No. 799,664. PATENTED SEPT. 19, 1905.

R. R. NORWOOD.

APPARATUS FOR TREATING ANKYLOSIS OF THE KNEE.

APPLICATION FILED FEB. 18, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

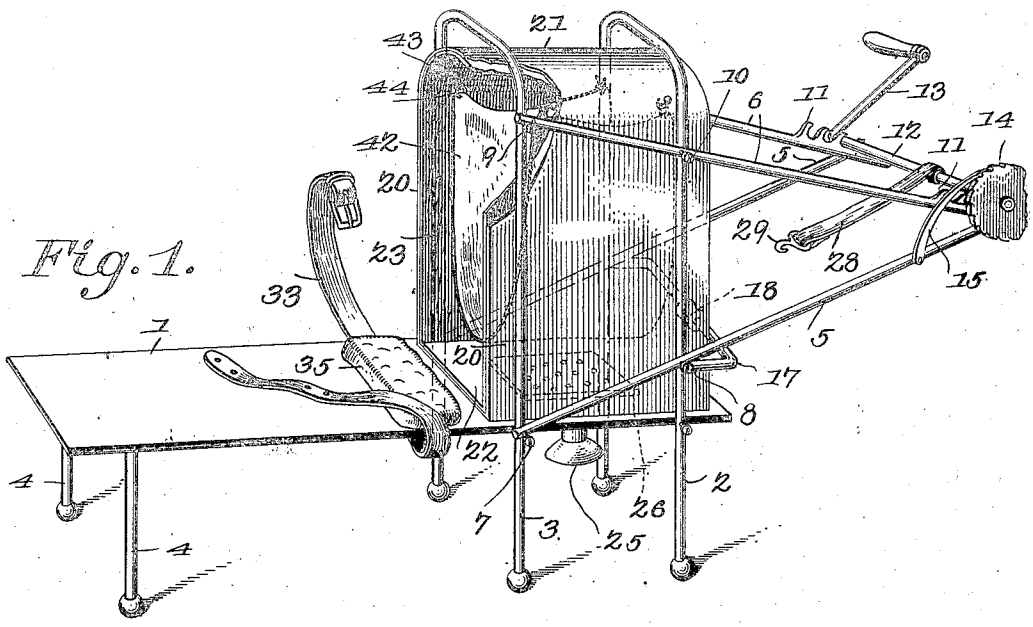
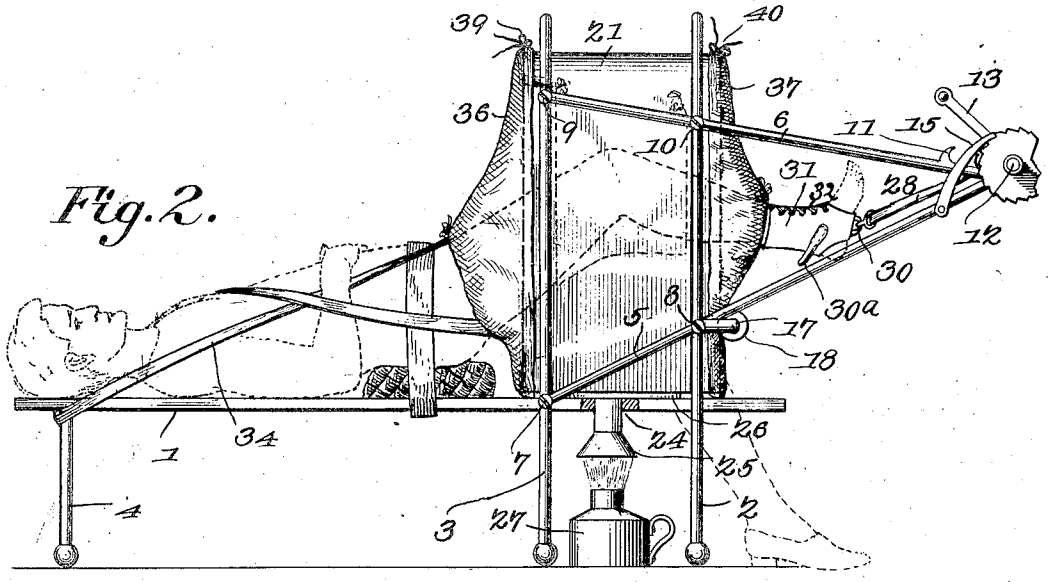


