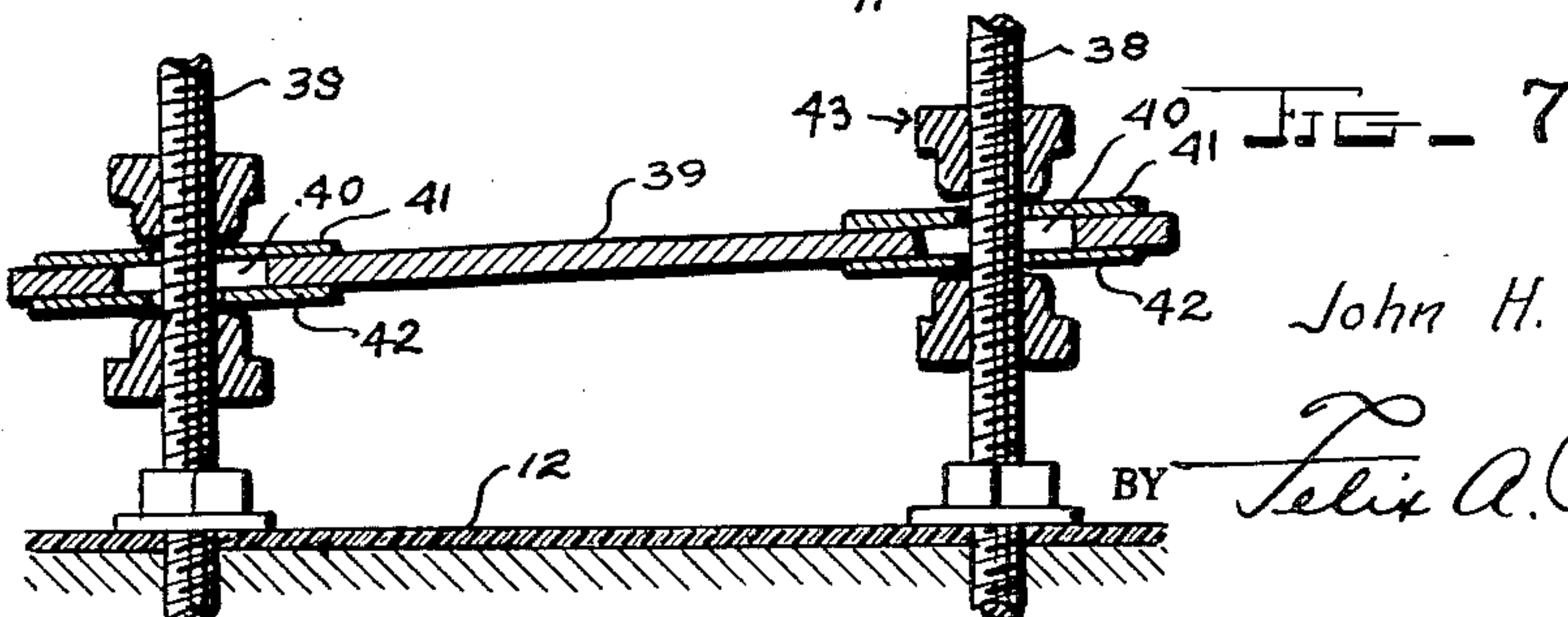
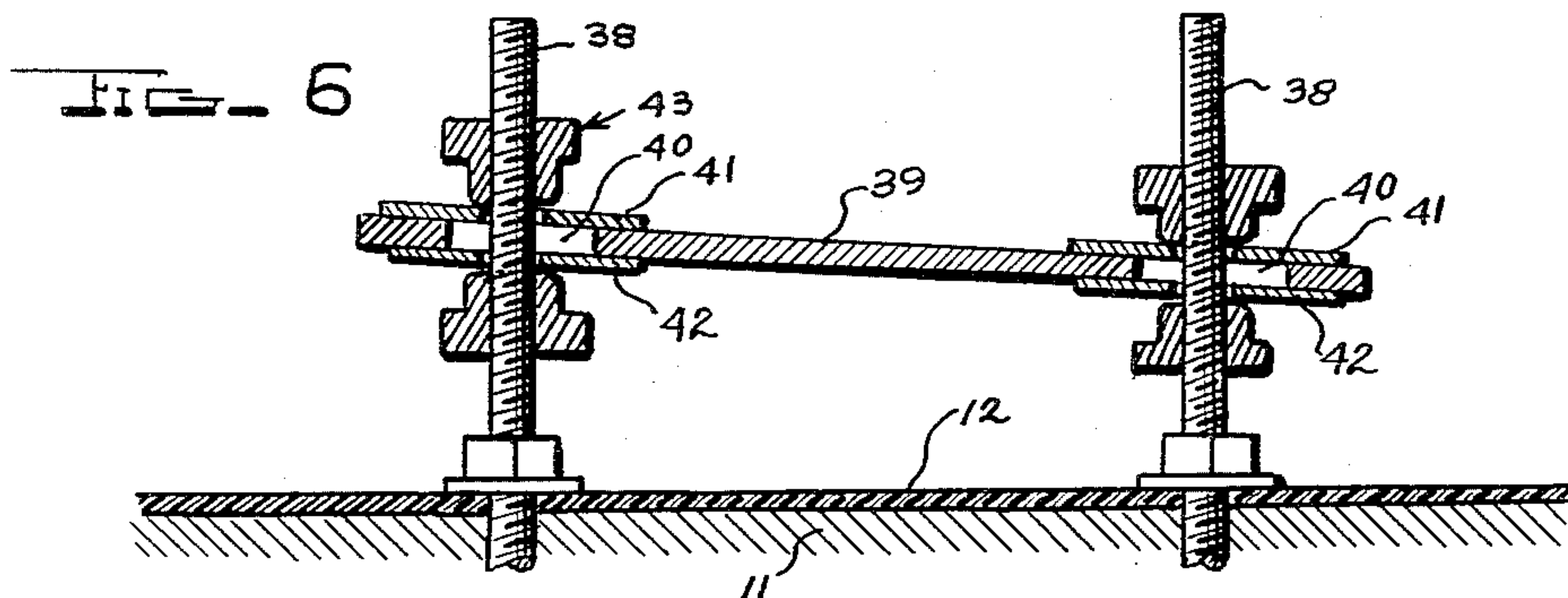
