

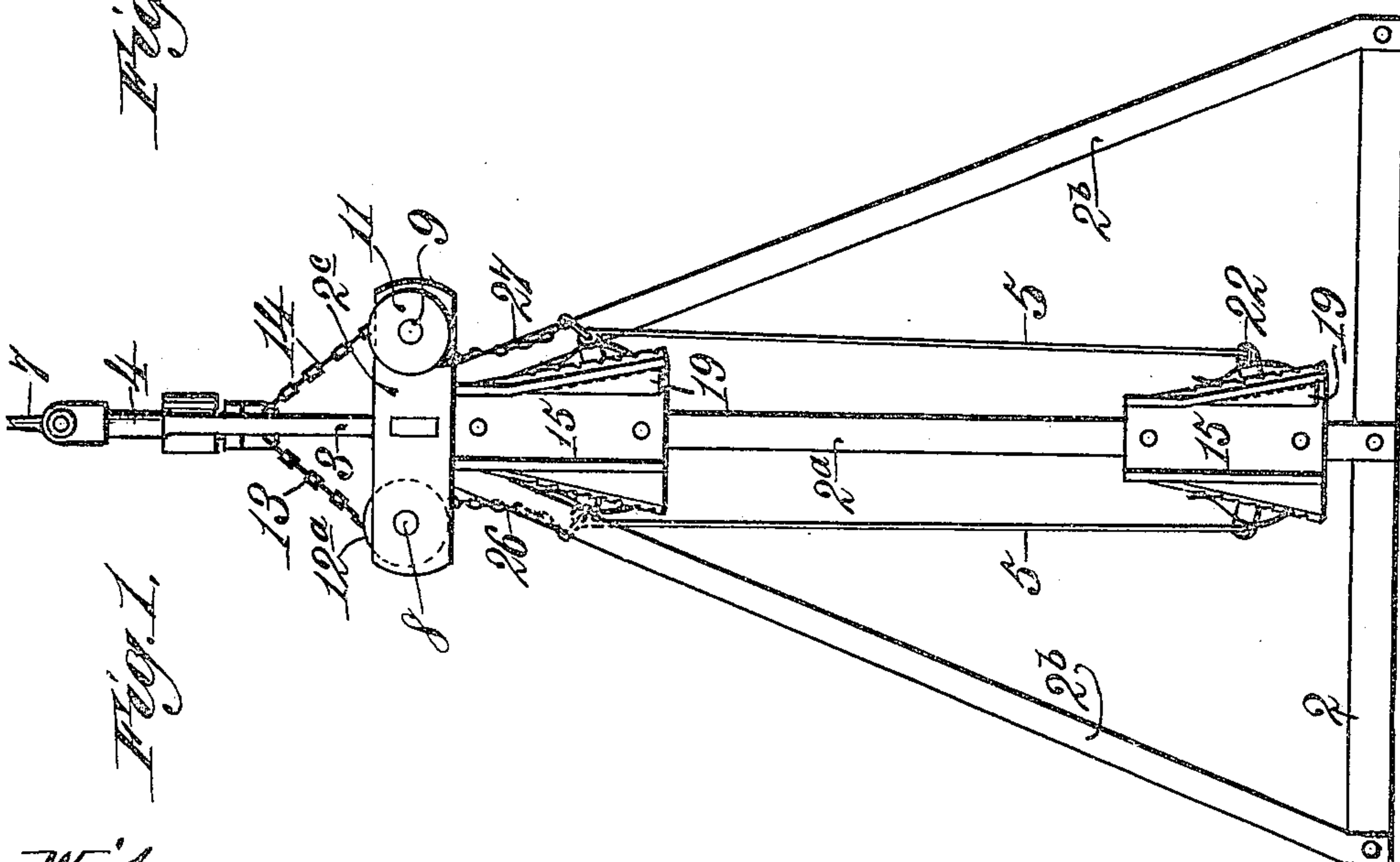
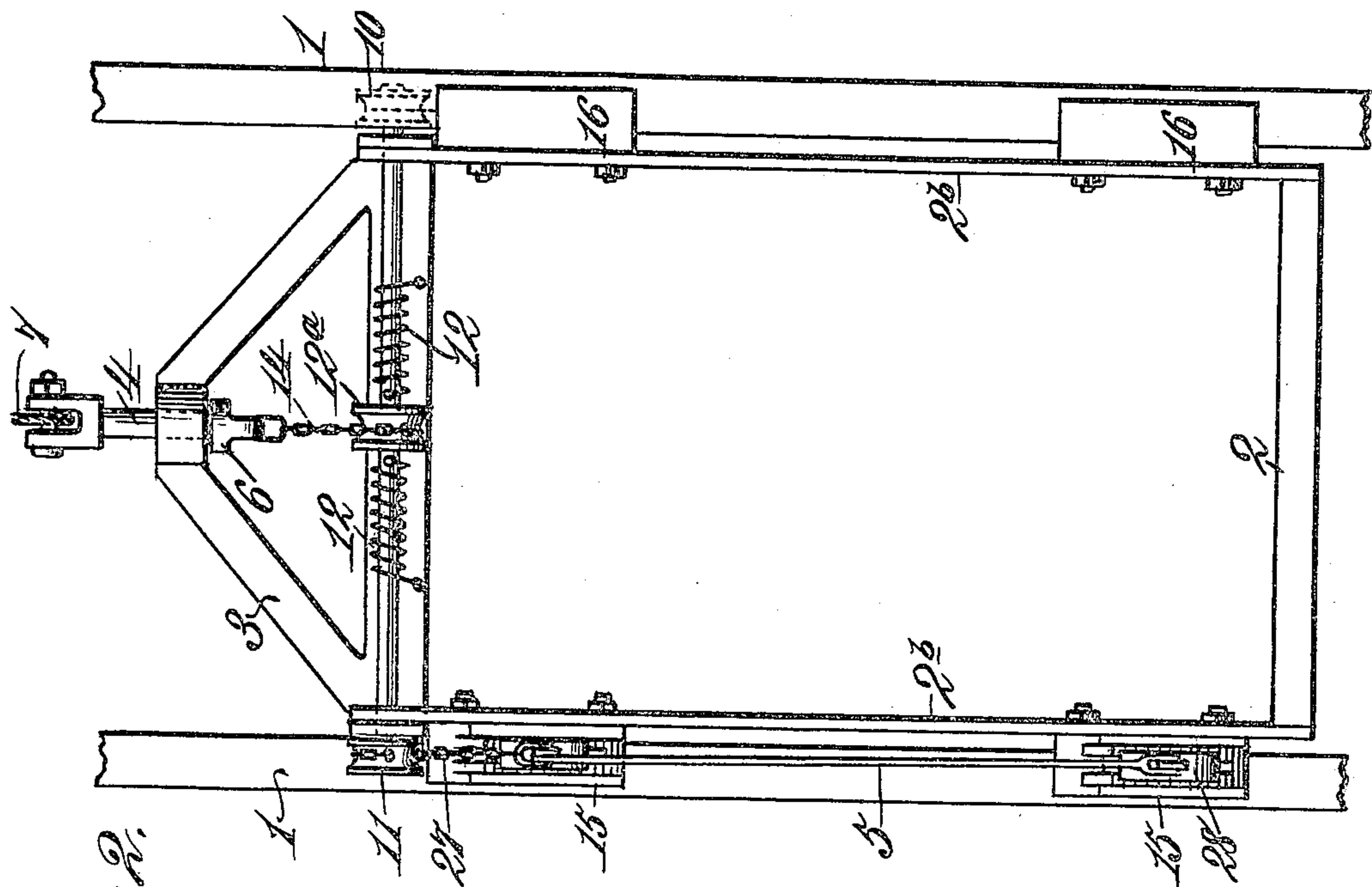
No. 817,623.

