

(No Model.)

2 Sheets—Sheet 1.

J. H. RANKIN.
ADJUSTABLE SPLINT.

No. 552,143.

Patented Dec. 31, 1895.

Fig. 1.

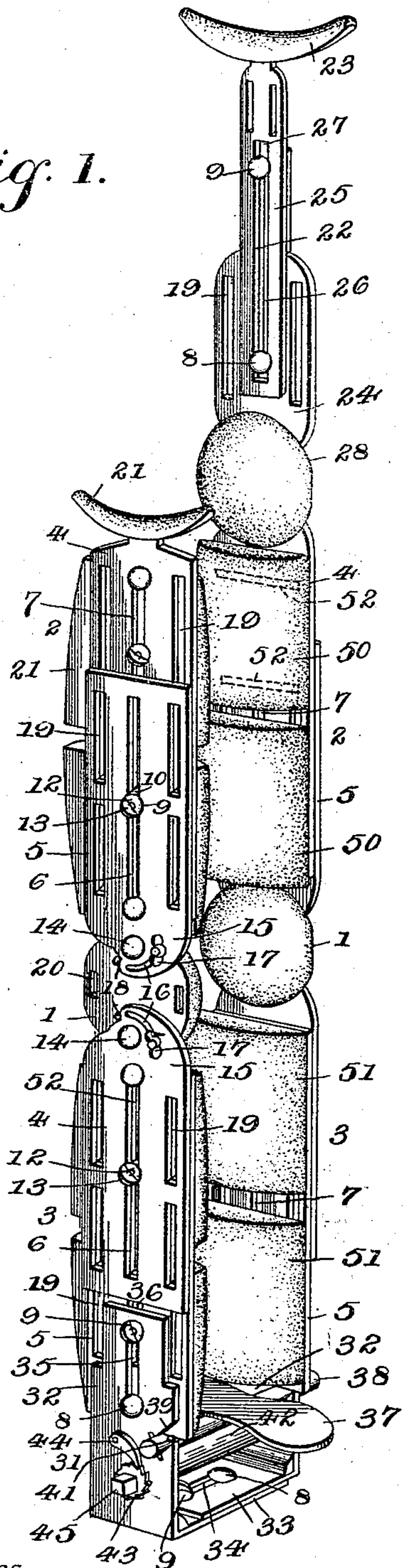


Fig. 3.