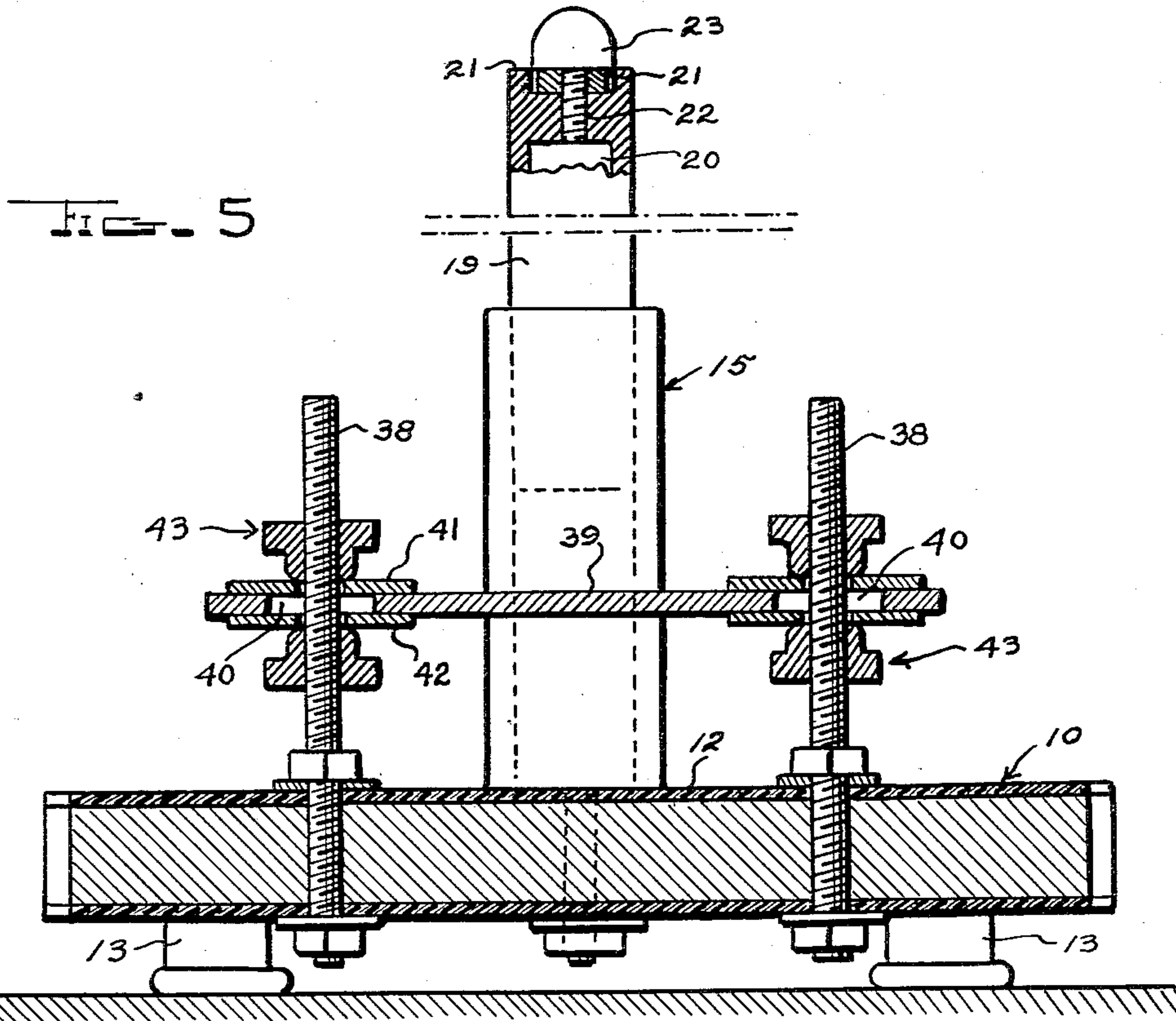
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5 Sheets-Sheet 4



