

G. L. DUTARD.
SURGICAL AND MEDICAL APPLIANCE.
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1,250,818.

Patented Dec. 18, 1917.
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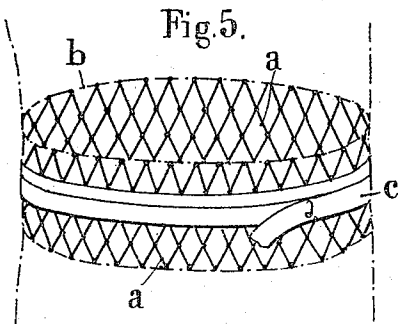
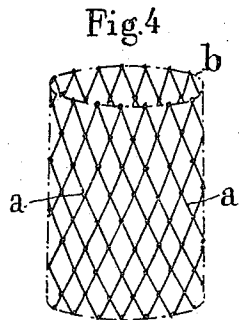
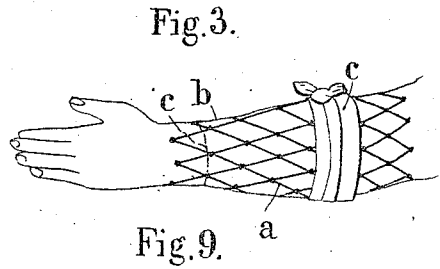
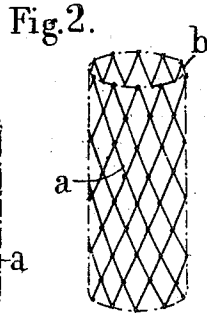
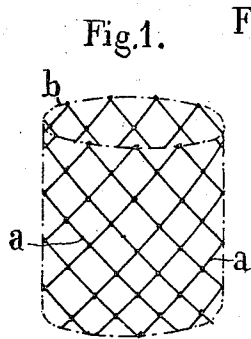


Fig.6.

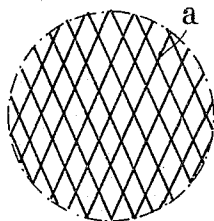
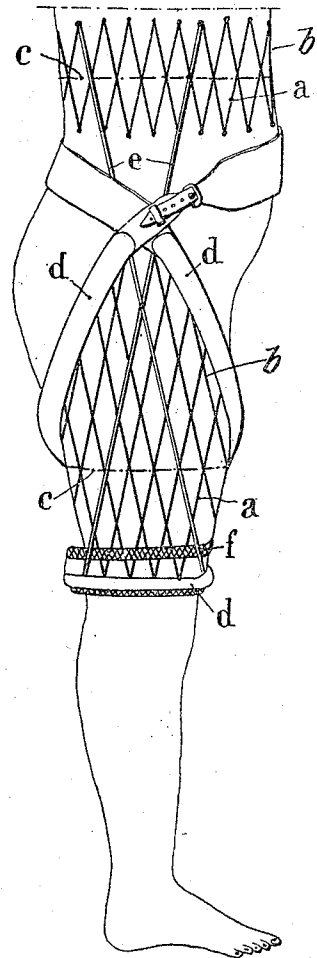
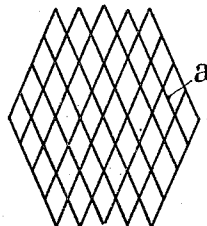


Fig.7.



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Fig.10.

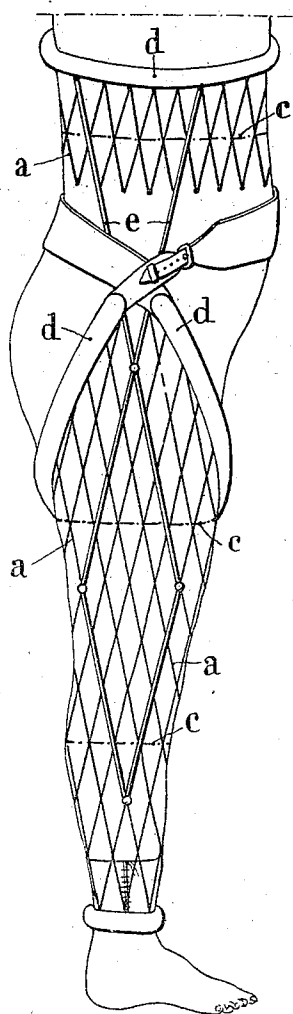


Fig.11.

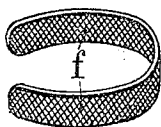


Fig.12.

Fig.13.

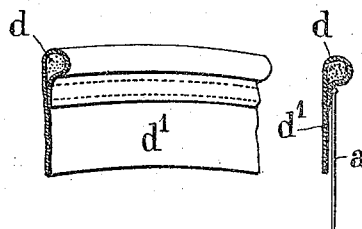
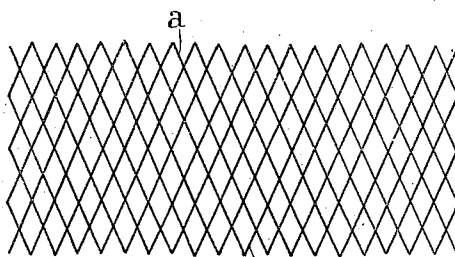


Fig.8.



