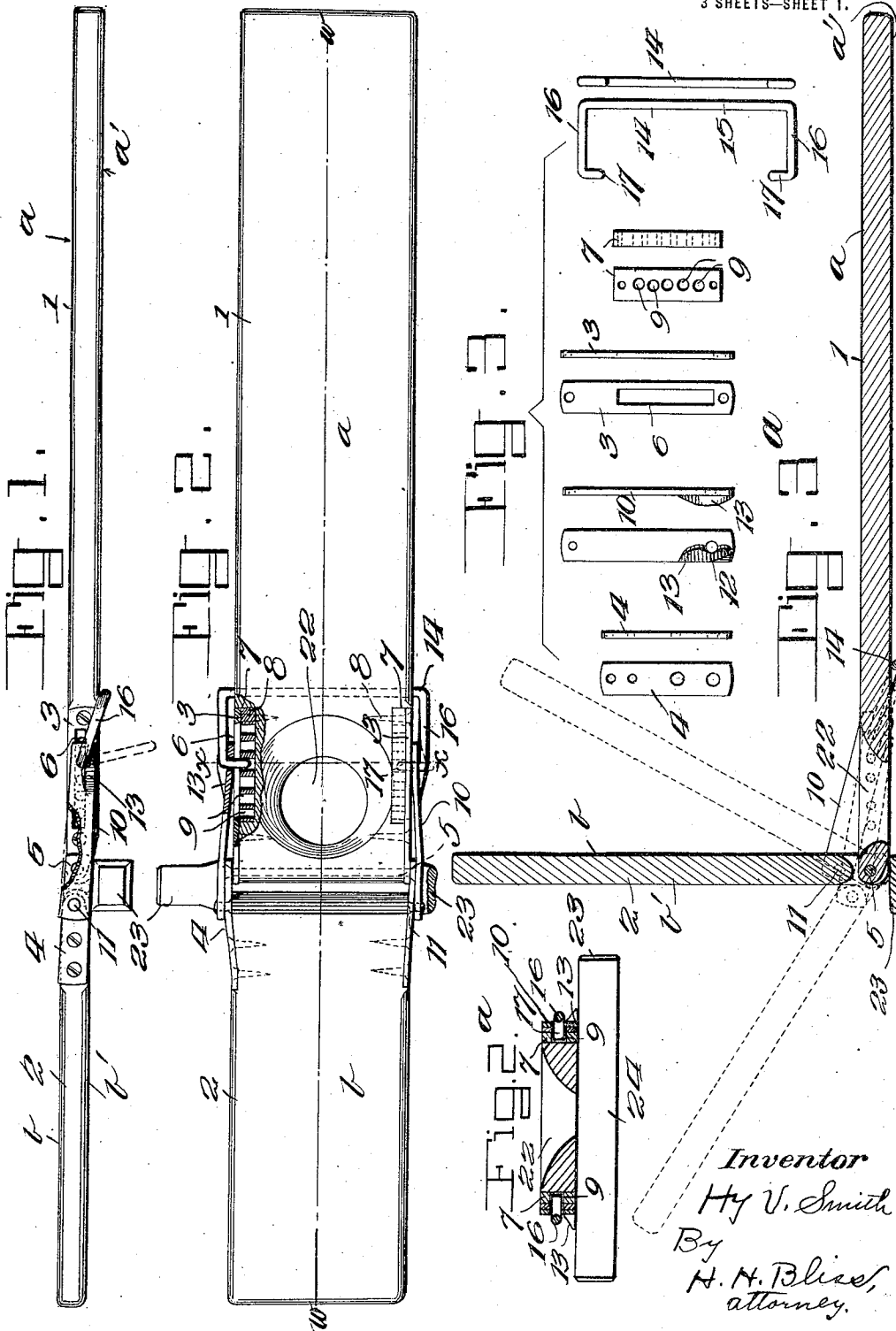


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1,418,486.

Patented June 6, 1922.