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

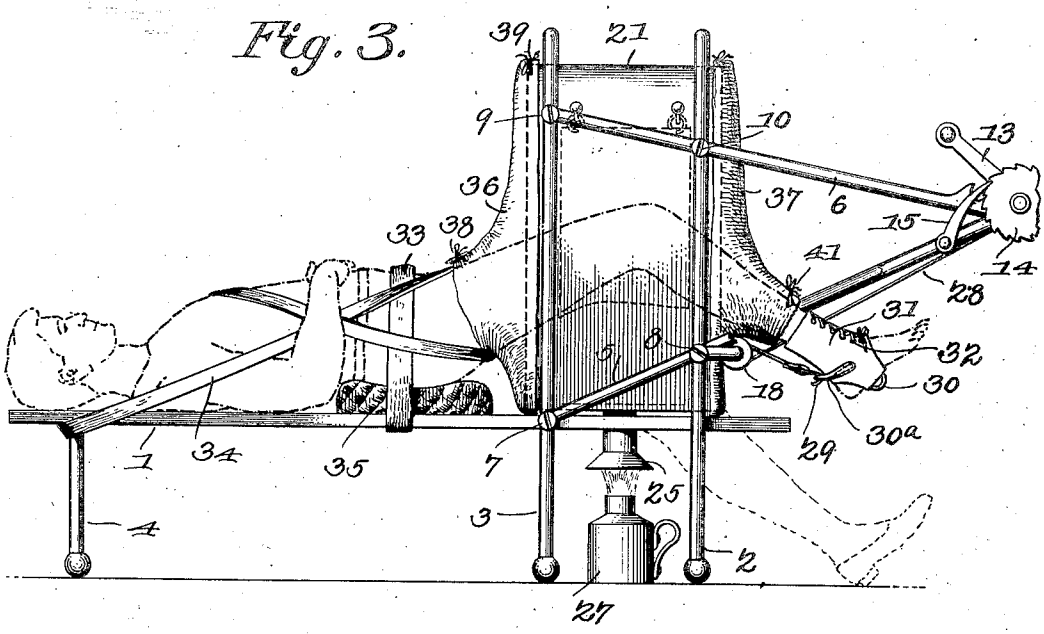
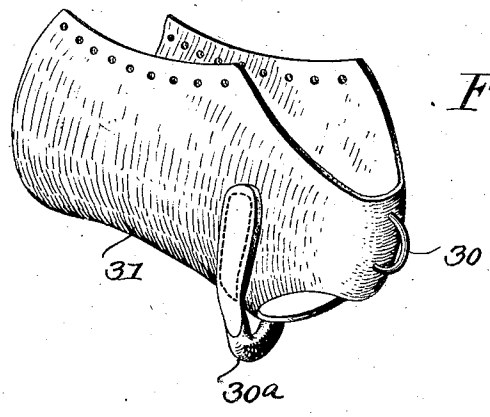


Fig. 4.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TREATING ANKYLOSIS OF THE KNEE.

No. 799,664. Specification of Letters Patent. Patented Sept. 19, 1905.

Application filed February 18, 1905. Serial No. 246,278.

To all whom it may concern:

Be it known that I, ROBERT R. NORWOOD, a citizen of the United States, residing at Mineralwells, in the county of Palo Pinto and State of Texas, have invented a new and useful Apparatus for Treating Ankylosis of the Knee, of which the following is a specification.

This invention relates to apparatus for treating ankylosis of the knees.

The object of the invention is in a ready and practical manner and without unnecessary pain or nervous shock to the invalid to apply the requisite heat, extension, and flexion to an afflicted part to render it supple and restore to it its natural functions.

With the above and other objects in view, as will appear as the nature of the invention is better understood, the same consists in the novel construction and combination of parts of an apparatus for treating ankylosis of the knee, as will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which like characters of reference indicate corresponding parts, Figure 1 is a view in perspective, partly in section, of an apparatus constructed in accordance with the present invention. Fig. 2 is a view in side elevation, exhibiting in dotted lines a patient and showing the manner in which extension of the affected limb is secured. Fig. 3 is a view similar to Fig. 2, showing the manner in which flexion of the affected limb is secured. Fig. 4 is a perspective detail view of an anklet used in carrying out the different operations.

The apparatus consists of a table or base 1, which is made of any suitable material and is supported at its foot portion by two yokes 2 and 3, suitably secured to the table, and at its head by two legs 4. The yokes 2 and 3 may be made of any suitable material, preferably of metallic tubing, and serve as supports for two pairs of brackets 5 and 6, the brackets 5 being secured at their rear terminals to opposite sides of the yoke 3, at or near its point of juncture with the table, as by screws or bolts 7, and intermediate of their ends to opposite sides of the yoke 2, as by screws or bolts 8. The brackets 6 are secured at their rear terminals on opposite sides of the yoke 3, near its upper end, as by screws or bolts 9, and intermediate of their ends on opposite sides of the yoke 2, as by screws or bolts 10. The free or outer terminals of the brackets are connected in any suitable manner, and the pair of brackets 6 carries a plurality of spaced bearings 11 to receive a shaft 12, one end of which carries a crank 13 and the other end a ratchet-wheel 14, engaged by a pawl 15, carried by one of the brackets 5. By the provision of the spaced bearings 11 the shaft may be adjusted relatively to the brackets in order to vary the line of draft or strain upon the limb being treated, as will hereinafter more fully appear.

Secured to the sides of the yoke 3 and held combined therewith by the screws or bolts 8 is an open-sided rectangular bracket 17, which is arranged beneath the brackets 5 and carries a spool-shaped roller 18, the function of which will presently appear.