PATENTED APR. 10, 1906.

J. W. CAMPBELL.
SAFETY GEAR FOR SKIPS, CAGES, AND THE LIKE.

APPLICATION FILED OCT. 27, 1905.

2 SHEETS—SHEET 1.



Witnesses:
Robert Everett,
J. B. Keefe.

Inventor:
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No. 817,623.

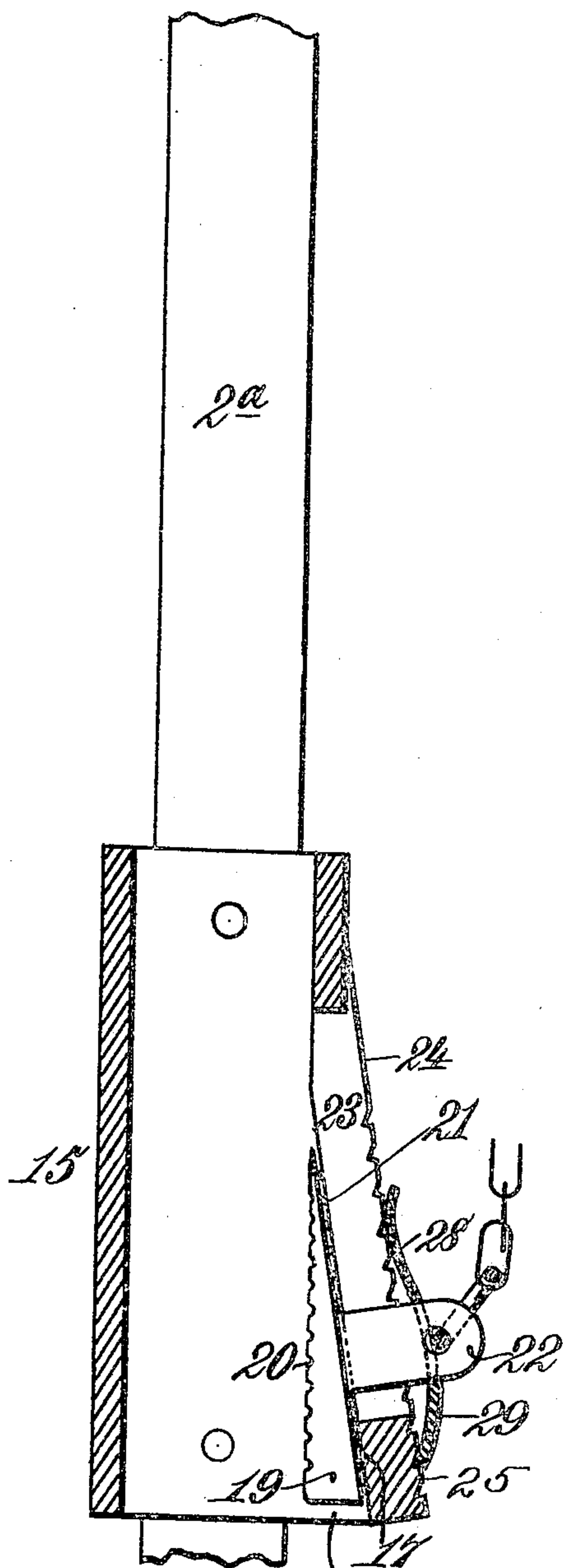
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2 SHEETS—SHEET 2.

Fig. 3.



Witnesses:
Robert G. Smith,
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Fig. 6.

