

(No Model.)

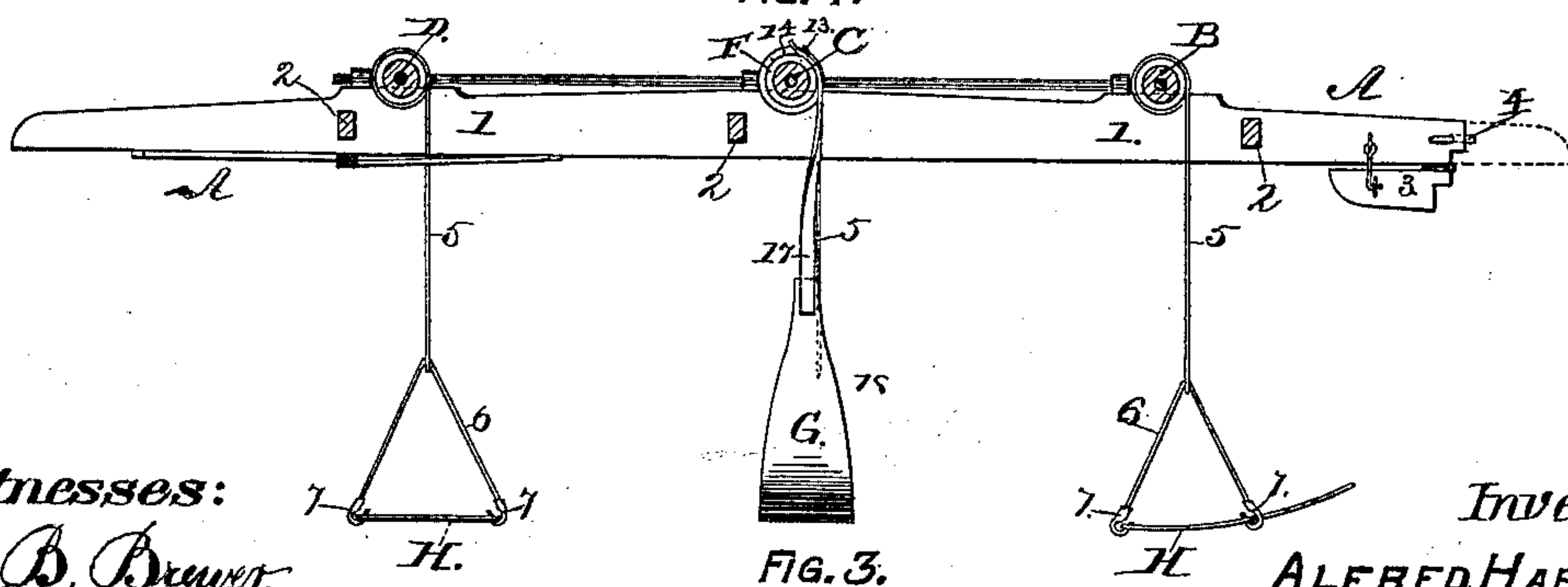
