Sept. 26, 1933. M. TIEGEL 1,928,515

APPARATUS FOR PREVENTING JOINT STIFFNESS AND ATROPHY OF THE MUSCLES WHEN TREATING BONE FRACTURES

Filed April 12, 1932

Fig. 1

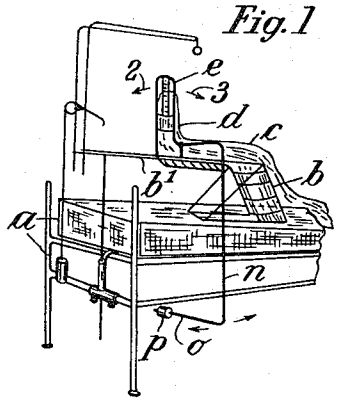


Fig. 2

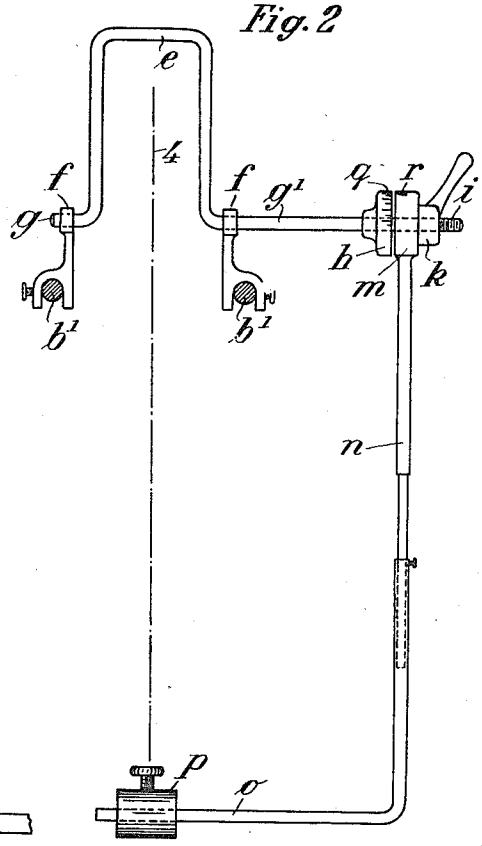


Fig. 3

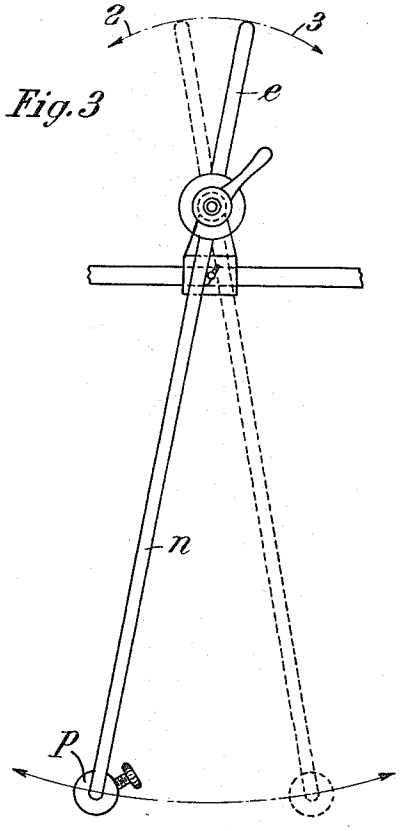
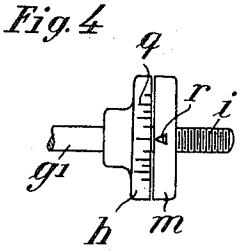


Fig. 4



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by [illegible]

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APPARATUS FOR PREVENTING JOINT STIFFNESS AND ATROPHY OF THE MUSCLES WHEN TREATING BONE FRACTURES

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Application April 12, 1932, Serial No. 604,673, and in Germany December 12, 1931

2 Claims. (Cl. 272—80)

When treating bone fractures with setting dressings as was hitherto customary joint stiffening and atrophy of the muscles often occur, owing to the limb remaining inactive for a long time. This is particularly the case with fractures in or near a joint. If such a stiffening or atrophy has occurred it is often difficult to cure. A wearisome medicomechanical subsequent treatment is mostly necessary, which considerably prolongs the healing treatment and causes extra expenses. Moreover, in spite of the use of all medicomechanical expedients stiffness sometimes still remains so that in the case of State insured persons a lifelong pension must be paid, thereby increasing the burden of the State.

