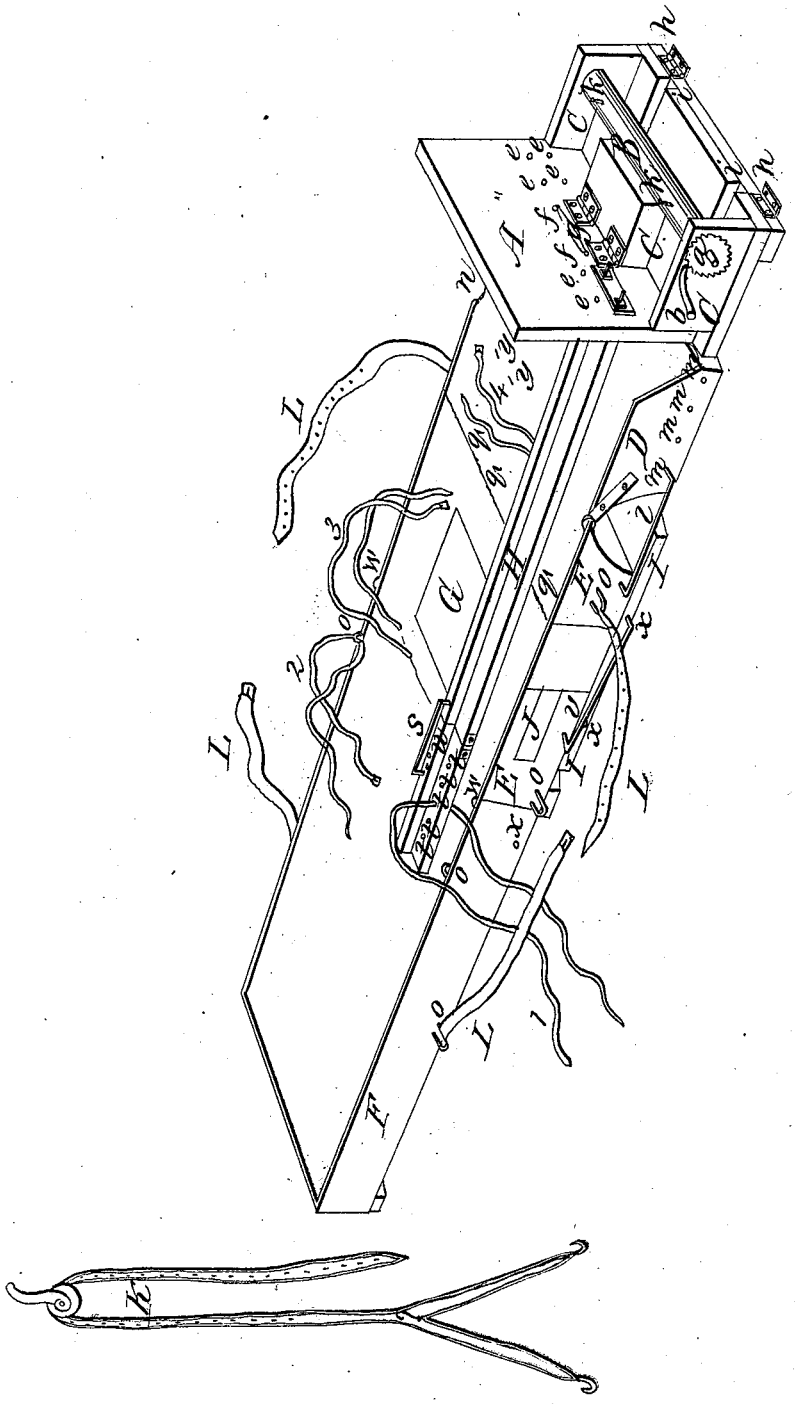
O. M. Allaben,

Fracture Apparatus.

No. 1,428. Patented Dec. 12, 1839.



UNITED STATES PATENT OFFICE.

O. M. ALLABEN, OF MIDDLETOWN, NEW YORK.

APPARATUS FOR THE CURE OF FRACTURES.

Specification of Letters Patent No. 1,428, dated December 12, 1839.

To all whom it may concern:

Be it known that I, ORSON M. ALLABEN, of Middletown, in the county of Delaware and State of New York, have invented a new and useful Machine for Fractures of the Lower Extremities, called "An Apparatus for Fractures;" and I do hereby declare that the following is full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which is given a diagonal view, exhibiting the upper surface, right side, and foot of the machine when in a horizontal position and a view of the elevating-strap by which it is moved.