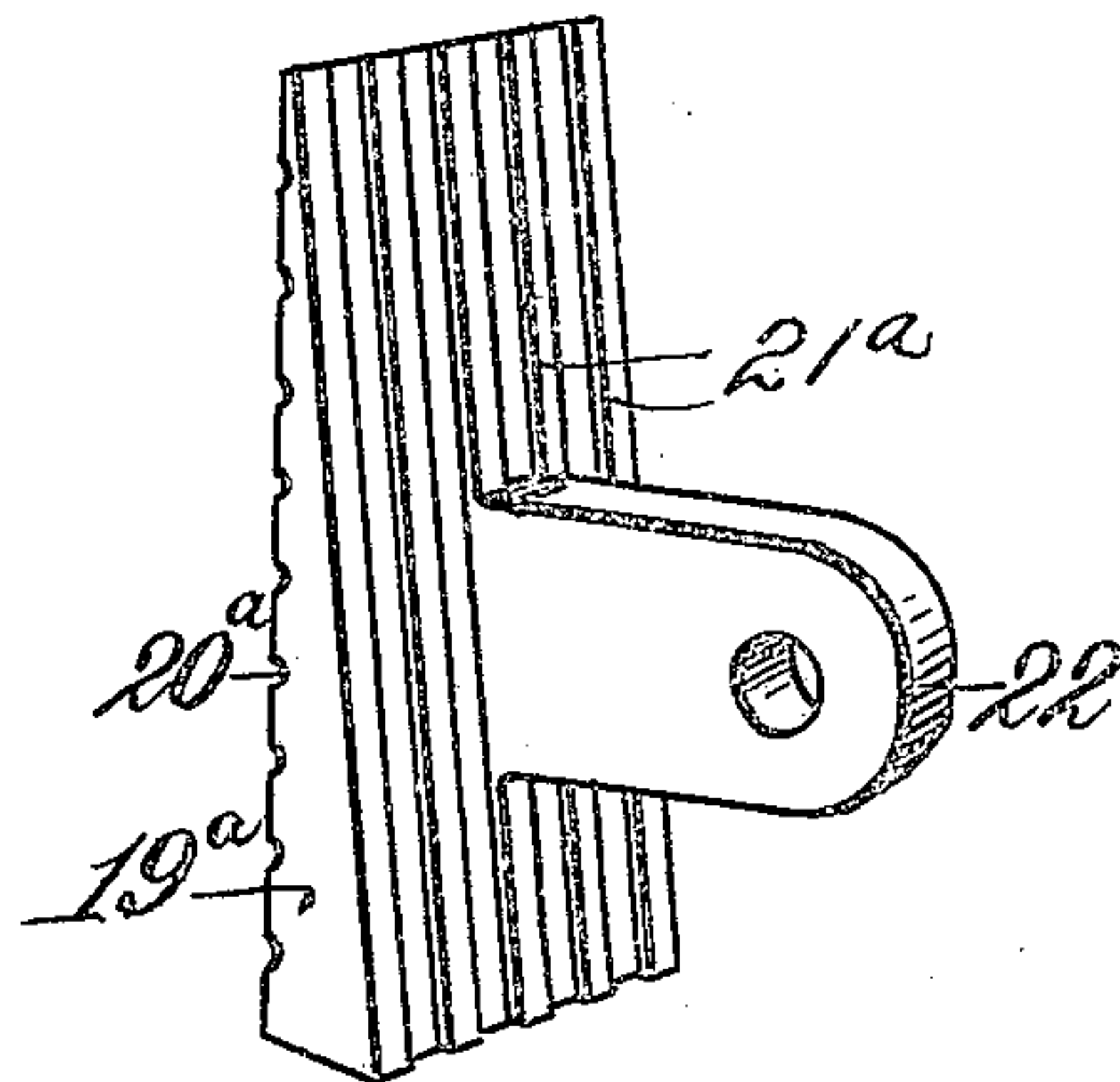


Fig. 4.