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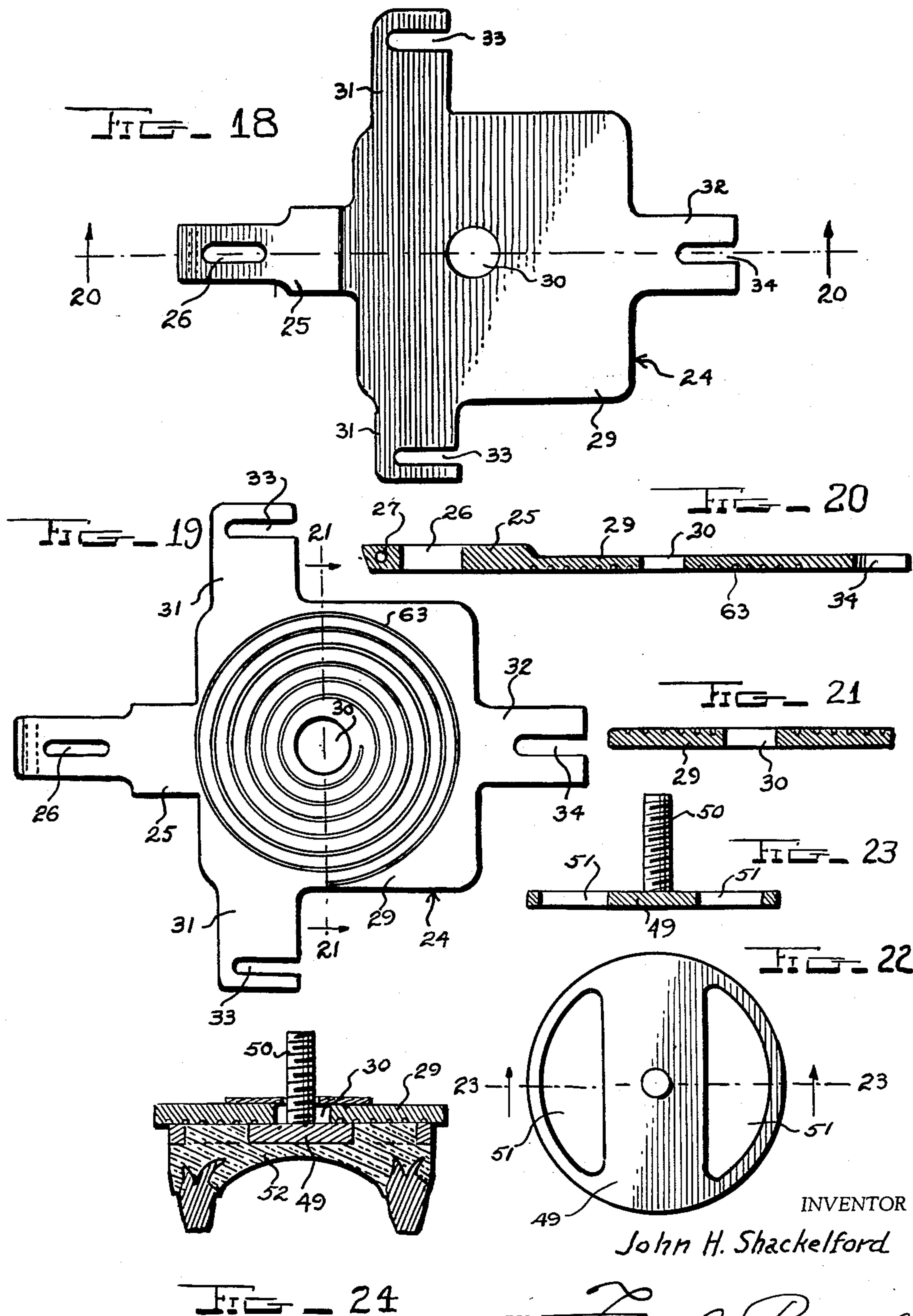
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ARTICULATOR FOR THE CORRECTION OF MALFUNCTIONING MUSCLES OF MASTICATION