References.—A, the footboard; B, the extension roller; C, C, C, the footblock; D, the leg portion of the fracture bed; E, E, the thigh portion of the fracture bed; F, the back portion of the fracture bed; G, a trap-door for the expulsion of the evacuations; H, H, the splint; I, I, the right leg of the machine; J, the sliding joint of the thigh portion of the fracture bed; K, the elevator or strap for elevating the machine; *a*, a small wheel for managing the extension roller; *b*, a brace for sustaining the extension wheel; *c*, *c*, hinges on which the footboard turns; *d*, plate nuts and screws for fastening the splint; *e*, *e*, *e*, *e*, *e*, *e*, transmission holes for the extension cords or splint screen; *f*, *f*, transmission holes for the cords fastening the well foot; *g*, a groove in which the last mentioned cords lie when tied; *h*, *h*, hinges for attaching the apparatus when used; *i*, *i*, spaces for the passage of the bolts of the footblock; *k*, *k*, pins for attaching the extension cords; *l*, an iron brace for controlling the joint corresponding to the knee; *m*, *m*, *m*, *m*, holes for the insertion of the above brace; *n*, *n*, a joint in the machine corresponding to the knee joint; *o*, *o*, *o*, *o*, *o*, staples for elevating the machine and for attaching straps; *p*, pin for securing the sliding joint; *q*, *q*, *q*, *q*, division in the cushion to allow the use of the sliding joint; *r*, a hinge forming a joint in the splint; *s*, an iron brace for securing the above joint; *t*, *t*, *t*, *t*, *t*, holes in the top of the splint for the transmission of the pelvis strap; *u*, holes for the insertion of the brace *s*; *v*, an iron brace for managing the leg and hip joint of the machine; *w*, *w*, a joint of the machine corresponding to the hip joint; *x*, *x*, *x*, holes for the insertion of the brace *v*; *y*, *y*, holes for the transmission of strap No. 4; *z*, represents a crank to turn the roller, but any other means will do. 1, pelvis strap; 2, hip strap; 3, thigh strap; 4, knee strap.

My apparatus, as a whole, consists of two parts, viz., the fracture bed, and the splint portion.

The fracture bed is about two feet wide and seven feet long, and is composed of three planes, adapted to the reception of the leg, or extremity below the knee, the thigh, and the back, or body and superior extremities.

The bed is composed of a backboard about two feet wide and one inch thick, supported on the back by narrow strips of board nailed across wherever necessary, and side boards of the same thickness, and four inches high, screwed upon the back board in the form of a box, and supported by small prismatic blocks fastened upon the inner angle which is formed by the back and sideboards. The whole is then cushioned from the top of the machine, across which a board is fastened in the manner of the sideboards, down to that part corresponding to the ankle of the patient, by stretching across from the upper edge of one sideboard to the upper edge of the other stout cloth, as bed ticking, and fastening it to the sideboard, by means of small nails, and then stuffing beneath it oat chaff firmly packed.

The three planes are united by means of rule joints, fastened upon the side boards, in such a manner, that the pivots of the hinges shall correspond exactly with the surface of the cushion. The frame of the bed, at the knee joint, is chamfered off backward to an angle of forty five degrees in each direction, in order to allow the two lower planes to form an angle to that extent backward. The posterior surfaces of the joints is lined, previous to stuffing the cushion, in the same manner as the surface of the bed. The cushion at the joints should be stitched across, previous to the stuffing.

The superior plane is about two feet nine inches long, and has fastened to its sides, a little above its middle, iron staples, for the purpose of elevating the bed, or the superior plane upon the middle plane, and for the attaching a strap and buckle for the support of the superior plane in an inclination forward upon the middle plane. Upon the upper edges of the sideboards, and about six inches from their lower extremities, are fastened small staples for attaching straps to

pass over the hip and groin of the broken limb, for the production of counterextension. Near the posterior and inferior angle of the sideboards is a hole, for the insertion of a brace, attached to the middle plane, and used to prevent the motion of the hip joint of the machine.

The middle plane is about one foot ten inches long, and of the same width and thickness as the superior plane. Attached to it, on the backside, at the edge, and about two inches from the upper end, which is battened, are legs, fastened with hinges, which allow them to be folded to the body of the plane, two inches wide at the upper end, and one inch at the lower end, one inch thick, and as long as the lower plane. They have two holes in their outer edge fitted so as to receive the iron brace of the middle plane, when folded, and when extended. The bottom board of the middle plane at about twelve inches from its upper end is sawed asunder, and each division has sideboards firmly attached, and which slide upon each other so as to form a kind of sliding joint. In the side boards of the upper section of this plane at one inch from the upper edge, and from below upward, is cut a space, one inch and three fourths wide, and ten inches long, and lined upon the inside with a half inch board, and battened upon the outside and lower end with a board four inches square and half an inch thick, through the center of which passes a pin, for securing the tongue which fits into the groove. The sideboards of the lower section terminate above in tongues, which fit exactly into the grooves above described, and which allow an extension of the middle plane of six inches, to adapt it to different limbs.