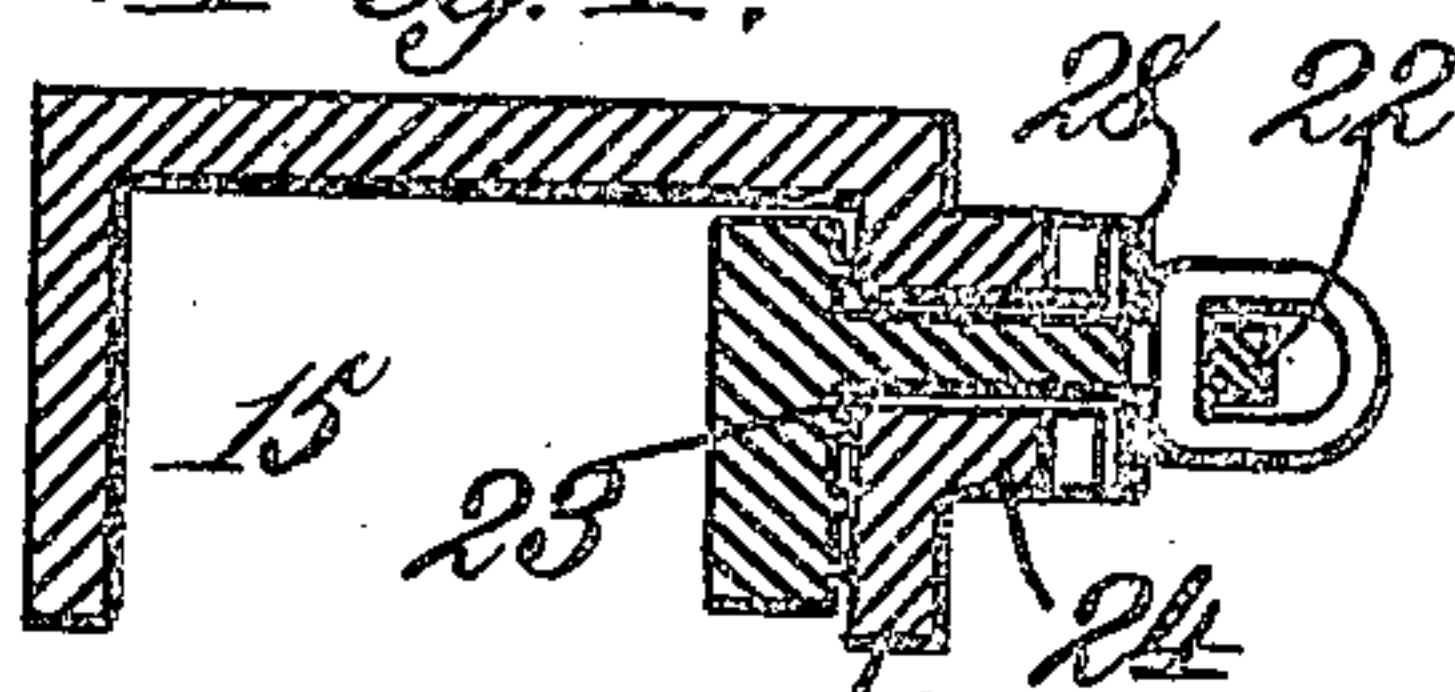
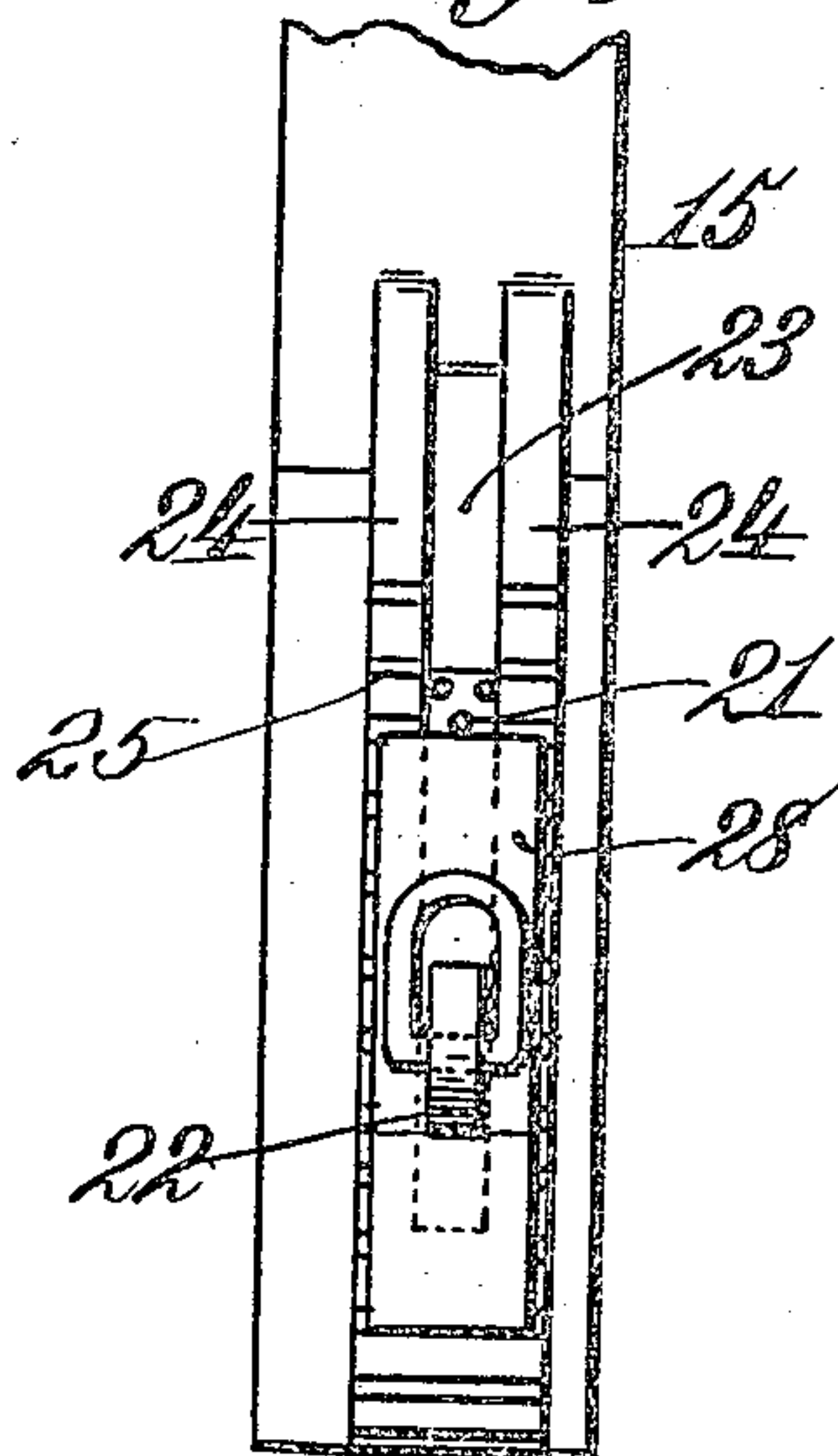


