

- [54] **KNEE JOINTS FOR LEG IRONS**
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FOREIGN PATENTS OR APPLICATIONS

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- [30] **Foreign Application Priority Data**
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- [58] Field of Search..... 128/80 F, 80 C, 80 R; 3/22, 27, 2; 403/54, 63, 72, 75, 102, 119, 161

[57] **ABSTRACT**
 The invention provides a knee joint for a leg iron comprising a longer forward link and a shorter rearward link pivoted between lugs at the base of a thigh iron and lugs at the head of a shin iron. A spur on the forward link contacts an abutment formed on the shin iron both at full extension and full flexure to prevent hyperextension and hyperflexion.

- [56] **References Cited**
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2 Claims, 2 Drawing Figures

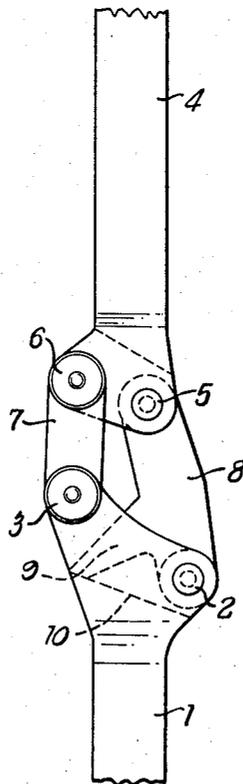


Fig. 1

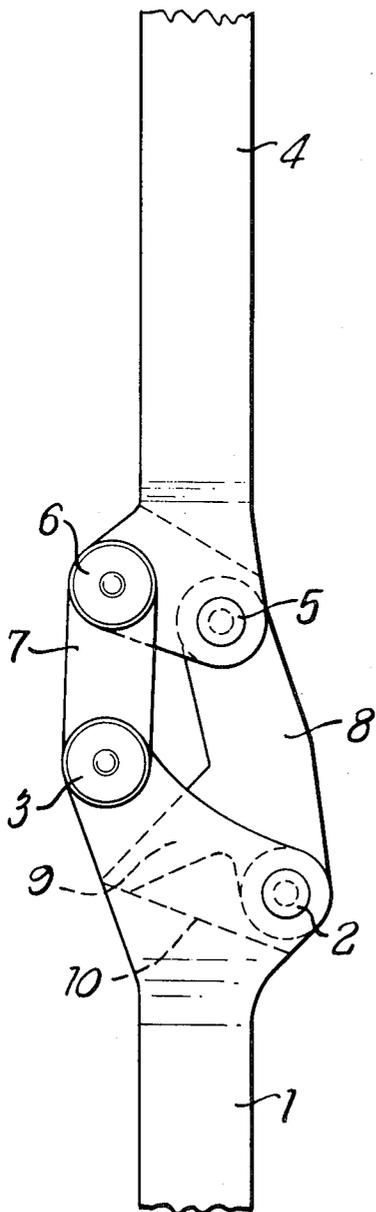
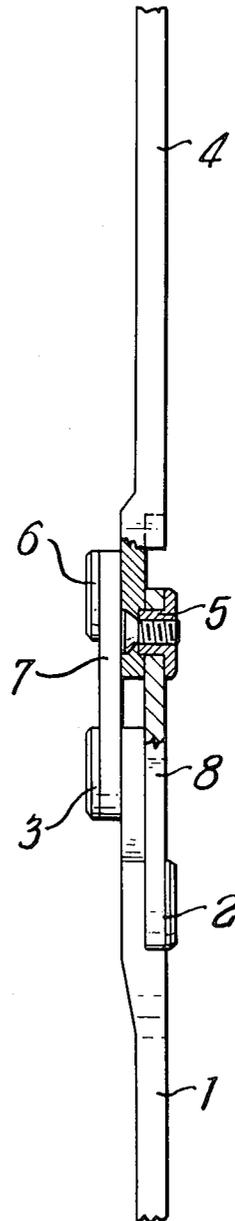


Fig. 2



KNEE JOINTS FOR LEG IRONS

BACKGROUND OF THE INVENTION

This invention concerns improvements in knee joints for leg irons, by which term we mean orthopaedic supports and splints used by patients who have retained their natural knee.