In the upper section of the middle plane is a trap door, cushioned separately from the bed, and which swings back upon hinges when stools are procured, and which is retained in its place by a button. The cushionings of the upper and lower portions of the bed terminate with the upper and lower sections of the middle plane. When the middle plane is extended, the aperture between the cushions is filled by a temporary cushion, secured by tapes tied over the aperture behind. At about one third of the distance of the sideboards, from above, and near their back part, is an iron brace, secured by a pin, upon which it turns, the other end of which is bent to be inserted into the holes in the leg and upper plane for their security. Near the superior and posterior angle of the side boards is a staple, for managing the machine by means of the elevator. In the lower section of the side boards near their middle are other staples, for managing the machine, and giving attachment to a leather strap for supporting the upper upon the middle plane. At the inferior and posterior angle of the lower section of the side boards, are iron braces, secured by pins upon which they turn, at one end, and bent at the other, to be inserted into holes in the lower plane. Through the cushion at the joint of the upper and lower planes pass leather straps, fastened to the back side of the machine, intended to buckle over the thigh and groin, and produce counter-extension of the fractured limb, when the upper plane is elevated.

The inferior plane of the fracture bed is about two feet or two and a half long, and of the same thickness as the other planes, but two inches narrower, to allow the passage of the lower ends of the legs, which are one inch wide, each, when the legs are folded to the middle plane, and the middle and lower planes are flexed back upon each other. About one foot of the lower surface of this plane has neither cushion or sideboards, but is left bare, for the attachment and regulation of the splint portion of the apparatus. The sideboards and cushion slant downward at their lower end, in order to give room for the motion of the foot board upon the footblock. In the sideboards near their posterior edge are holes, for the insertion of the brace attached to the lower section of the middle plane. These holes are so placed, as, by means of the brace, to sustain the two lower planes in the position of a double inclined plane, having any desired angle. Through the cushion, at the joint of the middle and lower planes, pass straps, fastened to the back of the machine, to be buckled over the knee of the well leg to keep it extended. In the backboard of the lower plane, six inches from the center on each side, are cut spaces, commencing at the bottom and extending up eight inches, one half an inch in width, for the passage of the bolt which retain the footblock to the plane, and which spaces allow the footblock to move up and down on the plane in a variation of six inches, to adapt the lower plane to the length of different limbs. Across the backboard of the lower plane, upon its posterior surface and lower end, is screwed an inch board, two inches wide, to which are attached the hinges for fastening the foot of the apparatus.

The splint portion of the apparatus consists of the splint, the footboard, the footblock, and the extension roller.

The splint is made long enough to reach from the superior surface of the footboards, to which one end is attached, to the spine of the ilium, and consists of two boards, one three inches wide and one inch thick, and the other two inches wide and one inch thick. The edge of the narrow board is screwed upon the center of the outer surface of the wider board, the inner surface of which faces to the side of the patient. The splint

is attached to the footboard, at about six inches from the center toward one end, on a line with the middle of the foot, and is fastened by means of two plates, with screws and nuts, on the lower ends, which pass through the footboard; one of which is fastened to the middle of the inner surface of the wide portion of the splint, and the other to the outer edge of the narrow portion of the splint. In that part of the splint which corresponds to the upper portion of the thigh, is a joint, with a hinge on the outer edge of the narrow board, which allows the upper part of the splint to be thrown back. This joint is controlled by means of small iron braces, fastened by pins, on which they move, to the edges of the wide board of the lower section of the splint, and whose loose ends are bent, to be inserted into holes in the upper portion and sides of the same board, which hole are so arranged, as to give the upper end of the splint an inclination outward, more or less, to adapt the splint to the widths of different pelves. The general inclination of the splint upon the footboard is outward for the same purpose. Through the narrow board of the upper section of the splint are holes, for the passage of the pelvis strap, and which allow the strap to be passed higher or lower in the splint to meet different cases.