3 SHEETS—SHEET 1.



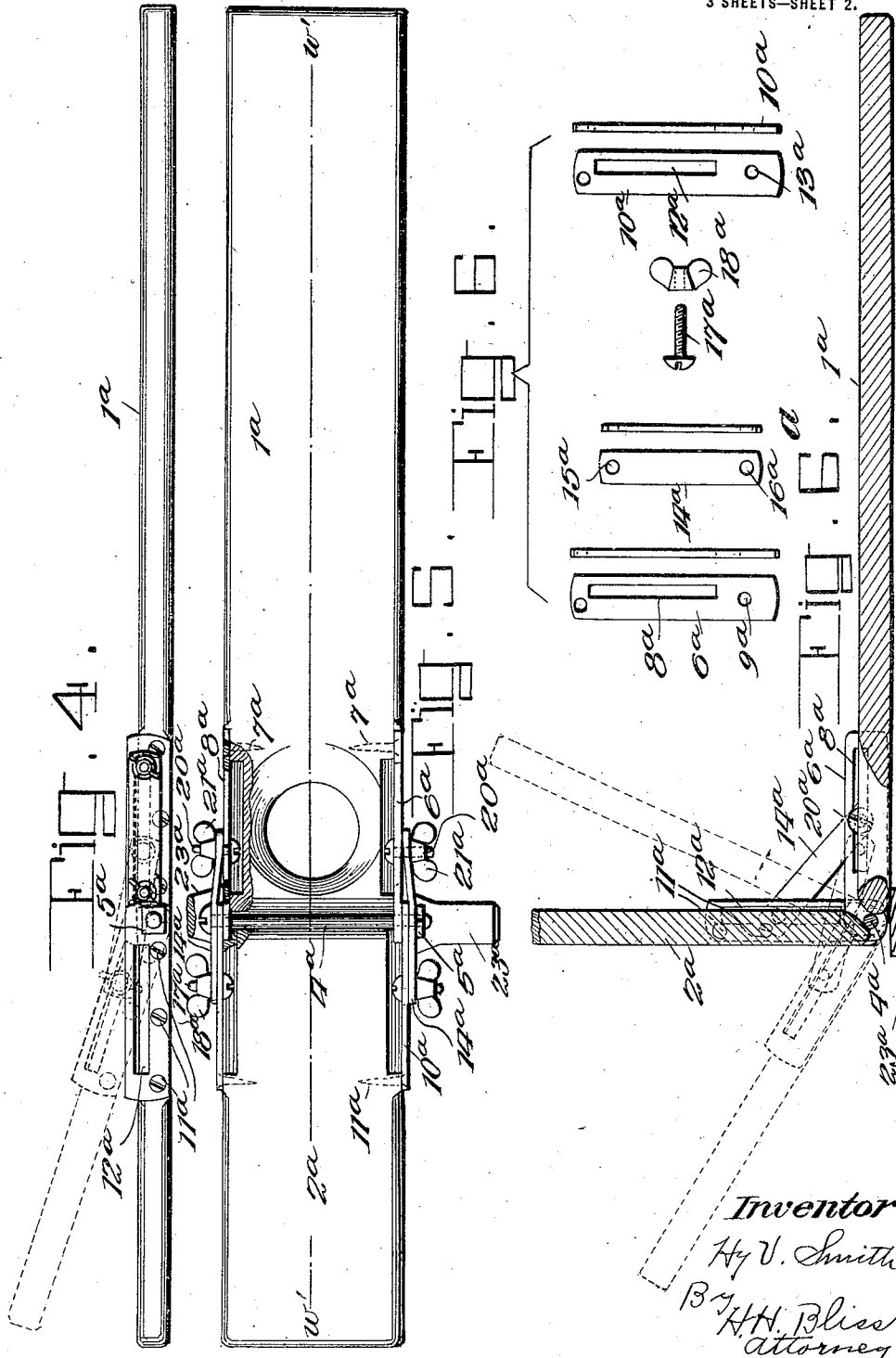
Inventor
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 By
 H. H. Bliss,