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UNITED STATES PATENT OFFICE.

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SURGICAL AND MEDICAL APPLIANCE.

1,250,818.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GABRIEL LOUIS DUTARD, of 24 Boulevard de Magenta, Paris, in the Republic of France, doctor of medicine, have invented Improvements in or Relating to Surgical and Medical Appliances, of which the following is a full, clear, and exact description.

The present invention relates to an expanding and removable device for use in reducing fractures and maintaining them reduced more particularly fractures of the limbs and is based on the application of an extensible or expanding member having a single set or a plurality of sets of jointed links which can be maintained in position by means of a band, strap, tourniquet or the like, for reducing fractures and maintaining them reduced.

It is known that when one of the diagonals of a jointed parallelogram is shortened the other is lengthened. This lengthening at the beginning of the travel, is considerable, and requires the application of a comparatively large force. On the other hand, toward the end of the travel, the lengthening becomes very small, but the force exerted by the links increases and, in order to move the links to the extreme limit, less and less force is required.

A jointed member of parallelogram form therefore constitutes an expansible or extension member, the action of which may be graduated at will according to the results to be attained.

Arranged in the form of a device for treating fractures, the first force exerted on the jointed parallelogram member serves to bring the device to the point, and the second force produces a useful and adjustable compression, tension or extension effect.

The present device is preferably arranged in the form of a sleeve formed by a set of jointed members which form a parallelogram the individual links of which are flexible and consist for example of pieces or stems of ratan or cane, so as to conform exactly to the form of the wounded limb under the action of a compressing strap, band or equivalent. The sleeves may be cylindrical or frusto-conical or they may be arranged in the form of girdles, collars and the like according to the part of the body to which they are to be applied.

The present device when arranged in the form of a sleeve constitutes an expanding and movable splint, capable of being used as a sling which is easy to remove and to replace, as it is only necessary to detach the band or strap holding the said sleeve in position in order to remove the splint; this simple or complex device may if required be made immovable by means of bands or plastered compresses.

The device may also be arranged in such a way that the jointed members in the form of parallelograms may be utilized in a rectilinear series in order to obtain, in a straight direction simultaneous extension or extensions in independent or conjugate, convergent or divergent, parallel series.

When the device comprises two or more sets of jointed parallelograms, the latter may be united by main branches, combining the said sets into one.

More particularly in fractures of the femur (thighbone) the present device is provided with special means of padding which is fixed above and below the wounded limb and serves as a support for the extremities of the jointed parallelograms, in order to enable a suitable extension of this member to be obtained.

I will describe with reference to the accompanying drawing a construction in accordance with this invention but I do not limit myself to the precise construction described and illustrated.

Figure 1 shows a device formed of jointed parallelograms, in accordance with the present invention, these parallelograms being widened laterally to enable the device to be put in position on a wounded limb and removed therefrom when necessary and with a minimum of discomfort to the patient.

Fig. 2 shows a sleeve, similar to that shown in Fig. 1 but collapsed diametrically and extended longitudinally.

Fig. 3 shows the same sleeve in use as applied to a forearm.

Figs. 4 and 5 show two other forms of sleeve.

Figs. 6, 7 and 8 show other methods of carrying the invention into practice, the jointed parallelograms in these views being arranged in the same plane so as to form a more or less plane surface.

Figs. 9 and 10 show the present device

applied to the treatment of fractures of the thigh.

Fig. 11 shows separately an auxiliary metallic piece suitable for use in the treatment of fractures of the thigh.

5 Figs. 12 and 13 show in elevation and in vertical section a part of a pad which serves as a support for the extremities of the jointed parallelograms.

10 Referring to the drawing, the present device for reducing fractures and keeping them reduced consists of one or more jointed parallelograms *a* capable of being expanded or lengthened at will according to the direction of the force applied.

15 The members of the parallelograms consist preferably of flexible material, such as stems of ratan, cane and the like.

In Figs. 1 to 5 of the drawing, the jointed 20 parallelograms are arranged in the form of sleeves *b*, of conical or cylindro-conical form, the dimensions of which vary according to the parts of the body to which they are to be applied. Figs. 1 to 3 show a sleeve for the treatment of fractures of the arm, 25 Fig. 4 a sleeve for fractures of the thigh, and Fig. 5 a wide narrow sleeve forming a girdle, corset or armlet.

30 Figs. 1 to 3 show the method of applying the device thus arranged for temporarily supporting fractures of the forearm.