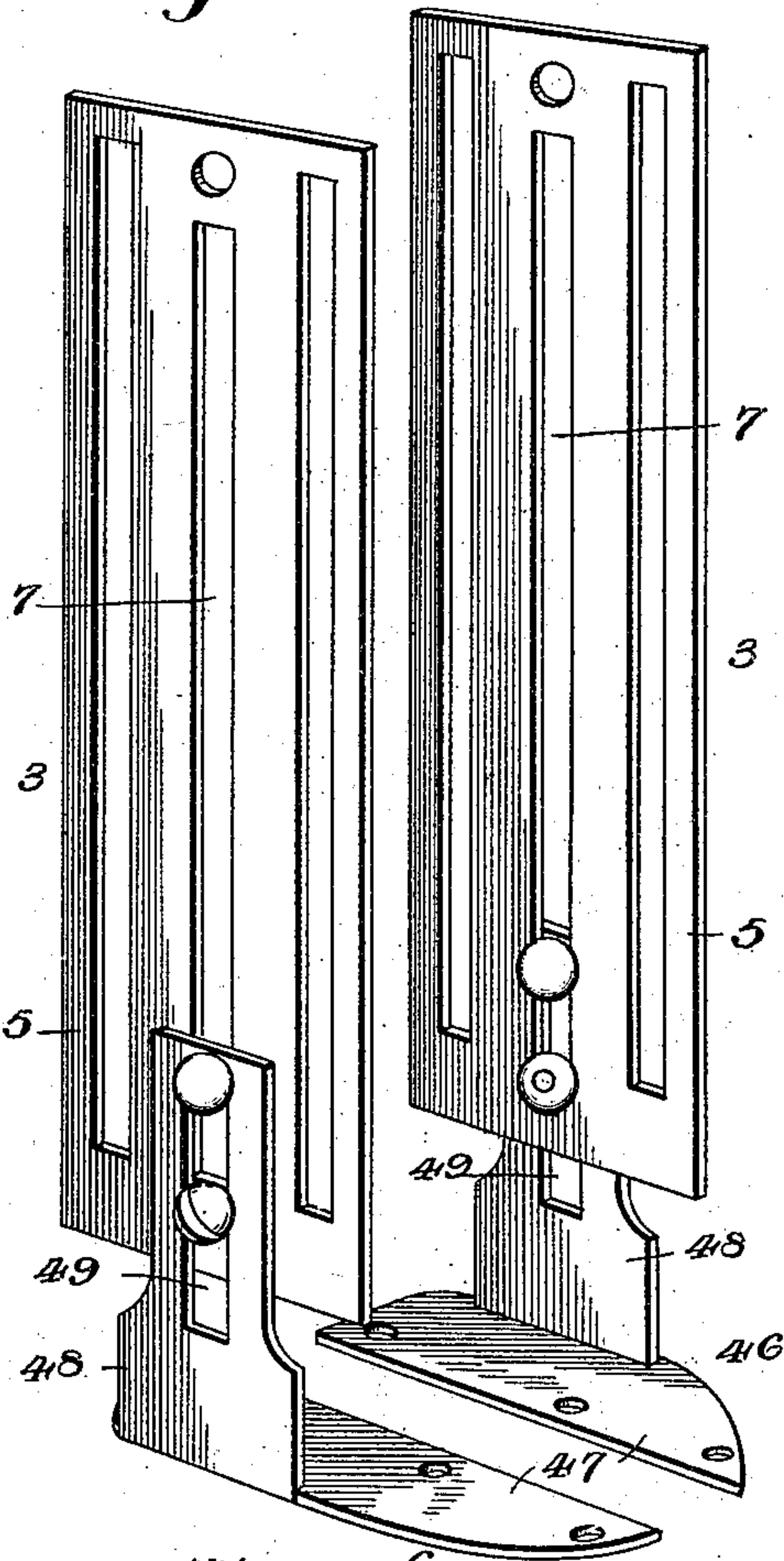
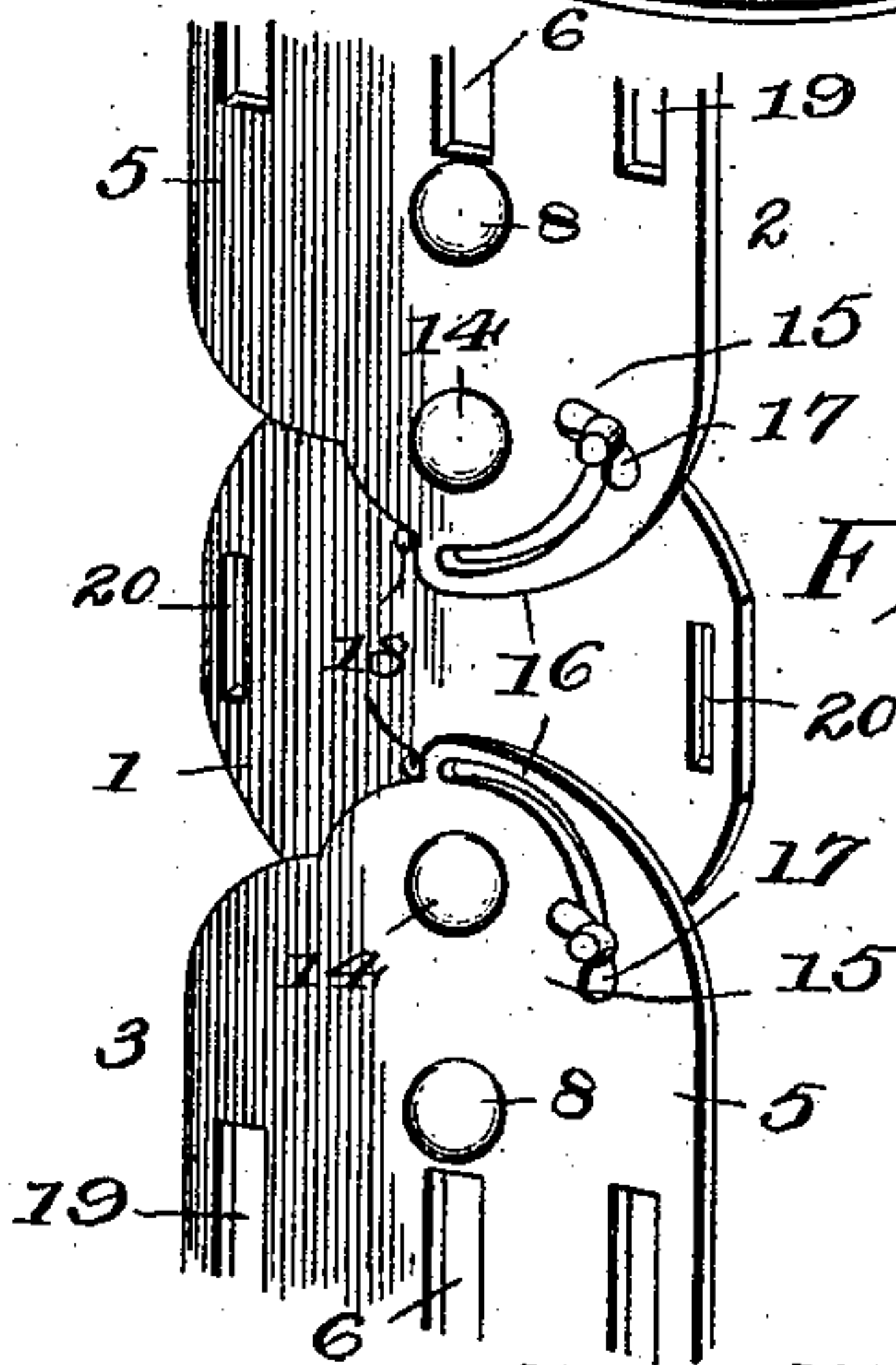