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5 Claims. (Cl. 32—32)

The present invention relates to an articulator for the correction of malfunctioning muscles of mastication and it consists in the combinations, constructions and arrangements of parts herein described and claimed.

This application is a continuation in part of Serial No. 394,955 filed November 30, 1953 (now U.S. Patent No. 2,829,639).

Generally the present invention relates to an articulator which is eminently useful in carrying out the method set forth in the above-set forth patent. The articulator of the present invention is provided with an upper and a lower mounting plate each of which is provided with multiple means for vertical and angular adjustment.

It is an object of the invention to provide a novel articulator for facilitating the treatment of malfunctioning muscles of mastication and the repositioning of the condile heads in the glenoid fossae.

Another object of the invention is the provision, in a device of the character set forth, of novel means for adjusting the pair of mounting plates forming parts of the invention.

Still another object of the invention is the provision, in a device of the character set forth, of novel means for latching portions of a mounting plate while adjusting another portion thereof.

Still another object of the invention is to provide an articulator of the character set forth which permits a wide range of accurate adjustments.

A further object of the invention is to provide, in a device of the character set forth, novel means for mounting casts upon mounting plates forming parts of the invention.

Other and further objects of the invention will become apparent from a reading of the following specification taken in conjunction with the drawings, in which:

Figure 1 is a side elevational view of an embodiment of the invention showing the same in normal closed position,

Figure 2 is a plan view of Figure 1,

Figure 3 is a fragmentary sectional view taken along line 3—3 of Figure 1,

Figure 4 is a view similar to Figure 1 but partly broken away and showing the device in opened position,

Figure 5 is a sectional view taken along line 5—5 of Figure 1,

Figure 6 is a fragmentary sectional view similar to Figure 5 but illustrating the downward adjustment of one portion of a mounting plate forming a part of the invention,

Figure 7 is a view similar to Figure 6 but illustrating an opposite adjustment thereof,

Figure 8 is a fragmentary plan view of a hinge structure forming a part of the invention,

Figure 9 is a plan view of a bight plate forming a part of the invention,

Figure 10 is a side elevational view of Figure 9,

Figure 11 is a sectional view taken along line 11—11 of Figure 9,

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Figure 12 is a reduced plan view of a mounting plate forming a part of the invention,