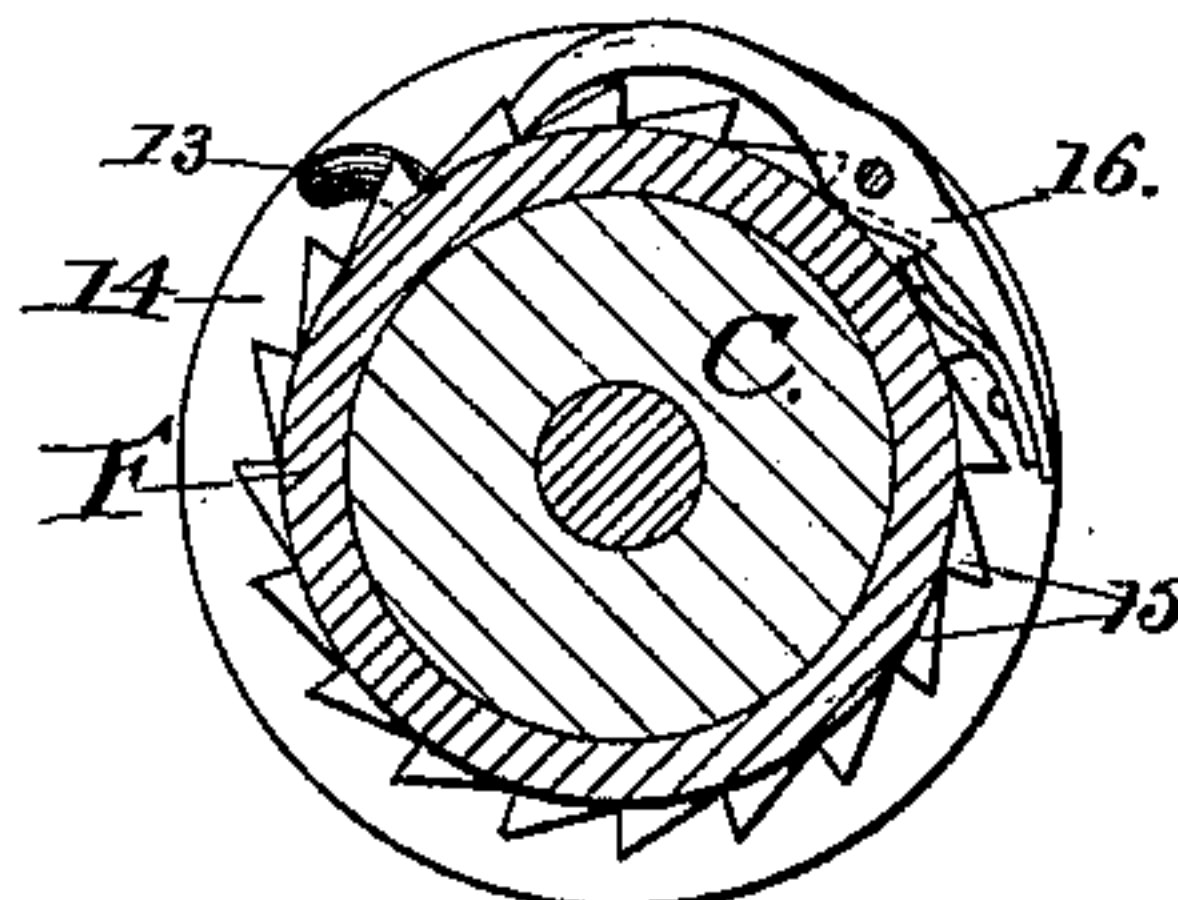
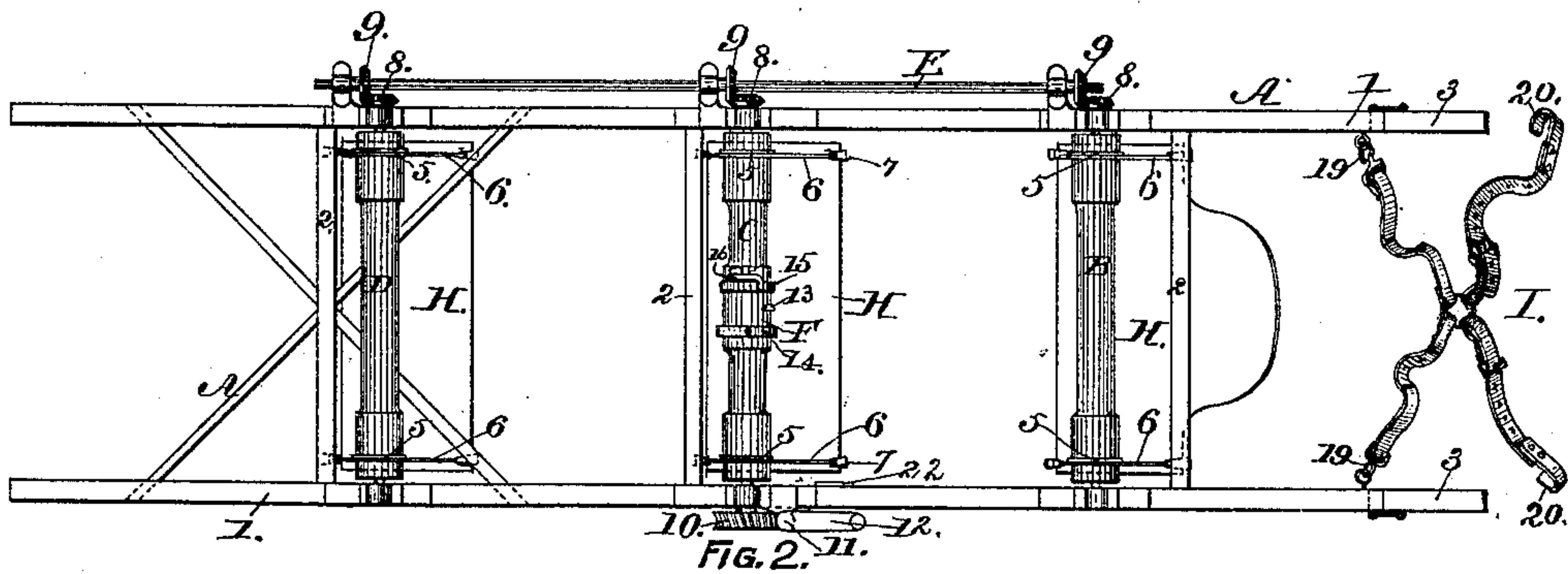