Fig. 4.



Inventor

Witnesses

Chas. A. Ford.

U. B. Hillyard.

By his Attorneys,

John H. Rankin,

C. A. Snow & Co.

J. H. RANKIN.
ADJUSTABLE SPLINT.

No. 552,143.

Patented Dec. 31, 1895.

Fig. 2.

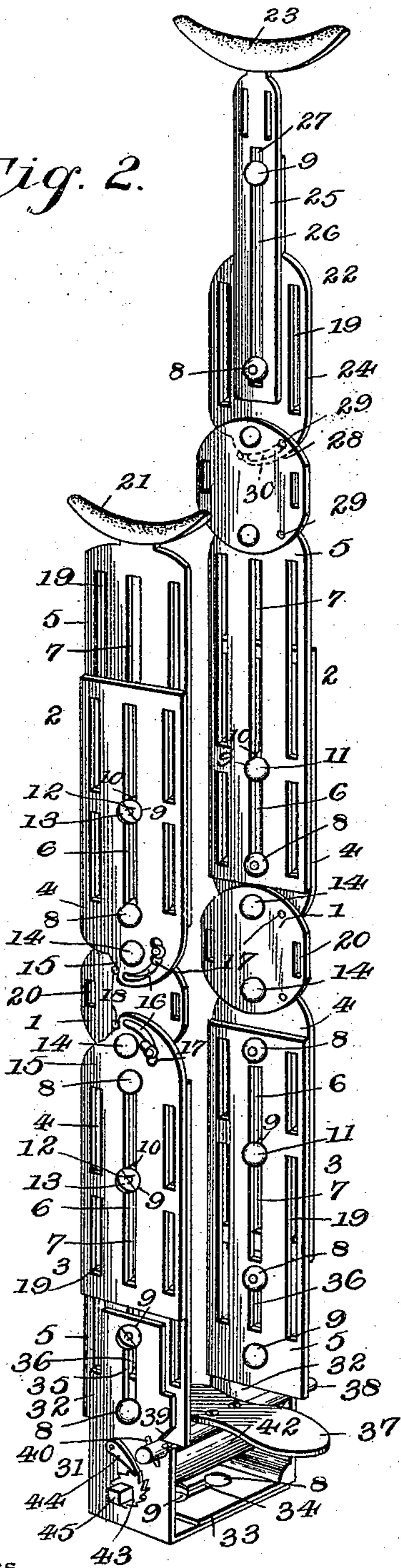


Fig. 5.