The footboard is twenty two inches long, twelve wide, and one thick. It is fastened to the footblock by means of hinges, in such a manner, that its lower edge shall be raised about one inch from the backboard. In the center of its length, and nearly on a level with the cushions upper surface are holes, for securing the foot of the sound leg; and at about five or six inches from the center toward either end are four holes for securing the other foot, on one side of the center, and the splint on the other. The splint is secured at the two inferior holes.

The footblock is composed of three pieces, a body and two end pieces. The body is twenty inches long three wide and four high in the middle, but only three inches high toward the ends, to give room for the strings and for the nuts and screws of the splint when the footboard is turned down upon the footblock. The end pieces are about five inches long, four high, and one thick, and are so fastened to the body, that the anterior and superior edges form a plane with the anterior and superior surfaces of the body. Their lower ends project two inches below the body, to give situation to the extension roller.

The extension roller is twenty inches long and one and three fourths of an inch in diameter. It is placed below the body of the footblock, on a level with its anterior surface. It turns on small gudgeons fixed in the lower ends of the side or end pieces of the footblock, and the extension is rendered permanent by means of a small wheel attached to the gudgeon on the outside of the end piece of the footblock, and retained in its place by an iron catch, turning on a pin at one end, and fastened to the outside of the end piece of the footblock. The gudgeon outside of the wheel is left square, for fastening any apparatus to turn the roller when that is necessary. The splint portion of the apparatus is fastened to the bed portion by means of iron bolts, which pass through the body of the footblock, opposite the spaces in the backboard, and are fastened to the backside of the backboard, after passing through a half inch crossboard, by means of nuts, which, when loosened, allow the whole splint portion to move up and down on the inferior plane of the bed.

When my machine is used, if it be desirable to use the long splint, place the patient with the foot of the sound leg upon the center of the footboard; then pass the splint over the hip joint of the sound limb, fasten it to the footboard at the bottom, and secure the top to the spine of the ilium, firmly, by means of the pelvis strap, buckled around the pelvis; then apply garters, or any other means for extension, to the foot of the broken limb, pass the strings through the footboard, secure them to the roller, and by turning the same draw the foot down to the footboard, and dress the fracture. The knee joint of the sound limb should be secured, by buckling the knee strap over the knee. If the long splint be not used, after securing the foot of the sound limb, buckle the strap fastened to the staple in the anterior edge of the sideboard of the superior plane, over the groin and hip of the injured side, to produce counter-extension, and then draw down the injured limb as before.

If the double inclined plane be preferred, raise the superior plane and secure it by means of the straps and buckles which are attached to the staples in the sideboards of the upper and middle planes, and flex the middle plane backward upon the lower plane, and secure that position, by means of the iron brace of the lower section of the middle plane, inserted into the holes in the sideboards of the lower plane, and then secure the feet of the patient to the footboard.

The machine is elevated by means of a stout leather strap, split at one end to the distance of three or four feet, with hooks in the end of each portion, to be fastened to the staples in the sides of the machine. The other end of the strap passes over a pulley in the ceiling, placed a little anterior in the ceiling to the place where the foot of the machine is fixed below, and comes down within reach of the patient. The tail or

loose end of the elevator is full of holes, to be fitted to an inverted hook placed where the division in the strap commences. When the patient would sit erect, the thigh strap, which passes through the superior joint of the machine, is buckled over the groin and hip, to keep up counter-extension; the pelvis strap loosened, the top of the splint thrown back, and the superior plane raised upon the middle, by the patient fastening the hooks of the elevator to the staple, in the sideboards, and pulling upon the tail of the elevator. This position may be secured temporarily, by fastening the tail of the elevator to the inverted hook, or permanently, by means of the side straps. From this position the machine may be converted into a sitting chair, by attaching the elevator to the lower staples, and bringing the lower planes to a right angle, and securing them, then attaching the hooks to the middle staples, and bringing the machine erect. The legs should now be let down and secured with the braces.

Previous to using, the planes of the machine should be reduced to such length as may fit the patient. The best situation for the apparatus is made, by taking two planks, one foot wide and seven feet long, fixing them on their edges parallel to each other, one foot and a half apart, and covering them with boards three feet in length nailed across.

When all the joints of the machine are secured, the whole may be brought erect by the elevator.

The patient may with the aid of the splint be brought erect, without the bed, by buckling a strap around the waist, with rings at the sides, and attaching the hooks of the elevator.

All the straps should be properly cushioned and the braces secured by buttons or tape.

What I claim as my invention, and wish to secure by Letters Patent, is, the combination of the splint, footboard, and extension roller, with the fracture bed, or chair.

ORSON M. ALLABEN.

Witnesses:

WARREN DIMMICK,

N. P. CHAMBERLIN.