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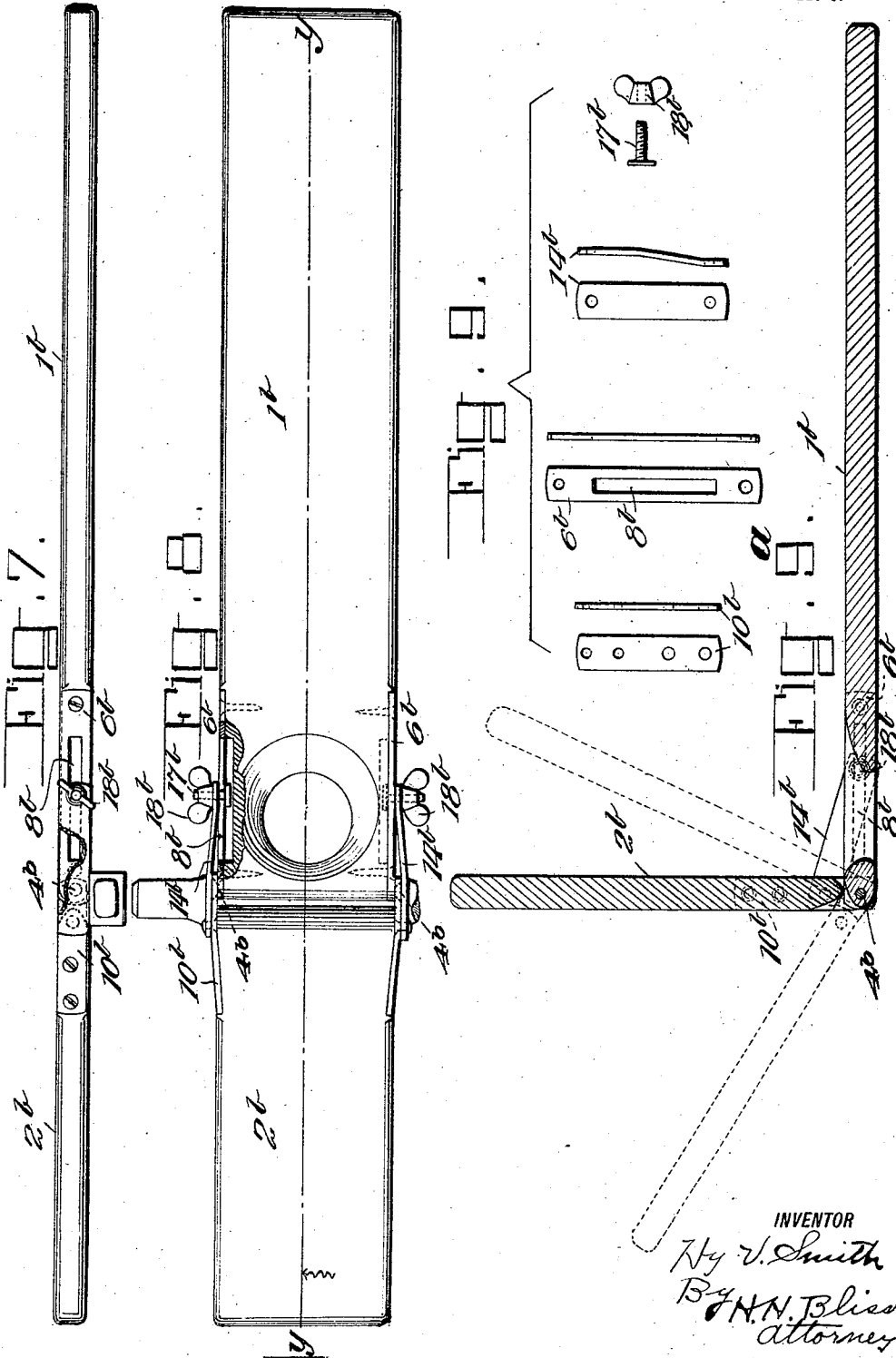
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INVENTOR