Fig. 5.



Inventor:
James W. Campbell,
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UNITED STATES PATENT OFFICE.

JAMES W. CAMPBELL, OF SALEM, VIRGINIA.

SAFETY-GEAR FOR SKIPS, CAGES, AND THE LIKE.

No. 817,623.

Specification of Letters Patent.

Patented April 10, 1906.

Application filed October 27, 1905. Serial No. 284,715.

To all whom it may concern:

Be it known that I, JAMES W. CAMPBELL, a citizen of the United States, residing at Salem, in the county of Roanoke and State of Virginia, have invented new and useful Improvements in Safety-Gears for Skips, Cages, and the Like, of which the following is a specification.

This invention relates to safety-gear for mine skips, cages, hoists, and elevating devices of like character, and aims to provide a safety-gear which is automatic and certain in its action and which when moved to operative position, thereby locking the skip or cage from movement, cannot be accidentally unlocked and can only be unlocked by disconnecting certain of the parts, or, in other words, after the gear has been moved to locking position the movement of the hoisting cable or rope will have no effect whatsoever upon the gear.

The invention further aims to provide a safety-gear for mine skips, cages, hoists, and elevating devices of like character in which its movement to locking position is sure and automatic and by the employment of which shocks and jerks will be reduced to a minimum when the gear is operated.

The invention further aims to provide a safety-gear for mine skips, cages, hoists, and elevating devices of like character which shall be simple in its construction, strong, automatic in its action, durable, interchangeable with shoes now in general use, and comparatively inexpensive to set up.