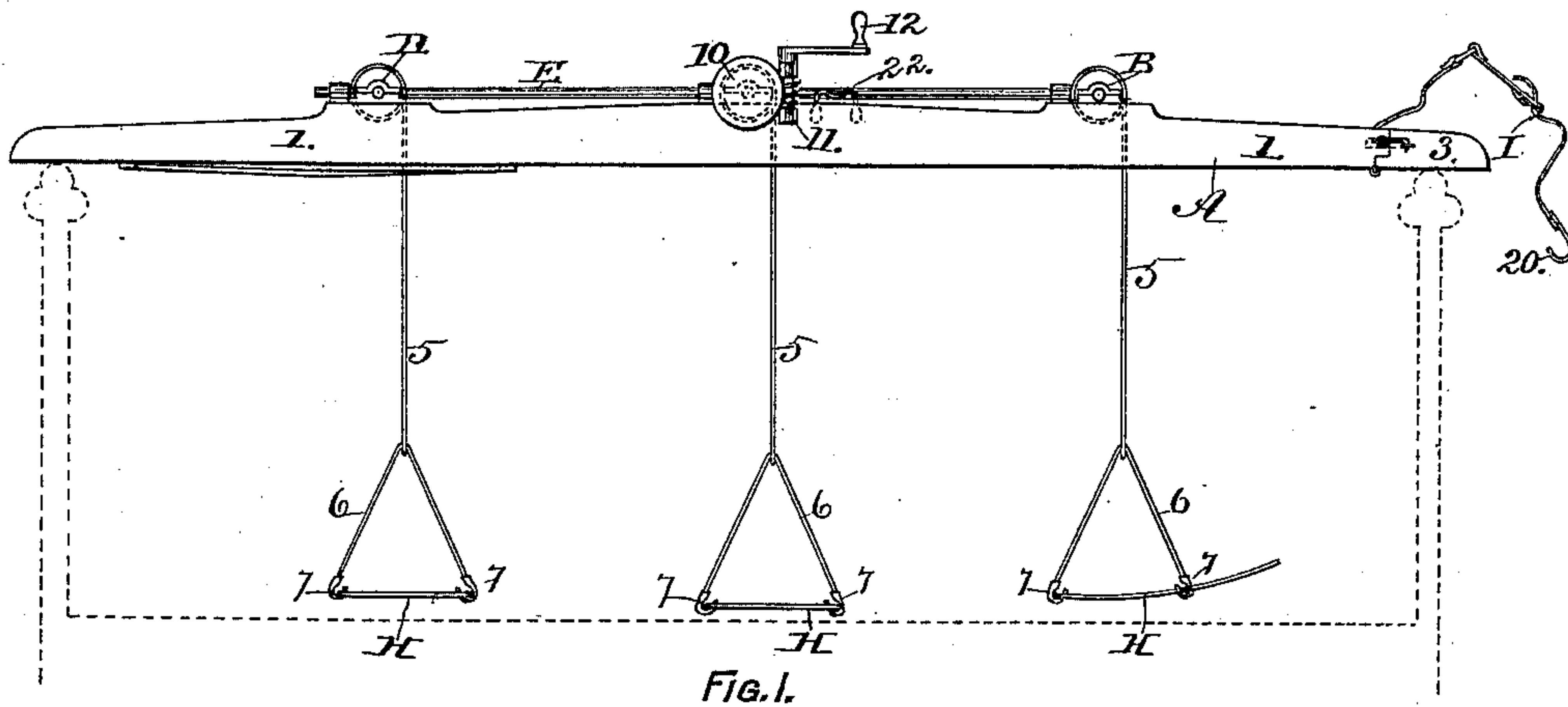
2 Sheets—Sheet 1.