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UNITED STATES PATENT OFFICE.

HENRY V. SMITH, OF CHESTER, PENNSYLVANIA.

ADJUSTABLE SURGICAL SPLINT.

1,418,486.

Specification of Letters Patent. Patented June 6, 1922.

Application filed August 18, 1917. Serial No. 186,891.

To all whom it may concern:

Be it known that HENRY V. SMITH, a citizen of the United States, residing at Chester, in the county of Delaware and State of Pennsylvania, has invented certain new and useful Improvements in Adjustable Surgical Splints, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in surgical splints, the devices used in supporting the parts of limbs (arms and legs) which have been wounded, fractured, or operated upon.

One object is to provide, for the supporting of two articulated limb elements, a device which will have all of the capabilities of articles of this class as heretofore made, but which will be susceptible of use in places and under many circumstances where no earlier one, within my knowledge, can be advantageously used.

Another object is to provide a light splint, simple in form and structure, having wide capabilities of use, but whose parts will be so designed, connected and related that they can be brought together and be devoid of projections that would interfere with their being packed among other articles in small space.

Figure 1 is a side elevation of a splint embodying my improvements.

Fig. 2 is a top plan view of the parts extended.

Fig. 2^a is a cross section on line *x—x* of Fig. 2.

Fig. 3 shows in side view and edge view each of the several metallic parts that constitute a set.

Fig. 3^a is a longitudinal section on the line *w—w* of Fig. 2.

Fig. 4 is a side view of a modified form of construction embodying my invention.

Fig. 5 is a plan view of the device in Fig. 4.

Fig. 6 shows detached the metal details of the splint in Figs. 4 and 5.

Fig. 6^a is a longitudinal section on line *w'—w'* of Fig. 5.

Figs. 7, 8, 9 and 9^a are corresponding views of another form.

Referring to the form of device shown in Figs. 1, 2 and 3, it consists of two sections of thin light material such as thin sections of hard wood or flat sheets of aluminum, they being indicated by 1 and 2. Unlike the

hinges in many of the earlier forms of splints, the hinge devices in the present structure are positioned along a line which is extended as much as possible so as to give a firm strong bracing, with the light materials mentioned, and prevent any lost motion or torsional movement such as permitted by hinges having short axial lines, and the result is that the articulated parts of an injured limb are held firmly in the predetermined position.

In the form now being considered, in Figs. 1 to 3, the element 1 is provided with two metallic strips 3, 3, which at their inner ends are perforated; and the element 2 is provided with similarly positioned strips 4, 4, which are also apertured at their ends. Through the overlapping ends of each strip 3 and its companion strip 4 pintle pivots are passed, which are secured by riveting or upsetting the metal at the ends. These hinge devices are as remote from each other as possible and the axial line of the hinge is thus extended.

The reinforcing strips 3, secured to the element 1, are each formed with a longitudinal slot 6. On the inner side of each strip 3 there is a metallic block or bar 7 secured in a rebate in the edge of the part 1 and fastened by screws 8. In this bar or block is a series of sockets or apertures 9 which are positioned immediately behind and in line with the adjacent slot 6 in the strip 3.

10, 10 are locking and bracing links, one at each side of the device. Each link is pivoted to one of the strips 4 by means of a riveted pivot 11. In the opposite end of each link 10 there is an aperture 12, and adjacent to this there is a cam lug 13.

14 is a bail having a central connecting part 15, elastic legs 16, and inwardly turned end parts 17. These parts 17 pass through the slots 6 and are adapted to enter into the apertures 12, and will do so when free to be moved in by the elastic action of the leg parts 16 of the bail 14.

When it is desired to change the angle of the element 1 in relation to the element 2 the bail is rocked to the position shown in Fig. 3^a. This causes the cam lugs 13 to spread the elastic legs 16 outward, and the inner ends of the parts 17 are drawn out of the apertures or sockets 9. Then the elements 1 and 2 can be turned on their hinges at 5. When they have been brought to the desired positions the bail 14 is swung back

to its relatively inclined position, and the leg parts escape from the cam lugs 13 and by their elasticity force the ends of the pins 17 into the cavities or apertures 9, and the main parts 1 and 2 of the splint are locked in position.

These elements 1 and 2 can be thus locked when in alignment, there being then provided a rigid flat splint equal in length to the sum of the length of the two elements; or, as stated, they can be placed at any desired angle.

It will be observed that in any event the region immediately above the faces *a* and *b* of these elements are entirely unobstructed; nor are there any obstructions projecting outward from the lower or opposite faces. The adjusting and locking devices are remote from the central plane passing at right angles through the broad faces of the elements 1 and 2. They are at the sides of the splint and at the sides of the limb of the patient. They present no projections; they can be adjusted delicately at any time, and tightly locked even when in position, without inconvenience to the patient.

Patients having splints attached to their limbs are liable to accidentally or intentionally turn or twist them when the limbs are in a horizontal position. To prevent this, I extend lateral projections 23 from the side lines of the elements 1 and 2 far enough to serve as a rigid base. These may be provided by securing a bar 24 to the lower element; or they may be formed in any other suitable way, as for instance, by the attaching of stiff wire loops.