The natural knee joint when flexing through its full range of movement performs a very complex action of sliding, gliding, rolling, twisting and rotation, sometimes sequentially but often all at one time. It therefore has no one axis about, which the rotation occurs. Research has shown that the locus of instantaneous centres of rotation approximates to a downward and forward curving path, beginning some 3 inches up in the femur and ending at about the position of the femoral epicondyles.

Traditionally, orthopaedic joints, for bracing the natural knee, and 'side steels' for supporting and suspending limbs for amputations where the knee is remaining, use single axis pivots, usually placed slightly behind and at about the level of the femoral epicondyles. The single axis not being compatible with the natural joint causes large forces to be applied to the 'steels', and also displacement and thus rubbing of the natural leg or stump.

SUMMARY OF THE INVENTION

It is an object of the invention to provide a knee joint which can support the full weight of a patient and which closely simulates the natural knee movement.

According to the invention we provide a knee joint for a leg iron comprising a forward pivot and a rearward pivot formed at the head of a shin iron and a forward and a rearward pivot formed at the base of a thigh iron, a swinging link between the rearward pivots and a longer swinging link between the forward pivots, the shin iron providing a fixed abutment and the longer link being formed with a rearwardly extending spur which contacts the said abutment at full extension and full flexion of the joint.

In a flexing movement of the thigh iron relative to the shin iron from the fully extended attitude the longer (forward) link first pivots forwardly through a given angle and then its motion is reversed so that adopts an identical position relative to the shin iron in both fully extended and fully flexed attitudes.

The abutment on the shin iron is preferably an inclined face formed by reducing its width towards its head.

In practice a complete splint or other prosthetic device employs two joints as above described, one located inside and one located outside the natural knee, and the two joints are made to opposite hands.

A preferred construction of knee joint is illustrated in the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of a preferred embodiment according to the present invention, and

FIG. 2 is an end elevation, partially sectioned, of the device of FIG. 1.

DESCRIPTION OF THE INVENTION

The shin iron 1 is formed at its head with a forward pivot bearing 2 and a rearward pivot bearing 3 at a higher level.

The thigh iron 4 provides at its base a forward pivot bearing 5 and a rearward pivot bearing 6 at a higher level.

A swinging link 7 interconnects pivot bearings 3 and 6, and a longer swinging link 8 interconnects pivot bearings 2 and 5.

The link 8 is formed with a rearwardly projecting spur 9, and the shin iron 1 is cut away on one face at its head to provide a forwardly inclined abutment face 10.

As indicated in FIG. 1, the thigh iron is capable of flexing through $134\frac{1}{2}^\circ$ relative to the shin iron from the fully extended attitude.

In the fully extended attitude the tip of the spur 9 abuts the face 10 as shown in the drawing; upon commencement of flexure of the thigh iron 4 relative to the shin iron 1, the link 8 first rotates clockwise about pivot bearing 2 and then reverses its pivotal movement and moves anti-clockwise. As the joint attains the attitude of full flexure the tip of spur 9 again contacts the face 10.

The joint is thus locked against hyper extension and hyper-flexion by means of only a single stop.

It will be understood that the invention is not restricted to the details of the preferred form which has been described by way of example which can be modified without departure from the broad ideas underlying them.

I claim:

1. A knee joint for a leg iron comprising a shin iron having a head carrying a forward pivot and a rearward pivot, a thigh iron having a base carrying a forward pivot and a rearward pivot, a swinging link between the rearward pivots and a longer swinging link between the forward pivots, a single fixed abutment on said shin iron, and means rearwardly extending from said longer link for cooperative engagement with said single fixed abutment at full extension and at full flexion of the joint so as to limit the degree of movement of said joint in both directions.

2. A knee joint for a leg iron according to claim 1, in which the abutment on the shin iron is an inclined face formed by reducing the width of the head of the shin iron.

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