A. HARLEY.

APPARATUS FOR LIFTING AND MOVING INVALIDS.

No. 428,602.

Patented May 27, 1890.



Witnesses:

*S. D. Brewer.*  
*H. M. Brown.*

Inventor:

ALFRED HARLEY,  
by *William H. Low,*  
Attorney.

(No Model.)

2 Sheets—Sheet 2.

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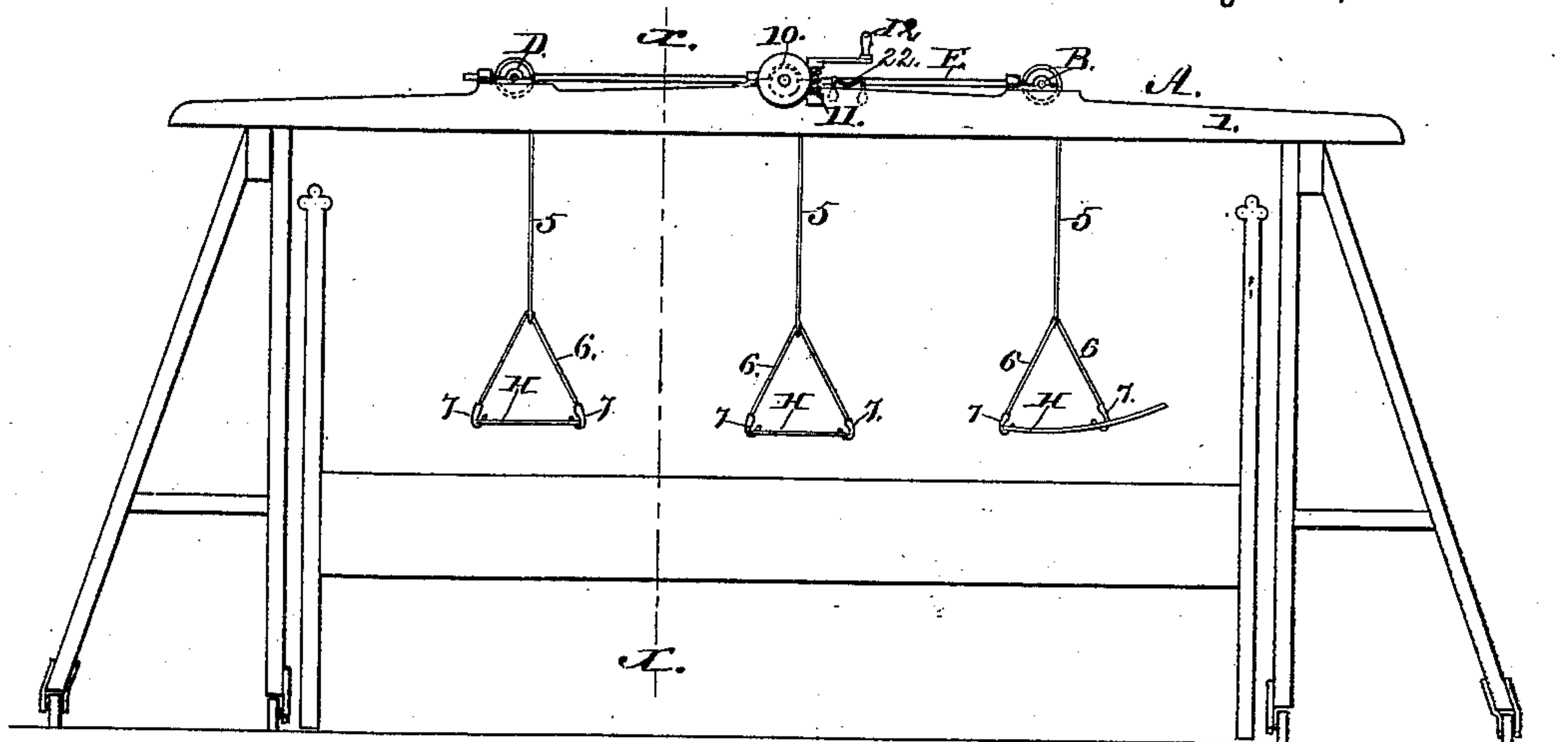


FIG. 5.