When the splint is used for properly holding the foot of the patient in relation to the adjacent parts of the lower leg; the projecting part of the heel is assisted in attaining a comfortable support. The surface of the leg element 1, being smooth and continuous, extends on straight lines from the end of the heel to the muscle of the calf, and at points immediately upon the heel there is a relatively large open space where the back part of the limb adjacent to the ankle is not in contact with the splint surface and is therefore without support. It is not desirable to follow the curvature of the under side of the ankle, as it may be necessary to use the same device for the support of the upper and forearm at the elbow, in which case the continuous straight surface is required.

To adapt the element 1 to follow closely the surface of the limb immediately above and behind the ankle of the patient, I form a cavity 22 near the lower inner end of this element. The edges of the cavity are sloped or beveled, and if the plate or bar is thin an aperture extending entirely through this element can be formed as is shown in the drawings. In either case it is in such posi-

tion as to receive the projecting part of the heel at the proper place relative to the hinge axis.

In Figs. 4, 5, 6 and 6^a, a modified form of the splint is shown. It also comprises two main flat elements 1^a, 2^a. 4^a is a long pintle, headed at one end, and provided with a nut 5^a at the other end, this pintle extending entirely across the splint and furnishing a firm brace against torsion. On each side there is a narrow, thin metallic plate 6^a, fastened by screws 7^a to the end of the base part 1^a. It is longitudinally slotted at 8^a and has a pintle aperture 9^a to receive the pintle 4^a.

10^a is a similarly shaped plate secured by screws 11^a to the lower or inner end of the support element 2^a. It also has an elongated slot 12^a, and at 13^a has a pintle aperture to receive the pintle 4^a.

14^a, 14^a are two adjusting, bracing and locking bars. Each is formed of a thin, light piece of metal and has apertures 15^a and 16^a near its ends, respectively. Threaded pins 17^a, with wing nuts 18^a, pass through aperture 15^a and slot 12^a. The threaded pin 20^a, with wing nut 21^a, passes through aperture 16^a and through slot 8^a. These devices provide for any angular adjustment of the flat elements 1^a and 2^a, which may be called for and provide for locking these elements at the desired angle of adjustment.

This form of the splint is also provided with laterally extending base projections 23^a to prevent the splint from rocking when it, in a horizontal position, is resting upon a support.

In Figs. 7 to 9, another modified form of the splint is shown. Here there are also two flat limb-supporting elements 1^b, 2^b. The former is provided with two thin metallic plates 6^b, slotted as at 8^b, and the latter (element 2^b) is provided with two similar slotted plates or bars 10^b, 10^b, which are joined by riveted pintles 4^b to the plates 6^b.

14^b, 14^b are the bracing and locking links which are secured to the plates 10^b by riveted hinge pins. At the opposite ends these links 14^b are each provided with a wing nut 18^b and a threaded pin 17^b which passes through the slot 8^b in one of the bars 6^b.

In this case there are no projections extending out at the hinge line in any of the relative positions of the parts. The links 14^b are free to cross the axis of the hinge, and the only projection at either side is the single small wing nut.

What I claim is:

1. In a surgical splint of the class described, the combination of a base element, a limb supporting element, both of said elements being substantially flat and formed of thin light material, hinging devices for the adjacent ends of said elements and duplicate sets of locking and bracing devices

one set at each side thereof, all of said parts being arranged to provide a limb support without projecting obstructions on either the upper sides or the lower sides and to have
5 the surfaces of the upper sides of both elements brought to and maintained in a common plane.

2. In a surgical splint of the class described, the combination of a thin flat base
10 element, a thin flat limb supporting element, reinforcing plates secured to each element at the end adjacent to the other, laterally remote hinge devices joining together said reinforcing parts, a bracing and lock-

ing link at each side of the splint, each link
15 being pivotally connected to a reinforcing part of one of the elements and slidable along the reinforcing part on the other element, and means for locking the said bracing and locking links to hold the said ele-
20 ments at different angles.

In testimony whereof, I affix my signature, in presence of two witnesses.

HY. V. SMITH.

Witnesses:

MARTIN GARVEY,
JOHN C. DAY.