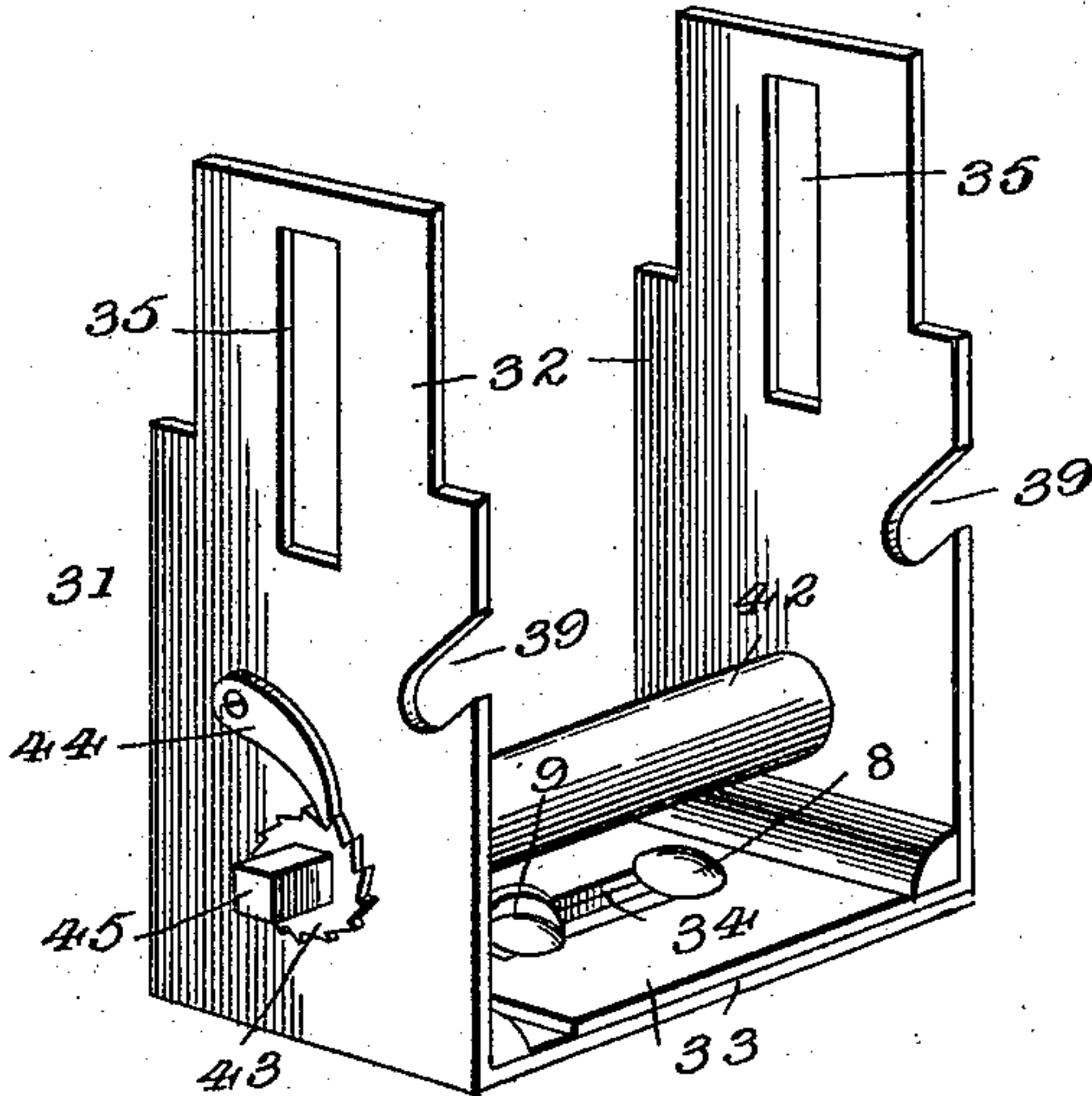


Fig. 7.

Fig. 8.

