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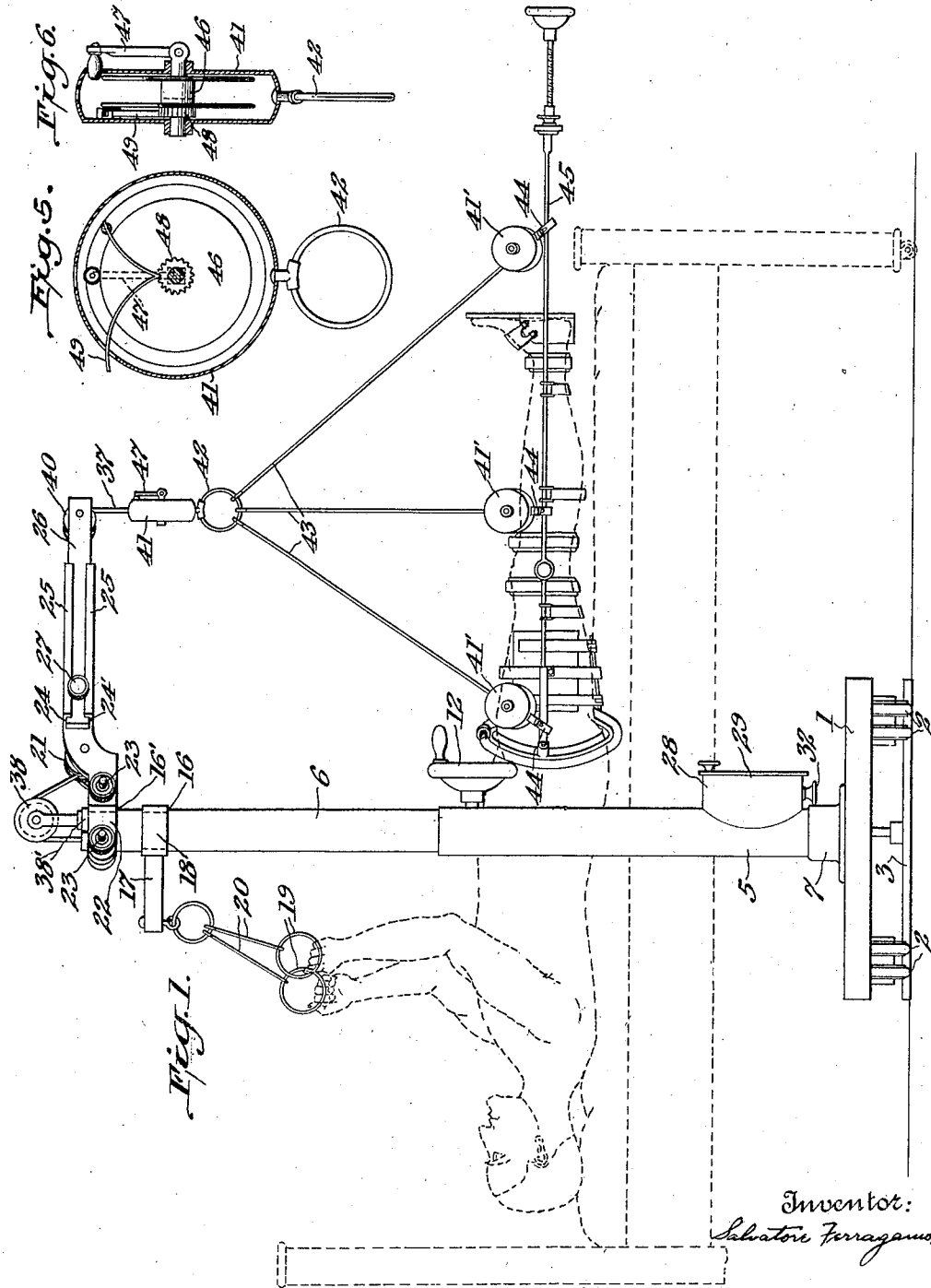
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APPARATUS FOR SUPPORTING INJURED LIMBS