Figure 13 is a sectional view taken along line 13—13 of Figure 12,

Figure 14 is a sectional view taken along line 14—14 of Figure 12,

Figure 15 is an enlarged side elevational view of a novel adjusting screw forming a part of the invention,

Figure 16 is a plan view of Figure 15,

Figure 17 is a sectional view taken along line 17—17 of Figure 16,

Figure 18 is a plan view of an upper mounting plate forming a part of the invention,

Figure 19 is a bottom plan view of Figure 18,

Figure 20 is a sectional view taken along line 20—20 of Figure 18,

Figure 21 is a sectional view taken along line 21—21 of Figure 19,

Figure 22 is a bottom plan view of a cast plate forming a part of the invention,

Figure 23 is a sectional view taken along line 23—23 of Figure 22, and

Figure 24 is a vertical sectional view illustrating the means of attachment of the cast to a mounting plate in accordance with the teachings of the invention.

Referring more particularly to the drawings, there is shown an articulator having a relatively thick horizontally extending substantially triangular base provided with rounded corners and generally indicated at 10. The base 10 has preferably a body 11 of wood or the like covered with a coating of hard plastic 12 on all sides thereof to enhance its appearance. A dependent leg 13 is affixed to the underside of each corner portion of the base 10.

Affixed atop the base 10 centrally of the rear portion thereof by means of a bolt 14 or the like is a vertically extending substantially square hollow housing generally indicated at 15 and provided with a rear wall 16 having a transversely extending fitting 17 adjacent the upper end thereof in which fitting is mounted a set screw 18.

A vertically extending block 19 is snugly and slidably mounted in the housing 15 and is preferably hollow, as indicated at 20, for a greater portion of its length in order to lessen the weight thereof.

The upper end of the block 19 has integrally formed therewith a pair of forwardly and rearwardly extending spaced parallel ears 21. A shaft 22 is threadably mounted centrally in the upper end of the block 19 and is provided at its upper end with a handle 23.

An upper mounting plate is generally indicated at 24 and is provided with an integrally formed rearwardly extending hinge member 25 provided adjacent its rearward end with a forwardly and rearwardly extending slot 26. A pin 27 extends through the rearmost portion of the ears 21 and also through the rearmost portion of the hinge member 25. The lower edge of the rear end of the hinge member 25 is cut away, as indicated at 28, to connect upward swinging movement of the plate 24 while the upper edge of the rear end of the hinge member 25 provides a shoulder which forms an abutment against the upper face of the block 19 to limit such upward movement of the plate 25 and support the same in raised position, as indicated in Figure 4.

The plate 24 is provided with a substantially square body 29 having a substantially centrally disposed circular opening 30 therein and provided with a pair of laterally extending ears 31 which are formed integrally with the rear portion of the body 29 and a centrally disposed forwardly extending ear 32, likewise formed integrally with the body 29.

Each of the ears 31 is provided with a forwardly ex-

tending slot 33 and the ear 32 is provided with a forwardly extending slot 34.

Three exteriorly threaded bolts 35 are provided and each has a bolt head 36 affixed to its upper end and each of the bolts 35 is slidably mounted in one of the slots 33 and 34. The knurled locknut is provided on each of the bolts 35 adjacent the underside of the ear 33 or 34, as the case may be, it being understood that the bolt head 36 rests upon the upper side of the ears 31 or 32, likewise as the case may be. The knurled locknuts are indicated at 37.

Three vertically extending bolts 38 are each affixed to the base 10 one adjacent each corner thereof. A lower mounting plate 39 is generally triangular in shape and is provided with a circular opening 40 in each corner portion thereof. Each of the bolts 38 extends through one of the openings 40 and has an upper washer 41 loosely mounted thereon and abutting the upper side of the plate 39 and a like washer 42 abutting the underside of the plate 39.

A novel latching nut is generally indicated at 43 and consists of a generally cylindrical knurled head 44 and an integrally formed cylindrical reduced portion 45 having a rounded outer face 46. Each bolt 38 has a pair of latching nuts 43 mounted thereon each with its rounded face 46 in abutting relation to one of the washers 41 and 42. The knurled portion 44 of each of the latching nuts 43 is provided in its peripheral portion with a vertical notch 47. The nuts 43 are, of course, interiorly threaded for threadable mounting upon the bolts 38.