With the foregoing and other objects in view the invention consists of the novel construction, combination, and arrangement of parts hereinafter more specifically described, and illustrated in the accompanying drawings, wherein is shown the preferred embodiment of the invention; but it is to be understood that changes, variations, and modifications can be resorted to which come within the scope of the claims hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings, wherein like reference characters denote corresponding parts throughout the several views, and in which—

Figure 1 is a side elevation of a safety-gear in accordance with this invention, showing the same in inoperative position. Fig. 2 is a front view. Fig. 3 is a vertical section of the shoe. Fig. 4 is a transverse section of the

shoe. Fig. 5 is a side view of the shoe, and Fig. 6 is a detail of a modified form of locking-wedge.

Referring to the drawings by reference characters, 1 denotes a pair of vertical runners or guides of known construction which are disposed in a known manner, and 2 indicates an element in the form of a skip, cage, platform, elevator, or similar device, and the said element will be hereinafter referred to as a "cage." The cage 2, as shown, is provided with a pair of vertical posts 2^a and the inclined brace members 2^b. The posts 2^a and the inclined brace members 2^b are connected at their tops to the vertically-extending plates 2^c. Fixedly secured to the plates 2^c is a triangular-shaped cross-head 3, and extending through the apex of the cross-head 3 is a draw-bar 4, the latter having a certain amount of play. At the lower end of the draw-bar 4 an abutment 6 is provided to prevent the draw-bar 4 passing through the apex of the cross-head, and to the upper end of the draw-bar 4 the hoisting-cable 7 is secured, the hoisting-cable being of any suitable construction. Supported in the plates 2^c and projecting from each of the plates 2^c is a pair of rock-shafts 8 9. These shafts are suitably disposed with respect to the draw-bar 4 and the cross-head 3—that is to say, a shaft is arranged on each side of the cross-head and extends parallel with respect thereto. At one end of the shaft 8 a spool 10 is provided, and at one end of the shaft 9 a spool 11 is provided. Surrounding each of the shafts 8 9 and disposed approximately centrally thereof are the coiled springs 12, having interposed therebetween a rotatable spool 12^a. The said springs 12 have one end secured to the cross-head 3 and the other end thereof fixed to their respective shafts. Attached to the lower end of the draw-bar 4 is a pair of flexible members 13 14, which are also connected to the spools 12^a and adapted to wind thereon. The function of the springs 12 is to rock or rotate the shafts 8 9 in one direction, and the function of the spools 12^a, in connection with the flexible members 13 14 and the draw-bar 4, is to rotate or rock the shafts 8 9 in a direction opposite to that imparted to the said shafts through the medium of the springs 12. Such action will be evident, owing to the play of the draw-bar 4, as when the draw-bar 4 is elevated through the medium of the hoisting-cable the flexible members 13 14 will be car-

ried therewith and unwind off the spools 12^a. The unwinding of the flexible members off the spools 12^a will tend to rotate or rock the shafts 8 9 in a direction opposite to that which will be imparted to the said shaft, owing to the action of the springs 12. During the rotation of the spools 12^a, through the medium of the flexible members 13 14 and the draw-bar 4, tension will be stored within the springs 12 and remain stored as long as the draw-bar 4 is elevated; but the moment the draw-bar 4 is released the flexible members 13 14 will become slack, consequently offering no resistance to the springs 12. The latter will then come into play, and the tension stored therein will cause the shafts 8 9 to rotate in an opposite direction, thereby throwing into operation the safety-gear. Although the shafts 8 9 are illustrated and referred to as being provided with a single spool 10 or 11, yet each of the said shafts 8 9 can be provided with a pair of spools. When both ends of either of the shafts 8 9 are provided with the spools, a pair of locks is carried by each shoe for each runner or guide; but as the invention is illustrated with the employment of a single lock carried by each shoe for each runner or guide it is only necessary to provide each of the rock-shafts 8 9 with a single spool for winding up the flexible connecting member for the safety-gear.

The safety-gear may comprise in its construction a single shoe for each side of the cage or a pair of shoes for each side of the cage. As shown a pair of shoes for each side of the cage is employed. Each shoe is provided with a single lock, although, if desired, each shoe can be provided with a double lock.

The safety-gear, as shown, consists of two pairs of vertically-movable guide-shoes 15 16, each pair being secured to a vertical post 2^a and adapted to embrace the runners or guides 1. As all the vertically - movable guide-shoes are constructed alike, as well as the lock carried by each of the shoes, but one shoe and lock will be described, the same reference characters being applied to each of the shoes and each of the locks. Each of the guide-shoes may be of any length desired, and one side wall of each of the shoes has a portion thereof extended in a downwardly and outwardly inclined manner, as at 17, so as to provide in connection with one side of the runners or guides a recess 18, in which is mounted a lock 19 in the form of a wedge. The lock will be termed a "locking - wedge," and the said locking-wedge is mounted in the said recess when in its inoperative position. The front wall of each of the guide-shoes is constructed in such a manner as to form the remaining wall of the recess 18.