These objections are overcome by the invention.

According to the invention a medicomechanical treatment of the injured limb or of its joints is carried out during the treatment of the fracture for prevening joint stiffness and atrophy of the muscles of the person confined to bed in that by arranging oscillating devices on the supporting splint of the injured limb, freedom of movement is ensured to the joints and to the muscles of this limb directly after the injury has happened so that the muscles are strengthened by moving in opposition to the resistance (weight loading). The oscillating device preferably consists of a U-shaped bow hingedly connected to the supporting splint of the injured limb, one arm of the bow, or its extended pivot axle carrying an oscillatable rod adapted to be adjusted to and to be secured in any desired angular position with an exchangeable weight, so that oscillating of the limb (foot, shank or fore-arm) in the desired angular positions and in opposition to resistance is possible.

An apparatus according to the invention is illustrated by way of example in the accompanying drawing in which:—

Fig. 1 shows in perspective view a portion of the extension bed with oscillating device connected thereto.

Fig. 2 shows on a larger scale the oscillating device in front elevation.

Fig. 3 is a side elevation of Fig. 2.

Fig. 4 shows a detail.

On an extension bed *a* a supporting bar *b*, *b'* for the stretching treatment of a broken leg is arranged. As an example of treatment the foot *d* of the patient is connected to the oscillating device, in order to prevent by the oscillating movement atrophy of the muscles and stiffening of the joint during the treatment of the bone fracture. The oscillating device consists of a bar *e* bent in U-shape and the ends of the arms of the U-shaped portion being bent at right angles to form axles g, g_1 journaled in bearings *f* and hingedly connected by these bearings to a pair of supporting bars *b'* so that they are adapted to oscillate in the direction of the arrows 2, 3. The axle g_1 is considerably longer than the axle g and has on its free end a disc *h* keyed thereon and a screw thread *i* with a tommy-screw *k*. A collar *m* of an oscillatable rod *n* is pressed tightly against the disc *h* and secured against rotation by means of this tommy-screw *k*. In order to facilitate the clamping, the disc *h* and collar *m* may be fluted preferably in radial form on their contacting surfaces. The oscillatable rod *n* is bent at right angles to form an arm *o* which carries an exchangeable weight *p*. This weight is vertical under the central line 4 of the bow *e*. In order to enable the apparatus to be easily adapted to different heights of beds, the oscillatable rod *n* is preferably subdivided and telescopic so that it can be easily adjusted to any desired length. It is possible, by means of the tommy-screw *k*, to bring the oscillatable rod *n* with the weight *p* into any desired angular position relative to the bow *e*, or to alter the angular position of the bow. The injured joint can thus be brought into different positions from time to time, the displacement being increased as the fracture heals. The joint can oscillate freely in all these positions. As the healing process progresses, the oscillating weight *p* is shifted so far from the perpendicular that the limb is brought into extreme bending or stretched position so that the patient, in order to return his limb into the middle position, must overcome the load of the weight by tensioning the group of muscles in question. These movements in opposition to the resistance lead to a premature muscle training and prevent atrophy of the muscles.

In order to be able to accurately control the adjustment of the oscillatable rod *n* or of the weight *p*, a scale *q* is provided on the upper edge of the disc *h*, on which scale a mark *r* on the collar *m* of the oscillatable rod *n* points. The shank, fore-arm or other limb may be connected, in an analogous manner as the foot *d*, to the bow *e* or to a bow shaped according to these limbs.

I claim:—

1. An apparatus for preventing stiffening and atrophy of muscles in the case of persons confined to bed for the treatment of bone or joint

fractures, comprising in combination extension bars for supporting the injured limb, a U-shaped bow hingedly connected to said bars, a swivel axle on said bow, an adjustable and fixable oscillatable rod on said axle arranged at any desired angle to said bow, and a weight on said oscillatable rod.

2. An apparatus as specified in claim 1, comprising in combination with the oscillatable rod and the bow, a disc rigidly mounted on said bow having a scale, an indicator on said rod adapted to indicate on said scale the angular position of said rod relative to said bow, and means for securing said rod in its adjusted angular position relative to said bow.

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