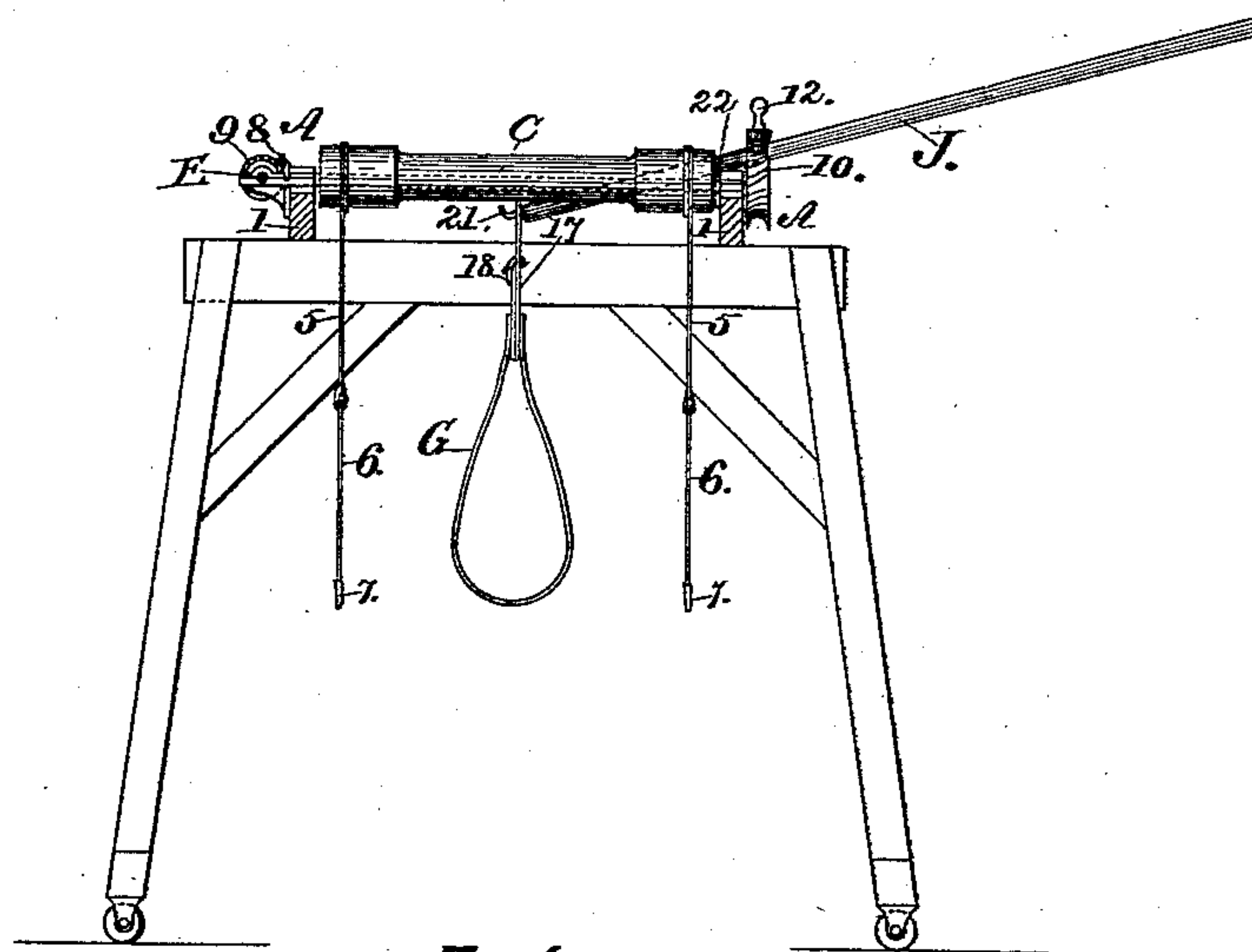


FIG. 6