The mounting plate 39 is centrally provided with a circular opening 48. A pair of cast-holding plates is provided and each consists of a circular body portion 49 and a centrally mounted vertically extending bolt portion 50. The body 49 is provided with openings 51 wherein the plaster forming a cast 52 may flow to thereby secure itself to the body 49, as shown in Figure 24. Alternatively, casts 53 and 54 may be temporarily secured, as indicated at 55 and 56 to plaster bases 57 and 58, respectively, which latter may be secured to the bodies 49.

An occusal plane or "bight plate" 58 is provided with three outstanding ears 59 which are each provided with an aperture 60 so that the bight plate may be mounted upon the lower end portions of the bolts 35. Latching nuts 43a identical in structure with the latching nuts 43 but smaller in size are mounted upon each of the bolts 35 in such manner that the rounded faces of each pair bear against the upper and lower sides of the associated ears 59. The bite plate 58 is dished downwardly, as clearly shown in Figures 10 and 11. The bodies 49 are mounted in such manner that one of them abuts against the underside of the upper mounting plate 24 while the other abuts against the upper face of the lower mounting plate 39. A washer 61 and nut 62 completes the adjustable mounting of the same in each case.

The lower face of the upper mounting plate 24 is provided with a spiral groove 63 which extends about the opening 30 while the lower mounting plate 39 is provided with a like spiral groove 64 which extends about the opening 48. These grooves are provided for the purpose of more securely holding the bodies 49 in frictional contact with their respective mounting plates when the nuts 62 are tightened upon the washers 61.

In the operation of the device, it will be apparent that there are two methods whereby the casts 53 and 54 may be mounted upon the articulator. In one case, the casts 53 and 54 may be removably attached to the members 57 and 58, respectively, by an adhesive, thus permitting quick removal and replacement of the cast for technical work. Another method by which the casts 53 and 54 may be mounted upon the respective mounting plates 24 and 39 is to provide a screw which may be embedded in the base of the cast when the cast is poured on the member 49. This method is ideal for study casts.

The cast of the maxillae occupies a fixed position ex-

cept for vertical adjustments. The corrections of mandibular malposition are made by adjusting the position of the mandibular cast. This enables the operator to visualize relationships for the construction of therapeutic splints and prostheses with greater ease. The use of X-rays of the temporal mandibular articulation, the study of ridge and tooth relationship, intra oral X-rays, clinical study or muscle tension and spasm, and carefully taken detailed case histories, help the experienced operator to decide upon the best method by which to rehabilitate the muscles of mastication for each individual patient. If the amount of adjustment required is slight (2 to 3 millimeters or less) the operator may decide upon the position desired and reposition the lower cast by means of the adjusting nuts 43, it being apparent that if it is desired to lower the plate 39 on the right hand side, as viewed in Figure 6, it is only necessary to loosen the lower right hand nut 43 to thus permit a lowering of the portion of the plate 39 encompassing the right hand bolt 38. This is done without loosening any other nuts on the other bolts 38. After this has been accomplished and the plate 39 moved to the position shown, for example, in Figure 6, the upper right hand nut therein shown may be lowered to tighten the same upon its associated washer 41 thus locking the plate 39 in its new position. It will be apparent that slight movement of the plate 39 with reference to the remaining nuts and bolts is permitted during the aforesaid operation due to the fact that the openings 40 are relatively large and the plate 39 may move laterally to adjust itself due to the rounded faces 46 of the nuts 43 bearing against the respective washers 41 and 42. It will also be apparent that if it is desired to raise the right hand side of the plate 39 as viewed, for example, in Figure 7, it is only necessary to first loosen the upper right hand nut 43 shown in that figure after which the lower nut 43 is raised until it tightens against its associated washer 42. In all of these operations, the notch 47 comes into play since it has been previously calculated that one turn of the nut 43 upon its associated bolt 38 is equal to a raising or lowering of the associated portion of the plate 39 a distance of one millimeter.

While such adjustments are being made, it will be apparent that the remaining nuts and the remaining bolts are secured sufficiently firmly to prevent shifting of the plate 39 and loss of ridge relationship with the upper cast 53.