The locking-wedge 19 is adapted when occasion requires to move in a vertical manner and wedge itself between the runner 1 and the guide-shoe, thereby arresting the move-

ment of the cage. That face of the locking-wedge which comes into engagement with the runner or guide 1 is serrated, as at 20, so as to securely grip the runner or guide 1, and the other face of the locking-wedge 19, which moves against the inner face of the portion 17 of the side wall of the guide-shoe, is studded, as at 21, thereby preventing any adhesion between the two engaging surfaces, which would be the case if the two engaging surfaces were flat, owing to the corroding of the metal, as in most instances the dampness in the mine will cause the metal to rust, and consequently cause the two surfaces to adhere to a certain extent and prevent a satisfactory working of the wedge. The studded face 21 of the wedge enables the passage of a lubricating material, the lubricant being a portion of that which is placed within the shoe and also upon the runner or guide. In lieu of constructing the face 21 of the wedge 19 in a studded manner the said face can be corrugated in the direction of its length—for example, as shown in Fig. 6, in which the wedge is indicated by the reference character 19^a, the corrugated face by the reference character 21^a, and the serrated face by the reference character 20^a. The locking-wedge 19 is provided with a laterally-extending apertured lug 22, which is slightly inclined and extends through an elongated slot 23, formed in the portion 17 of the side wall of the guide-shoe, said slot 23 extending in the direction of the length of the portion 17. The lug 22 also extends through a U-shaped reinforcing member 24, which is fixedly secured to the portion 17 of one side wall of the shoe, as well as being fixedly secured to the said side wall. Said U-shaped member has its outer face provided with a series of teeth, as at 25.

Connected to, adapted to wind upon, and depending from the spool 10 is a flexible connecting member 26, and depending from and connected to the spool 11 is a flexible connecting member 27. The member 26 is connected with that locking-wedge which associates with the rock-shaft 8, and the member 27 is connected with that locking - wedge which associates with the rock-shaft 9. The said members 26 and 27 are connected to the apertured lugs of their respective locking-wedges in any suitable manner. As shown, the flexible connections 26 and 27 are in the form of chains, and the lower link of each member extends through the aperture of the lug of its respective locking-wedge.

To retain the studded or corrugated face of the locking-wedge in sliding contact with the inner face of the portion 17 of the side wall of the shoe, a bow-shaped spring 28 is provided which acts also as a lock to prevent the accidental displacement of the locking - wedge when moved to locking position. The bow-shaped spring 28 has that end of the flexible connecting member which is attached to the

apertured lug of the locking - wedge bear against the same, so as to compress it, the counter action of the spring thereby tending in connection with that end of the flexible member which is attached to the lug to force said lug outwardly, thereby retaining the studded or corrugated face of the locking-wedge in slidable contact with the inner face of the portion 17 of the side wall of the guide-shoe. The lower end of the bow - shaped spring 28 is reinforced, as at 29, so as to act as a dog, and is adapted when the locking-wedge is moved to operative position to engage in the teeth 25 of the U-shaped reinforcing member 24, thereby preventing the return of the locking - wedge to inoperative position until the said reinforced end 29 of the spring 28 is moved out of engagement with the teeth of the U-shaped reinforcing member 24.

When a pair of vertically-movable shoes is secured to each side of the cage, a connection is had between the apertured lug of the wedge of the upper shoe with the apertured lug of the wedge of the lower shoe. This connection can either be a flexible one or consist of a rod. As illustrated, the connection is in the form of a rod and is indicated by the reference character 5, the function of the rod 5 being to move the locking-wedge of the lower shoe of the pair of shoes to operative position. This movement is caused by the vertical movement of the wedge of the upper shoe, said vertical movement of the wedge of the upper shoe being had when said wedge is moved to operative position.

The manner in which the safety-gear is thrown into operation is as follows: It will be assumed that there is a slack in the hoisting-cable 7 or the said cable has become broken, the draw-bar 4 will be released, and consequently the tension stored in the springs 12 will tend to rock the shafts 8 and 9, which in turn will cause the flexible connecting members 26 27 to wind around their respective spools. The winding of the flexible members 26 27 upon their respective spools will impart a vertical movement to the locking-wedges of the upper shoes of the pairs of shoes, thereby causing the moving of the said wedges to a position between the runners or guides 1 and the inner face of the side wall of the shoes, consequently securely locking the cage from movement or arresting the movement of the cage, as the case may be. Owing to the slack in the flexible members after the locking-wedges have been moved to operative position, it will be evident that if the hoisting rope or cable is connected together again and an attempt is made to elevate the cage that although the draw-bar 4 will move to a certain extent yet the slack in the connecting members will prevent any pulling action upon the locking-wedges or, in other words, no action whatsoever can be had upon the locking-wedges, even if an attempt

is made to elevate the cage. To release the wedges, it will be necessary to remove the spring 28 from its engagement with the teeth 25, and the wedges will then have to be knocked out of position. Therefore it is evident that when the safety-gear has been moved to operative or locking position it cannot be moved from said position except by disconnecting certain of the elements which constitute the safety-gear and knocking the locking-wedges from their operative position between the runners and the shoes.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A safety-gear for the purpose set forth comprising a pair of vertically-movable shoes, locking-wedges carried thereby, flexible members for moving the wedges to locking position, means for operating said members, and means carried by the wedges and adapted to engage with the shoes to prevent the moving of said wedges out of locking position.