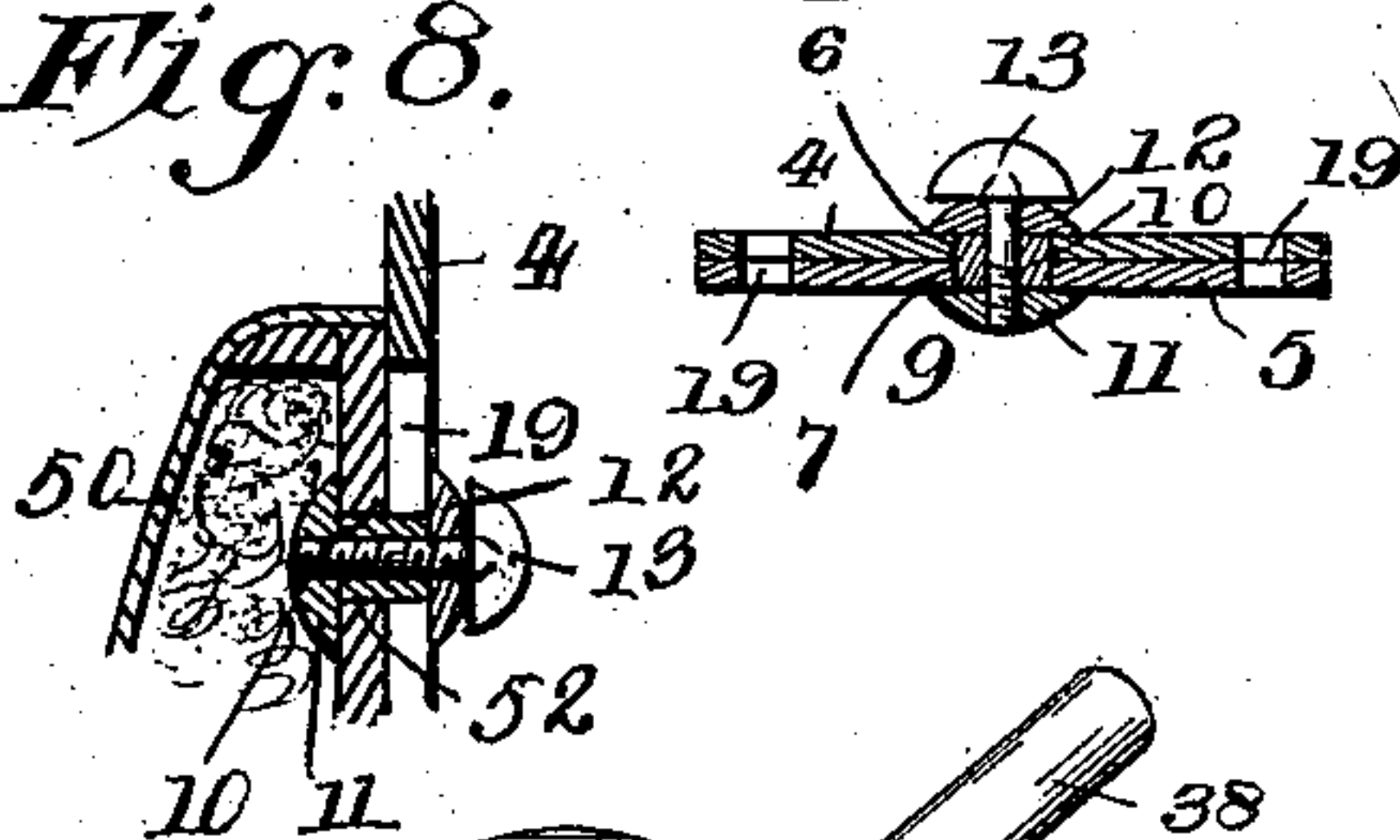
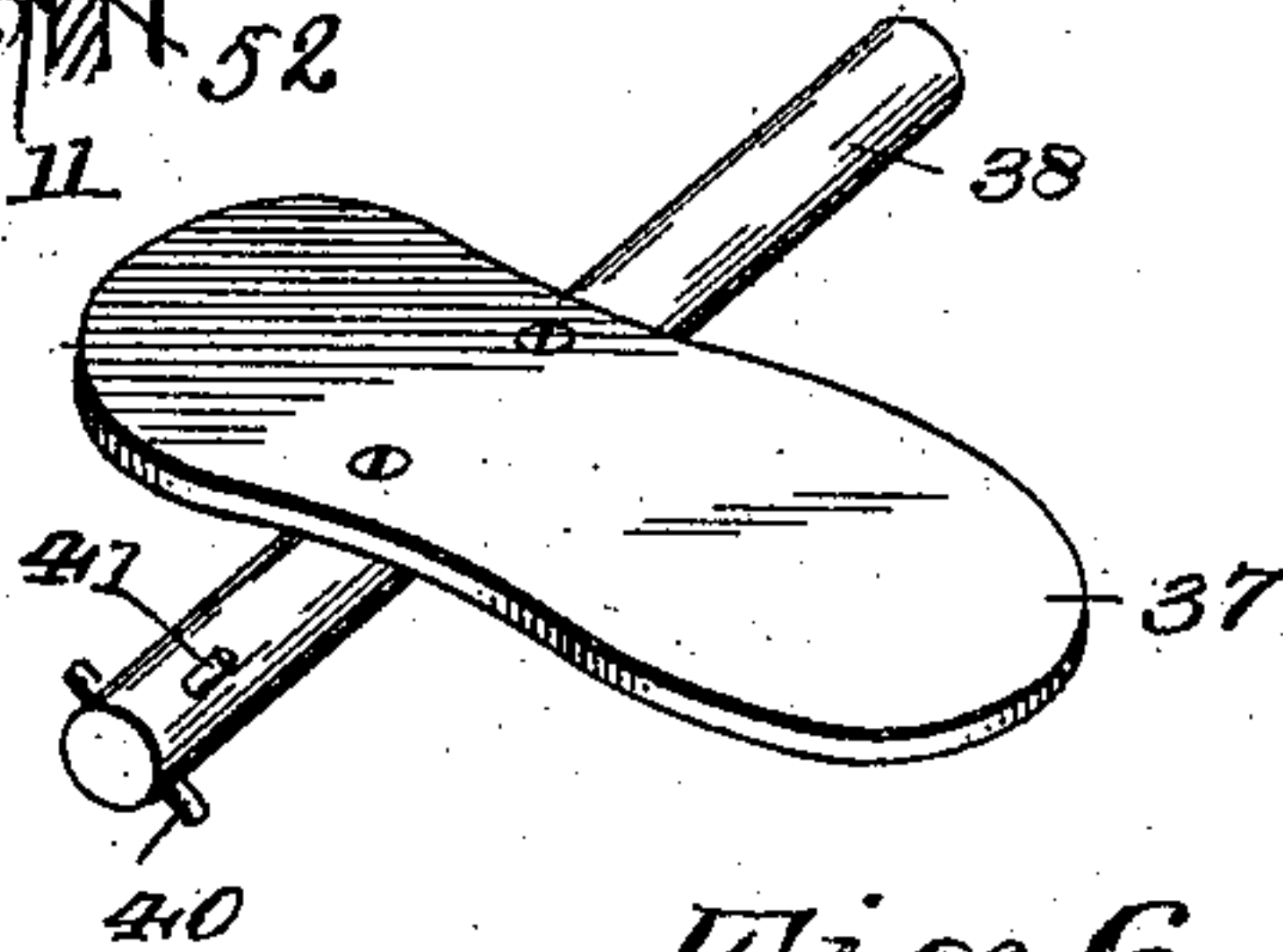