Filed Nov. 3, 1921

2 Sheets-Sheet 1



Inventor:
Salvatore Ferragamo

By *Byrnes, Townsend & Brickmaster*,
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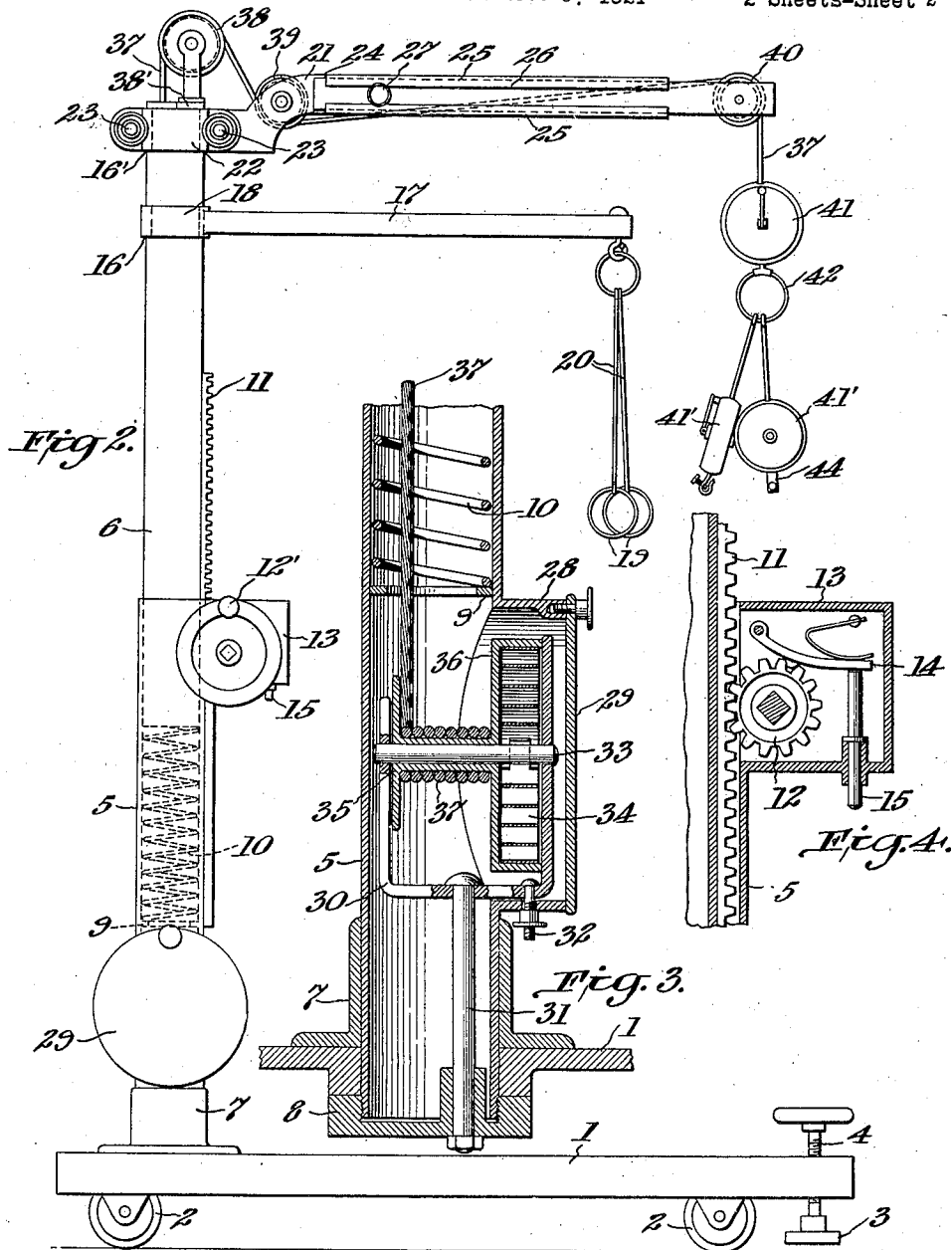
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Inventor:
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UNITED STATES PATENT OFFICE.

SALVATORE FERRAGAMO, OF SANTA BARBARA, CALIFORNIA.

APPARATUS FOR SUPPORTING INJURED LIMBS.

Application filed November 3, 1921. Serial No. 512,612.