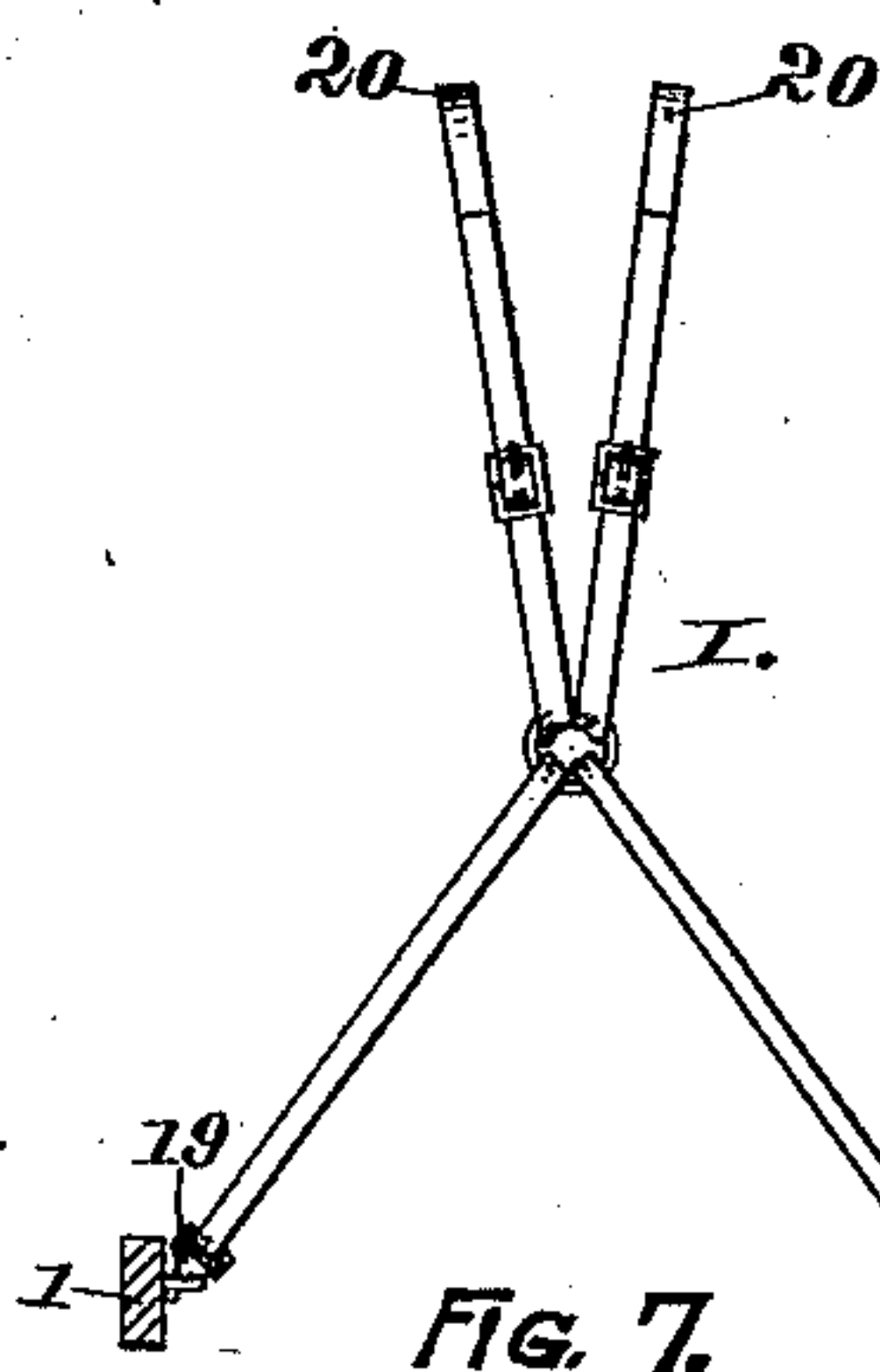


FIG. 7.