Fig. 6.



Inventor

John H. Rankin,

By his Attorneys,

C. A. Snow & Co.

Witnesses

Chas. A. Ford

U. B. Hillyard.

UNITED STATES PATENT OFFICE.

JOHN H. RANKIN, OF VERSAILLES, MISSOURI.

ADJUSTABLE SPLINT.

SPECIFICATION forming part of Letters Patent No. 552,143, dated December 31, 1895.

Application filed May 8, 1895. Serial No. 548,585. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. RANKIN, a citizen of the United States, residing at Versailles, in the county of Morgan and State of Missouri, have invented a new and useful Adjustable Splint, of which the following is a specification.

This invention relates to splints or fracture apparatus for the treatment of broken limbs, sprains, and dislocated joints, and has for its object the provision of an appliance for the purposes aforesaid which is adjustable in its several parts to adapt it for the treatment of various sizes of limbs, thereby placing within the reach of the surgeon a splint capable of universal application, and which at the same time will be light and attain the desired results in a satisfactory manner.

A further purpose of the invention is the construction of a splint combining with the adjustable femoral and tibial sections means whereby the said sections are adapted to give at a point corresponding with the position of the knee, and which at the same time will have combined therewith an interchangeable foot brace and rest to adapt the splint for the various conditions of the fracture or injury being treated.

The improvement will be more particularly set forth hereinafter and pointed out in the subjoined claims, and is illustrated in the drawings hereto attached, in which—

Figure 1 is a perspective view of a splint embodying the invention. Fig. 2 is a view similar to Fig. 1 having the leg-pads removed. Fig. 3 is a detail view of the lower or tibial section of the splint, showing the roller extension replaced by the foot-rest. Fig. 4 is a detail view of a joint provided between contiguous and adjacent sections. Fig. 5 is a detail view of the roller extension. Fig. 6 is a detail view of the foot-rest. Fig. 7 is a cross-section through two slidable parts, showing the means for connecting them together. Fig. 8 is a detail view in section, showing the means for securing a pad to one of the parts of the splint.

The splint or fracture apparatus comprises similar side pieces formed of adjustable femoral and tibial sections which have pivotal connection at their contiguous or adjacent ends with a knee plate or pad 1, whereby the

flexion of the knee is rendered possible without the removal of the splint from the limb. The femoral and tibial sections are similarly constructed and a detailed description of the one will be sufficient, and corresponding parts will be indicated and referred to by similar reference-numerals in the drawings and the following description.