To all whom it may concern:

Be it known that I, SALVATORE FERRAGAMO, a subject of the King of Italy, residing at Santa Barbara, in the county of Santa Barbara and State of California, have invented certain new and useful Improvements in Apparatus for Supporting Injured Limbs, of which the following is a specification.

My invention relates to an apparatus for supporting an injured limb and particularly to a portable apparatus adapted to provide a yielding support for a limb which is carried in a splint or other frame.

An object of my invention is to provide an apparatus for properly supporting an injured limb during healing and which apparatus will provide for the maximum ease and comfort of the patient. A further object of my invention is to provide a portable apparatus which may be anchored in position near the bed on which the patient lies. A further object of my invention is to provide an apparatus including a yielding support, and more specifically a yielding support having provision for varying the tension applied by the yielding support. Still another object is to provide a support for the limb and hand grips which the patient may use in shifting the position of his body, but not of the supported limb. A further object is to provide a platform carrying a vertically adjustable standard having an extensible lateral arm which carries a tensioned cable for supporting the limb. More specifically an object is to provide a vertically adjustable standard carrying a radially adjustable and extensible arm, upon which parts is mounted an adjustably tensioned cable for supporting a limb.

One embodiment of my invention is illustrated in the accompanying drawings, in which—

Fig. 1 is an end elevation of my apparatus as applied to support a leg splint;

Fig. 2 is a side elevation of the apparatus, the radial arms being shown in position over the platform;

Fig. 3 is a fragmentary vertical section through the base of the post and the cable drum;

Fig. 4 is a detail view, in section, illustrating the standard adjusting means; and

Figs. 5 and 6 are vertical sections on planes at right angles to each other, through one of the take-up devices.

In Fig. 1, which illustrates the invention in use in connection with a case involving a fracture of the leg, the platform which supports the apparatus is designated by the numeral 1, and said platform is carried on rollers 2 and is provided with a brake or anchoring device such as a bar 3 which may be forced against the floor by a screw 4 which passes through the platform 1. A telescoping standard comprising a lower outer post 5 and an upper inner post 6 is mounted on the platform 1. The lower post 5 passes through a flanged opening in the platform 1 and is clamped to the platform by means of a collar 7 and a cap 8 which is screwed onto the lower threaded end of the post. The lower post 5 is provided with an internal flange 9 and a cushioning spring 10 is located between flange 9 and the lower end of the upper post 6. To provide means for adjusting the height of the standard 5, 6, the post 6 carries a rack 11 which engages with a pinion 12. The pinion 12 is suitably mounted in housing 13 which is carried by the post 5, and said pinion is provided with a handwheel 12' and a spring-pressed locking pawl 14 which may be moved out of locking position by plunger 15.

Near its upper end, post 6 is provided with a pair of upwardly presented shoulders 16 and 16', and said shoulders are preferably formed by reductions in the outside diameter of the post. An arm 17 is mounted on post 6 by means of a sleeve 18 which rests upon the lower shoulder 16 and which is free to rotate about the post. A pair of hand grips, as rings 19, are suspended from the outer end of arm 17 by means of cords or cables 20.

The upper shoulder 16' provides a stop surface upon which a second lateral arm rests. This second arm comprises a pair of members 21 having their inner ends 22 located on opposite sides of the post 6 and curved to conform to the outer surface thereof. These end portions 22, together with suitable clamping bolts 23 provide a clamp for fastening the lateral arm to post 6 in any desired radial position. The outer sides of the members 21 are formed with upper and lower lateral extensions 24, 24 which terminate, respectively, in downwardly and upwardly directed flanges 25, 25. This construction provides longitudinal sockets or sleeves for the reception of extension bars 26

which may be moved along the members 21 and clamped in any desired position by means of nuts 27 which bear against flanges 25, 25 and which are mounted on bolts carried by bars 26.

A casing 28 having a removable cover plate 29 is formed on the post 5 near its lower end and houses a U-frame 30. The frame 30 is attached to the post 5 by means of a bolt 31 which passes through the cap 8 and an additional bolt 32 which passes through the frame 30 and the housing 28 prevents rotation of the frame about the bolt 31. The frame 30 carries a fixed shaft 33 through which one end of a coiled spring 34 passes. Upon the shaft 33 is mounted a drum 35 having a flanged side 36 which encloses the spring 34 and to which the outer end of said spring is fixed. A cord or cable 37 has an end coiled upon and attached to the drum 35 and the other end pass up through the hollow standard 5, 6, over a pulley 38 and then under pulley 39. The pulley 38 is carried on a post which is free to turn on a plate 38' which is attached to the post 6 and pulley 39 is mounted on the relatively stationary members 21 of the upper arm.