Witnesses:

S. B. Brewer,  
A. M. Brown.

Inventor:

ALFRED HARLEY,

by William H. Low,

Attorney.



# UNITED STATES PATENT OFFICE.

ALFRED HARLEY, OF ALBANY, NEW YORK.

## APPARATUS FOR LIFTING AND MOVING INVALIDS.

SPECIFICATION forming part of Letters Patent No. 428,602, dated May 27, 1890.

Application filed September 26, 1887. Serial No. 250,677. (No model.)

*To all whom it may concern:*

Be it known that I, ALFRED HARLEY, of the city and county of Albany, in the State of New York, have invented new and useful  
5 Apparatus for Lifting and Moving Helpless Invalids, of which the following is a specification.

My invention relates to an apparatus by which an invalid while in a recumbent position  
10 can be lifted bodily and when occasion requires moved from one bed to another without infliction of pain; and the object of my invention is to provide suitable facilities for painlessly lifting invalids for the purpose  
15 of changing their bedding, for washing the under side of them, and for any other sanitary purposes. This object I attain by the means illustrated in the accompanying drawings, which are herein referred to and form part  
20 of this specification, and in which—

Figure 1 is a side elevation of my lifting apparatus. Fig. 2 is a plan view thereof. Fig. 3 is a longitudinal section thereof. Fig. 4 is an enlarged cross-section of the central  
25 lifting-drum, showing a sleeve-windlass attachment that is used for slightly raising the middle portion of the body alone, when occasion requires. Fig. 5 is a side elevation of my lifting apparatus mounted on movable  
30 trestles provided with casters for the purpose of moving an invalid from one bed to another. Fig. 6 is a transverse section of the same at the line X X, showing a modified form of mechanism for raising the middle portion of  
35 the body; and Fig. 7 is a front elevation of a suspensory harness for carrying one end of my apparatus on a bedstead provided with a high head-board.

As represented in the drawings, A is the  
40 frame-work of my apparatus. It is preferably made of wood in the form of a right-angled oblong frame composed of string-pieces 1 and cross-girts 2. As shown in Figs. 1, 2, and 3, said string-pieces project beyond the points  
45 where the cross-girts are framed into them, and at one end said string-pieces are provided with a hinged portion 3, which is arranged to fold downwardly, as shown in Fig. 3, for the purpose of adapting the apparatus  
50 for use on bedsteads with either high or low head-boards. India-rubber bearings or plugs 4 are inserted in the ends of said string-pieces

to prevent injury to the high head-board when the apparatus is used on that class of bedsteads. The frame-work A is provided  
55 with three lifting-drums, which are journaled thereon, and which consist of the head-lifting drum B, the middle-lifting drum C, and the feet-lifting drum D, the said drums being located where they will respectively be nearly  
60 over the head, the middle, and the feet of an invalid. Each of said drums is provided with two pendent lifting-cords 5, which are attached near the ends of said drums, and each  
65 of said lifting-cords has at its lower end branch cords 6, whose terminals are provided with hooks 7, for a purpose hereinafter explained. Each of said lifting-drums is provided with a bevel gear-wheel 8, fitted to gear  
70 into a corresponding gear-wheel 9, that is secured to a longitudinal shaft E, so that all of said drums will be synchronously rotated. One of said drums—preferably the middle  
75 one—is provided with a worm-wheel 10, in which an endless screw 11 engages to impart a rotatory motion to the series of drums, said endless screw being provided with a crank-handle 12, by which motion is imparted thereto. The middle-lifting drum C is preferably provided with a sleeve-windlass F for the purpose  
80 of slightly raising the middle portion of an invalid's body when it is required to insert a lifting-plate thereunder. Said windlass consists of a sleeve that is fitted to rotate on said drum C, which forms its axis,  
85 and is provided with a hook 13 near its middle, a perforated capstan-head 14 at one end for the purpose of receiving a handle for imparting motion to the windlass, and at the opposite end with ratchet-teeth 15, in which  
90 a spring-pawl 16 engages to hold the windlass motionless when occasion requires.

G is a breeching that is designed to pass under the middle portion of an invalid's body, and is provided at one end with a strap  
95 17, which is adapted to engage with the hook 13, and at the opposite end with a strap 18, that adjustably engages with the strap 17 to form a proper-sized loop in which an invalid's body may be suspended from the wind-  
100 lass.