2. A safety-gear for the purpose set forth comprising a pair of vertically-movable shoes, locking-wedges carried thereby, flexible members for moving the wedges to locking position, means for operating said members, and an automatically-operating means engaging with the shoes for preventing the moving of said wedges out of locking position.

3. A safety-gear for the purpose set forth comprising a pair of vertically-movable shoes, each having a recess, a locking-wedge in each of said recesses and having one face serrated and its other face studded, flexible members for moving said locking-wedges to locking position, thereby arresting the movement of the shoes, and means for operating said members.

4. A safety-gear for the purpose set forth comprising a pair of vertically-movable shoes, each having a recess, a locking-wedge in each of said recesses and having one face serrated and its other face studded, flexible members for moving said locking-wedges to locking position, thereby arresting the movement of the shoes, means for operating said members, and means to prevent the displacement of said wedges from locking position.

5. A safety-gear for the purpose set forth comprising a pair of vertically-movable shoes, each having a recess, a locking-wedge in each of said recesses and having one face serrated and its other face studded, flexible members for moving said locking-wedges to locking position, thereby arresting the movement of the shoes, means for operating said members, and an automatically-operating means for preventing the moving of said wedges out of locking position.

6. A safety-gear for the purpose set forth comprising a pair of vertically movable shoes, a locking-wedge mounted in each of said shoes and having one of the faces thereof

studded, and flexible members for moving said wedges to locking position, thereby arresting the movement of the shoes.

7. A safety-gear for the purpose set forth comprising a pair of vertically-movable shoes, a locking-wedge mounted in each of said shoes and having one of the faces thereof studded, flexible members for moving said wedges to locking position, thereby arresting the movement of the shoes, and means for retaining said wedges in locking position.

8. A safety-gear for the purpose set forth comprising a pair of vertically-movable shoes, a locking-wedge mounted in each of said shoes and having a studded inclined face and a serrated straight face, a lug carried by each of the wedges and extending through its respective shoe, flexible members connected to the lugs and adapted when operated to move the wedges to locking position, thereby arresting the movement of the shoes, and means for operating the said members.

9. A safety-gear for the purpose set forth comprising a pair of vertically-movable shoes, a locking-wedge mounted in each of said shoes and having a studded inclined face and a serrated straight face, a lug carried by each of the wedges and extending through its respective shoe, flexible members connected to the lugs and adapted when operated to move the wedges to locking position, thereby arresting the movement of the shoes, means for operating said members, and means mounted on the lugs for holding the wedges in sliding contact with the shoes and for retaining the wedges in locking position.

10. A safety-gear for the purpose set forth comprising a vertically-movable pair of shoes, a locking-wedge mounted in each of said shoes, flexible members for moving the wedges to locking position, thereby arresting the movement of the shoes, and means for holding the wedges in sliding contact with the shoes and for retaining the wedges in locking position.

11. A safety-gear for the purpose set forth comprising a vertically-movable pair of shoes

each having one side thereof provided with a slot extending in the direction of the length of the shoe, wedges mounted in the shoes and arranged in operative relation with respect to the slots, a toothed reinforcing member for the slotted side of each of the shoes, lugs carried by the wedges and extending through the slots and said members, flexible members connected with the lugs and adapted when operated to move the wedges to locking position, thereby arresting the movement of the shoes, operating means for said flexible members, and means mounted on the lugs and engaging the toothed reinforcing members for holding the wedges in sliding contact with the shoes and for retaining the wedges in locking position.

12. A safety-gear for the purpose set forth comprising a pair of vertically-movable shoes, a toothed reinforcing member for each of the shoes, a locking-wedge mounted in each of said shoes, flexible members connected with said wedges for moving them to operative position, thereby arresting the movement of the shoes, operating means for said flexible members, and means engaging with said toothed reinforcing members for holding the wedges in sliding contact with the shoes and for retaining the wedges in locking position.

13. A safety-gear for the purpose set forth comprising a pair of vertically-movable shoes, locking-wedges carried thereby, flexible members for moving the wedges to locking position, thereby arresting the movement of the shoes, a pair of spring-actuated rock-shafts connected with said members for operating them, and means for holding said wedges in sliding contact with the shoes and for retaining the wedges in locking position.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES W. CAMPBELL.

Witnesses:

D. P. SHOWALTER,
W. D. CRAWFORD.