The cable 37 then passes over a pulley 40 on the outer ends of the extensible bars 26 and carries a take-up device 41 at its outer extremity. The take-up device carries a ring 42 to which a plurality of cords or cables 43 are attached and each of said cables is provided at its lower end with a take-up device 41'. The several devices 41' are individually attached by means of clamps 44 to the splint frame 45.

The take-up devices 41' are preferable identical in construction with the take-up 41 which comprises a suitable casing and a shaft having fixed thereon a drum 46, a handle 47 and a ratchet 48 which is engaged by a locking lever 49. The handle 47 is pivoted to the shaft so that it may be folded over to engage an opening in the casing to provide an additional locking means.

In use, the platform is wheeled into position and anchored adjacent the bed after the splint has been applied to a patient's limb. The standard 5, 6 is adjusted to the desired height and the upper lateral arm is swung into and clamped in position over the injured limb. The length of the arm is adjusted to bring the ring 42 over the center portion of the limb. The cables 43 are then connected to the splint frame 45 by means of the adjustable clamps 44 and the cables are adjusted in length through take-up devices 41'. When the cables 43 are properly adjusted the take-up device 41 is operated to take up on the cable 37 until the spring 34 is tensioned sufficiently to raise the limb to the desired position above the bed. The limb is thus carried by a yielding sup-

port which exerts just the required tension to hold the limb in proper position. The actual tension required depends upon the weight of the limb and the relative position in which it is supported. The apparatus described furnishes what is in effect an automatic means for properly tensioning the supporting cable since the limb will not be raised into its position until the increasing tension in the cable has reached the proper value.

The device as illustrated in Fig. 1 shows its use for supporting a fractured leg but it is to be understood that it may be used for supporting other portions of the body and that the part supported may be held in any desired position by a suitable adjustment of the cables 43. It is obvious that various changes may be made in the several parts, their relative size, proportion and relationship and that such changes are contemplated within the scope of my invention.

I claim:—

1. An apparatus of the class described comprising a standard, means including a lateral arm for supporting a limb of a patient from said standard, a second lateral arm loosely pivoted on said standard and a hand grip carried by said arm, said second arm being freely movable to position said hand-grip within reach of the patient.

2. Apparatus of the class described comprising a vertical standard, an arm mounted on said standard, a frame for supporting a limb, a cable carried by said standard and arm and connected to said frame, and means including a tensioned cable drum for varying the tension in said cable.

3. Apparatus of the class described comprising a vertical standard, an arm mounted on said standard, a frame for supporting a limb, a plurality of flexible connections attached to said frame, means for varying the lengths of said connections, a cable supported by said arm and having one end connected to said flexible connections, and a spring drum to which the opposite end of said cable is attached.

4. Apparatus of the class described comprising a vertical standard, an arm mounted on said standard, a frame for supporting a limb, a plurality of flexible connections adjustably attached to said frame, means for varying the lengths of the said flexible connections, a cable having one end connected to said flexible connections, a spring drum on said standard for receiving the opposite end of said cable, means on said arm for guiding said cable, and means for varying the length of said cable.

5. Apparatus of the class described comprising a vertically adjustable standard, a member having a longitudinal socket, means for clamping said member to said standard, a bar located in said socket, means for

clamping said bar to said member, guide means carried by said bar, a cable connected to said standard and passing over said guide means, a limb supporting frame suspended from said cable, means for varying the length of said cable and means for varying the tension in said cable.

6. Apparatus of the class described comprising a movable platform, a brake for anchoring said platform, a vertical standard on said platform, a pair of shoulders formed

on said standard, an arm resting on the lower shoulder and loosely pivoted on said standard, hand grips carried by said arm, a second arm resting on the upper shoulder and clamped to said standard, and means carried by said second arm for supporting a limb.

In testimony whereof, I affix my signature.

SALVATORE FERRAGAMO.