H represents lifting plates or platforms, of which there are three—one for the head, one for the middle portion, and one for the feet



of an invalid—detachably connected to the branch cords 6 by means of the hooks 7.

When my apparatus is used on a bedstead whose head and foot boards are about of the same height, as indicated by dotted lines in Fig. 1, the hinged portions 3 are extended, so that the frame-work A will rest on the head and foot boards; but when the apparatus is used on a bedstead whose head-board is higher than the foot-board the hinged pieces 3 are folded back under the string-pieces 1, as shown in Fig. 3. The foot of the apparatus will then rest on the foot-board of the bedstead, and the head of the apparatus will be suspended from the head-board by means of the suspensory harness I, whose lower ends are provided with hooks 19, which engage in staples fixed in the head of the frame-work A. The upper straps of said harness, which are made adjustable in length, are provided with hooks 20, that are adapted to engage over the top of the head-board of the bedstead.

It is well known that when a person is lying down the preponderance of weight is near the middle portion of his body. Therefore the lifting of that part of his body is attended with greater difficulty, and in cases of inflammatory disease is only attained by the infliction of considerable pain, the lifting of the extremities being comparatively of easy accomplishment. In order that the insertion of the lifting-plate II under the middle portion of the body may be accomplished with as little pain as possible, the breeching G is passed endwise under the invalid near the small of his back, and after the straps of said breeching are secured together the strap 17 is attached to the hook 13, and the windlass F is rotated until the middle portion of the invalid's body is raised high enough to permit a lifting-plate II to be freely passed thereunder, after which the motion of the windlass is reversed to lower the invalid to place on the lifting-plate.

In the modification of my apparatus, as shown in Figs. 5 and 6, the windlass F is dispensed with, and a lifting-lever J is substituted for the same purpose. Said lever is provided at one end with a hook 21, on which the strap 17 of the breeching G engages. The lever J, while performing its office of lifting, bears upon a fulcrum 22, that is attached to one of the string-pieces of the frame-work A.

The operation of my apparatus is as follows: The lifting-plates II being adjusted in their several places under the invalid, and the branch cords 6 being connected to said lifting-plates, motion is imparted to the endless screw 11, whereby the lifting-drums B, C, and D will be rotated at a uniform rate of

speed to wind the several lifting-cords 5 steadily around said lifting-drums, and thereby the invalid will be lifted bodily from the bed without the least jar or strain being imparted to him. When raised to a required height, the rotations of the lifting-drums are stopped, said drums being held stationary by the endless screw 11 and worm-wheel 10, so as to leave the invalid suspended on the lifting-plates II, and while so suspended the bedding may be adjusted or changed, and the body of the invalid may be bathed or otherwise treated. The invalid is lowered to the bed by reversing the operations just described.

For the purpose of removing an invalid from one bed to another I provide a pair of movable trestles K—one for the foot and the other for the head of the bed—and support thereon the frame-work A of my apparatus, as shown in Figs. 5 and 6. Said trestles are provided with casters 21, on which the apparatus can easily be moved from place to place in an apartment, while an invalid is borne on the lifting-plates II, as hereinbefore described.

I claim as my invention—

In an apparatus for lifting and moving invalids, the combination of a frame provided with three transversely-arranged lifting-drums, each being provided with a bevel-gear fitted to engage with a corresponding gear secured to a longitudinal shaft, and each of said drums being provided with lifting-cords having hooks on their branch terminals, one of said drums being provided with a worm-wheel fitted to engage with an endless screw journaled to said frame, and the middle drum being provided with a sleeve-windlass which is journaled on said drum and is provided with a hook to which a breeching for lifting the middle of a patient's body can be attached, one end of said windlass having a ratchet-wheel which engages with a spring-pawl attached to said drum, so as to lock said drum and windlass to move conjunctively, and the opposite end of said windlass being fitted to receive a handle for rotating the windlass independently of said drum for the purpose of raising the middle portion of an invalid's body without affecting the head and feet, and three separate and independent lifting-plates, which are fitted to attach to said lifting-cords, as and for the purpose herein specified.

ALFRED HARLEY.

Witnesses:

WM. H. LOW,  
S. B. BREWER.