The numeral 2 designates the similar femoral sections and the numeral 3 the like tibial sections. The sections comprise adjustable or slidable parts 4 and 5, the parts 4 being adjacent to and having pivotal connection with the knee plate or pad 1 and the parts 5 being remote therefrom. The part 4 has a longitudinal slot 6, which is adapted to register with a corresponding slot 7 in the part 5, and suitable fastenings are provided to operate in the registering slots 6 and 7 to guide the parts 4 and 5 in their various adjustments and by means of which they are secured in the adjusted position. One of the fastenings, as 8, comprises a portion to extend through the registering slots 6 and 7 and is headed at its ends to overlap the sides or edges of the slots so as to retain the parts 4 and 5 in close relation, and this fastening 8 is movable with one of the parts, as 5, and travels in the slot in the part 4.

The fastening 9 comprises a block 10 to operate in the registering slots 6 and 7, a circular plate or button 11 on the inner side of the section, a corresponding plate or button 12, and a binding-screw 13 to operate through the buttons 11 and 12 and the block 10, and adapted to clamp the parts 4 and 5 between the plates or buttons 11 and 12, so as to hold them in the located position.

The part 4 has pivotal connection with the end portion of the knee-plate 1, as shown at 14, and a quadrant enlargement 15 has a curved slot 16, through which extends a binding-screw 17, by means of which the parts 1 and 4 are secured in the adjusted position, said binding-screw entering a threaded opening provided in the plate 1. A pin or stop 18 projecting laterally from the plate 1 is adapted to engage with the end of the enlargement 15, so as to prevent and limit the relative forward movement of the femoral and tibial sections and maintain them in alignment. The several sections will have a series of longi-

tudinal slots 19 in proximate relation to their edges for the passage of the bandages by means of which the splint is secured upon the limb under treatment and the knee-plates will have slots 20 for a similar purpose.

The inner femoral section will have a perineal section or pad 21 for close engagement with the crotch, which is of especial advantage in the treatment of certain fractures and dislocated joints. Obviously this perineal section or pad may be dispensed with without affecting the merits of the invention, and is shown as it will be provided in the most generally constructed splint.

An auxiliary or supplemental extension 22 may be provided and applied to the external femoral section, and is provided at its upper end with an arm pad or section 23, by means of which the greater part of the weight and strain can be removed from the limb when the patient is in a standing or upright position. This auxiliary extension is composed of adjustable parts 24 and 25, which have longitudinal registering slots 26 and 27, through which extend fastenings 8 and 9, by means of which the said parts are secured in the desired position, and these parts have edge slots 19 for the passage of straps or bandages by means of which the said extension 22 is firmly secured to the trunk of the patient. A plate 28, similar in construction to the knee-plate 1, has pivotal connection near its opposite ends with the auxiliary section 22 and the adjacent femoral section, and these latter sections are held in a relative adjusted position by means of binding-screws 29 passing through curved slots 30 in the said sections and screwing into threaded openings in the plate 28.

The roller extension 31 comprises similar side sections 32, which have their lower portions bent inward, as shown at 33, and provided with registering slots 34 to receive suitable fastenings, as 8 and 9, by means of which the side sections 32 are held at the required distance apart. The upper parts of the side sections 32 have longitudinal slots 35 to correspond with similar slots 36 in the lower parts of the tibial sections to receive fastenings, as 8 and 9, by means of which the said side sections 32 are held in the required adjusted position. A foot-brace 37 is attached to a short rod 38, which is adapted to be fitted in upwardly-inclined slots 39 formed in the edges of the side sections 32, and said rod is held from longitudinal movement by means of two pins 40 and 41 passing transversely through an end thereof and adapted to come upon each side of the adjacent section 32. The roller 42 is journaled in the side sections 32, and its projecting end is provided with a ratchet-wheel 43, which is adapted to be engaged by means of a pawl 44 to hold the said roller in the required position, and the projecting portion 45 is made angular or otherwise constructed to receive a wrench or tool by means of which the roller 42 is turned

when required to attain the desired result. When the treatment has sufficiently advanced to admit of the patient being placed in an upright or standing position, the roller extension 31 is removed and replaced by a foot-rest 46, the same consisting of two plates 47 to be secured in any desired manner to the sole of a slipper or other foot-gear and side extensions 48 having longitudinal slots 49 to receive the fastenings by means of which the foot-rest is adjustably connected with the lower parts of the tibial sections.

The knee-plates and the thigh-plate will be padded on their inner side for the ease and comfort of the patient and to obviate all possible chafing and soreness which would result from the engagement of the metal with the limb. Femoral and tibial pads 50 and 51 of similar construction will be provided and have adjustable connection with the corresponding sections and consist of plates having transverse slots 52 for the reception of the fastenings by means of which the parts of the respective sections are secured together in the located position. Each pad will comprise two similar parts and is adapted to be adjusted to any length or width of limb to which the splint is adapted to be applied. The plates forming the base of the leg-pad will be suitably cushioned to afford a soft bearing between the limb and the splint-sections.