35 The parallelograms of the sleeve are first expanded laterally in order to enable the said sleeve to be engaged on the forearm, then these parallelograms are extended in order to apply them to the corresponding segment. The device is then held by one or more straps or bandages *c* or the like as shown in Fig. 3.

40 The sleeve then constitutes an actual splint enveloping the limb, conforms to the external shape thereof, and provides by the multiplicity of its points of contact a powerful support by a methodical and synergetic gripping produced by the straps, bands or the like *c*. Moreover the elements of the sleeve, which are at the same time soft and rigid, cannot produce irregular compressions, and consequently the device may be applied by 50 skilled or unskilled assistants.

The present device in the form of a splint-sleeve may produce two effects due to the same force:—a reductive effect and an extensive effect.

55 To this end it suffices to furnish, at the extremities of the parallelogram *a*, point of support sufficiently rigid and suitably placed above and below the fracture.

60 These points of support may be formed as shown in Figs. 12 and 13 of the drawing, by a pad *d* constituting one of the edges of a band of linen or other flexible material *d'* capable of being fixed securely at the desired place.

65 The present apparatus is capable of pro-

ducing in this way powerful coördinated and synergetic effects totaling up and aggregating and capable of combining with one another to keep fractures reduced to a greater extent than can be effected with the ordinary splints and slings.

70 Fig. 9 of the drawing shows a device arranged for the treatment of fractures of the thigh. It consists of two sleeves *b*, one placed around the patient's waist, and the other around his thigh. These two sleeves are united by two main branches *e*. 75

In practice the upper part of the parallelograms of the thigh sleeve is suitably cut so as to permit of the said sleeve being correctly adjusted. The extremities of the parallelograms are thus supported on pads *d*, one of which passes between the thighs, while the other is arranged at the level of the knee, and applied to a wire splint *f* 80 shown separately in Fig. 11. 85

This horse-shoe shaped splint *f* grips the femoral condyles and embraces the upper front part of the knee. Its two branches are parallel and pass beyond the popliteal cavity, protecting the vessels and nerves of that region against all compression. 90

The sleeve *b* placed around the waist serves as a point of support for the main branches *e* which also coöperate to bring about extension. 95

Fig. 10 shows a modified form of the device illustrated in Fig. 9.

In this form the sleeve which is placed around the waist is supported at the upper part by a pad *d*. The sleeve surrounding the thigh is extended as far as the ankle, and is supported on a cushion or pad placed there. 100

In both cases the reductive and the extensive effect are produced by one or more straps, bands or bandages surrounding the sleeves *b*. 105

This device may also consist of plane members formed by jointed parallelograms of diamond or lozenge shape, and having a round, polygonal or rectangular contour as shown in Figs. 6 to 8 of the drawing. 110

These plane plate members are intended to be wrapped around or placed on the wounded limb, and they may be kept in position by straps, bands or linen bands, tourniquets or the like as hereinbefore explained. 115

The said plates may be combined with various arrangements of appliances in order to complete the latter. 120

The device when formed of jointed parallelograms may be applied in the case of fracture of the vertebral column and of the pelvis, in which case it acts as a powerful sling. It suffices in this case to give the sleeve the appropriate dimensions and strength. 125

Whatever may be its method of execution, 130

the apparatus forming the object of this invention may be readily removed for dressing or other purposes and when in position is practically immovable, and may be utilized if desired in the form of a sling.

As a matter of fact it can be taken away and replaced with the greatest facility for the treatment of the wounds, sores or the like; to that end it is sufficient to detach and refasten the band holding the device in place.

It may be made immovable by applying to its surface a band or plastered compress after it has been suitably placed in position.

It is to be understood that the methods just described of carrying the invention into practice are only given by way of example, as other forms of execution are capable of being utilized without departing from the nature of the present invention.

Similarly the shapes, dimensions and arrangements of detail may be varied according to the purposes for which the device may be used.

Claims:

1. In combination, a fracture reducing device comprising one or more sleeves formed of jointed parallelograms, the side members of some of the parallelograms of one sleeve being extended to form the sides of some

of the parallelograms of the other sleeve to form a combination splint.

2. In combination, a fracture reducing device comprising one or more sleeves each formed of jointed parallelograms, the side members of some of the parallelograms of one sleeve being extended and connected with similar extensions on some of the parallelograms of the other sleeve to form a combination splint, and pads applied to said splint to support said sleeves in a set position on a limb.

3. In combination, a thigh splint comprising a thigh sleeve of lazy-tong formation, a waist sleeve also of lazy-tong formation coöperating with the thigh sleeve to produce extension of the latter, and a horse-shoe shaped splint arranged about the thigh sleeve to embrace the upper front part of the knee and grip the femoral condyles and having its branches passing beyond the popliteal cavity to protect the vessels of that region against compression.

The foregoing specification of my improvements in or relating to surgical and medical appliances signed by me this sixth day of November 1916.

GABRIEL LOUIS DUTARD.

Witness:

CHAS. P. PRESSLY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."