The operator may now proceed to adjust the nuts 43 on the remaining bolts 38, thus having the mounting plate 39 secured on two of the bolts at all times. In this manner the plane of occlusion of the upper teeth and the corrective splint or new prosthesis may be placed where the dentist desires to improve the function of the muscles of mastication or reposition the condyle heads in the glenoid fossae with ease and accuracy.

In the original setting of the casts 53 and 54 upon their respective plates 24 and 29, it will be apparent that the device may be first brought to opened position, as shown in Figure 4 by moving the upper mounting plate 24 in a counterclockwise direction until the upper rearward edge of the same comes into abutting contact with the top of the arc 19. In this position, it will be apparent that the plate 24 and the devices carried thereby will be in over-center position and will remain in the position shown in Figure 4. At this time the occusal plane 58 may be attached to the lower end portions of the bolts 35 by means of the latching bolts 43a in such manner that they abut against the lower edges of the teeth of the cast 53. The plate 24 may then be moved in a clockwise direction to its position shown in Figure 1 after which the plate 24 may be locked in such position by turning the handle 23 so that its underside abuts against the hinge arm 25 as shown, for example, in Figure 1, it being apparent that during the downward movement of the plate 24, the handle 23 will pass through the slot 26. The cast 53 may be adjusted in its position upon the plate 24

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forwardly and rearwardly by means of the locknuts 37 which may be lessened to permit the bolts 35 to move forwardly and rearwardly in the slots 33 and 34. After the casts 53 and 54 have been positioned to the satisfaction of the operator, they may then be moved apart by loosening the set screw 18 whose inner end bears against the block 19 to thus permit upward movement of the block 19 and hence the plate 24 and its associated mechanisms. The block 19 may then be locked in its raised position by again tightening the set screw 18.

It will also be apparent that both the cast 53 and the cast 54 may be adjusted with respect to their respective plates 24 and 29 by loosening the nuts 62 to thus permit the entire cast to be turned upon its axis and, due to the relatively large size of the openings 30 and 48 with respect to the bolts 50, some movement of each of the casts 53 and 54 is permitted in a radial direction with respect to the axis of the shaft 50 in each case.

It will thus be seen that there has been provided an articulator which permits an infinite number of adjustments in all directions necessary for the study and correction of malfunctioning muscles of mastication and the repositioning of the condyle heads in the glenoid fossae.

While but one form of the invention has been shown and described herein, it will be readily apparent to those skilled in the art that many minor modifications may be made without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. An articulator of the character described comprising a horizontal base, a vertical housing centrally affixed atop the rear portion of said base, a block vertically adjustable in and extending upwardly from said housing, an upper mounting plate pivotally connected to the upper end of said block, means for dependently mounting a first cast upon the upper mounting plate, a plurality of vertically extending bolts affixed to the base, a lower mounting plate carried by said bolts, means for

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mounting a second cast upon said lower mounting plate, and means for adjusting the planar relation of said lower mounting plate with respect to a horizontal plane, said last-mentioned means comprising relatively large openings in said lower plate each encompassing one of said bolts, a washer abutting said plate above and below each of said openings and each loosely encompassing its associated bolt, and a pair of latching nuts threadably mounted on each bolt and each bearing against one of said washers.

2. A device as defined in claim 1 wherein each of said latching nuts comprises a knurled cylindrical portion, and a reduced cylindrical portion having a rounded outer face, said outer faces forming the abutting surfaces.

3. A device as defined in claim 1 wherein means is provided for separately adjusting the casts upon their vertical axes with respect to their associated mounting plates.

4. A device as defined in claim 1 wherein a bite plate is provided, wherein means is provided for suspending said bite plate from said upper mounting plate, and wherein means is provided for adjusting the planar relationship of said bite plate with respect to said upper mounting plate.

5. A device as defined in claim 1 wherein said upper mounting plate is provided in its underside with a spiral groove, and wherein said lower mounting plate is provided with a like spiral groove whereby to increase frictional engagement between said mounting plates and their respective casts.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 23,498 Stoll _____ May 20, 1952
2,629,929 Levine et al. _____ Mar. 3, 1953

OTHER REFERENCES

Oral Hygiene, March 1938, page 368, "Torit."