Supported upon the table between the yokes 2 and 3 is a metallic heating chamber or casing comprising parallel sides 20, an arched or curved top 21, and a flat bottom 22. This casing, which is open-ended, may be made of any suitable material, preferably of galvanized iron, and is provided with an insulating-lining 23, preferably of asbestos. The table is provided at a point beneath the casing with an opening through which projects the upper end of a chimney 24, having a flared bottom 25, and over the opening is arranged a perforated pan 26, the function of which is to disseminate the heat, and thus equalize the temperature within the casing when the apparatus is in use, the heat being supplied to the interior of the casing in this instance by an alcohol-lamp 27, although, as will be obvious, any other suitable heating medium may be employed and still be within the scope of the invention.

The shaft 11 has combined with it a strap 28, the free end of which is provided with a hook 29 to engage either one of a pair of rings or loops 30 and 30ª, carried by an anklet 31, the same being constructed of any material capable of withstanding strain, preferably of leather, and provided with a lacing 32, by which it can be secured around the ankle of the patient, as shown in Fig. 2. As a means for holding the patient in position while extension or flexion is being applied to the limb there are two straps 33 and 34 provided, the former of which is secured to the under side of the table, transversely thereof and adjacent to the casing, and is adapted to be passed across the abdomen and around the crest of the pelvis and the latter being adapted to be passed around the hips of the patient and around the head of the table and to en-

gage with the legs 4. There is also provided a pad or cushion 35 to elevate the patient's hips and to obviate any pain when being strapped to position.

In addition to the mechanical features above described there are provided two hoods or heat-retainers 36 and 37, each of which is an open-ended bag-like structure provided at each end with a draw-string 38, 39, 40, and 41. One end of each of the hoods is adapted to be secured around the open end of the casing and to be held in position thereon through the medium of the draw-strings 39 and 40, the other end portion of the hood 36 being secured around the leg of the patient adjacent to the knee and held in position thereon by the draw-string 38, while the outer end of the other hood is secured around the leg of the patient near the ankle and is held in position thereon by the draw-string 41. When the hoods are thus positioned, any escape of heat from the interior of the heating-chamber is positively precluded.

To sustain the leg of the patient while in the casing, there is a rest 42 provided in the nature of a hammock, which is supported from the upper portion of the casing in any suitable manner, as by hooks 43 and eyes 44.

In the use of the apparatus the clothing is removed from the limb to be treated, and this is then wrapped in two or three thicknesses of Turkish toweling. The limb is then disposed within the support 42, nd hoods 36 and 37 are positioned in the manner described, and the straps 33 and 34 are tightened. The lamp is then lighted, and the heat therefrom enters the chamber, and when a temperature between 350° and 450° is reached the stiffened tendons relax and soften, and the limb is now in condition to be extended or flexed. To extend the limb, as shown in Fig. 2, the hook 29 is engaged with the loop or ring 30, and upon the crank 13 being turned the strap 28 will be placed under tension, thereby drawing out the limb. Where the limb is to be flexed, the strap 28 is passed around the roller 18 and the hook 29 is brought into engagement with the loop or ring 30ª, and upon the crank being turned the strap will be placed under tension and will draw the heel backward toward the head of the patient, thereby securing the requisite flexion. The treatment will be continued until the stiffened parts relax and become flexible.

In operating the apparatus where proper care is exercised practically no pain will ensue to the patient, inasmuch as owing to the high heat used the limb becomes practically insensible to pain.

The apparatus as a whole is exceedingly cheap of construction, is not likely to get out of repair from long-continued use, and in case of damage, any of the parts may be readily repaired and replaced at but a slight expense.

Having thus described the invention, what is claimed is—

1. An apparatus of the class described comprising a heating-chamber, means for sealing the same, and extension-exerting and flexion-exerting mechanism combined with the chamber.

2. An apparatus of the class described comprising a table, a heating-chamber disposed thereon, means for supplying heat to the chamber and for diffusing the same therein, a limb-support arranged within the chamber, means for sealing the chamber against the escape of heat, and mechanism combined with the chamber for exerting extension and flexion.

3. An apparatus of the class described embodying a heating-chamber, means for suspending the limb therein, means for sealing the chamber against escape of heat, means for exerting both extension and flexion upon the limb of the patient, and means for holding the patient against movement while undergoing treatment.

4. An apparatus of the class described comprising a table, a pair of yokes disposed at one end thereof, brackets supported by the yokes, extension and flexion mechanism supported by the brackets, and heating-chamber supported by the table.

5. An apparatus of the class described comprising a heating-chamber, and extension and flexion mechanism adjustable relatively to the chamber.

6. An apparatus of the class described comprising a heating-chamber, a shaft and means for actuating the same, a draft mechanism combined with the shaft, and means for converting the draft mechanism from an extension device into a flexion device.

7. An apparatus of the class described comprising a table, a pair of yokes disposed at one end thereof, brackets supported by the yokes and provided with spaced bearings, a shaft engaging the bearings and carrying at one end a crank and at its other end a ratchet-wheel, a pawl carried by the bracket and engaging the ratchet-wheel, and a strap combined with the shaft and carrying a hook.

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

ROBT. R. NORWOOD.

Witnesses:
ED C. BAKER,
W. S. CONATSER.