For treating various patients it is necessary to shift the position of the leg-pads laterally relative to their supporting-sections, and this adjustment is rendered easy by reason of the transverse slots 52, and when the pads are required to be moved longitudinally the corresponding slots in the respective pad-supporting sections admit of such adjustment, one or both adjustments being attained by loosening the fastenings employed for attaching the pads to their respective sections and for securing the latter in the required position, as will be readily understood.

The several sections and component parts of the splint will be constructed from sheet metal of any required kind suitable for the purpose, but it is preferred to make the same exclusively of aluminum because of its great strength and lightness and because it is not liable to corrode.

The roller extension 31, with its roller 42, is designed for use in the treatment of limbs which are required to be stretched, and to effect this latter result bandages are firmly attached to the lower portion of the limb and are secured to the roller 42 in any convenient manner, so that when it is required to extend the limb the roller 42 can be turned upon its journals to wind up the bandage and thereby stretch the limb, as will be readily understood.

The splint is adapted for either limb, the upper femoral sections being interchangeable at the knee-joint to admit of the adaptation of the device for the treatment of either limb, as will be readily appreciated.

It will be seen from the foregoing that the splint is capable of a varied adjustment and is susceptible of use in a variety of ways, and that it can be worn without causing inconvenience or annoyance to the patient and will admit of the articulation of the limb to obviate stiffness of the joints without the necessity of removing the splint to attain this result. Many other objects and advantages are apparent, and it is to be understood that in the embodiment of the invention various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new is—

1. A splint comprising similar femoral and tibial sections composed of slidable parts having corresponding and registering middle and side longitudinal slots, the side slots being provided to receive the bandages, and fastenings operating within the middle slots to guide the parts in their sliding movements and secure them in the located position, substantially as set forth.

2. A splint comprising femoral and tibial sections having their contiguous or adjacent ends separated or spaced apart, and a knee plate interposed between the separated ends of said sections and having the latter pivotally connected therewith at diametrically opposite points, substantially as and for the purpose set forth.

3. A splint comprising femoral and tibial sections having their opposing or adjacent ends separated or spaced apart, a knee plate interposed between the separated ends of the said sections and having the latter pivotally connected thereto at diametrically opposite points, stops for limiting the movements of the sections and assuring their alignment, and fastenings for securing the parts in the located position with respect to the knee plate, substantially as set forth.

4. In a splint, the combination with the tibial sections, of a roller extension comprising similar side sections having their lower portions bent inward and overlapping, means for adjustably connecting the said overlapping portions whereby the roller extension can be contracted or expanded, and provisions for adjustably securing the roller extension to the tibial sections, whereby the splint can be

lengthened or shortened, substantially as specified.

5. In a splint, the combination with the lowermost extension provided with upwardly inclined notches in its edges, of a foot brace, and a rod therefor adapted to be supported in the said notches, and held from longitudinal movement, substantially as set forth.

6. In a splint, the combination with the tibial sections, of a foot rest to be secured to the sole of a slipper or other foot gear and comprising two plates of similar construction each having a side extension, and means for adjustably connecting the side extensions with the respective tibial sections, substantially in the manner set forth for the purpose described.

7. A splint comprising inner and outer femoral sections, in combination with a perineal section or pad attached to the inner femoral section, and an auxiliary extension having pivotal connection with the outer femoral section and terminating in an arm pad, said auxiliary extension being composed of slidable parts having longitudinal registering slots within which operate the fastenings by means of which the parts are adjustably connected together, substantially as specified.

8. The herein described splint comprising knee plates, similar femoral and tibial sections having pivotal connection with the opposite ends of the knee plates and comprising slidable parts, means for securing the movable parts in a fixed position, a roller section removably and adjustably connected with the tibial sections, a roller and foot brace supported by the roller extension, a thigh plate, and an auxiliary extension, having pivotal connection with the thigh plate, and extensible, and provided with an arm rest or section, substantially as set forth.

9. The combination with a splint comprising slidable parts, of a leg pad formed of similar parts, having transverse slots, and having both a longitudinal and lateral adjustment, substantially in the manner set forth for the purpose described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN H. RANKIN.

Witnesses:

JOHN S. CARLISLE,
JOEL D. HUBBARD.