

T. BRYANT.
SAFETY DEVICE FOR SHAFT SINKING.
APPLICATION FILED AUG. 24, 1910.

998,599.

Patented July 25, 1911.

3 SHEETS-SHEET 1.

Fig. 1.

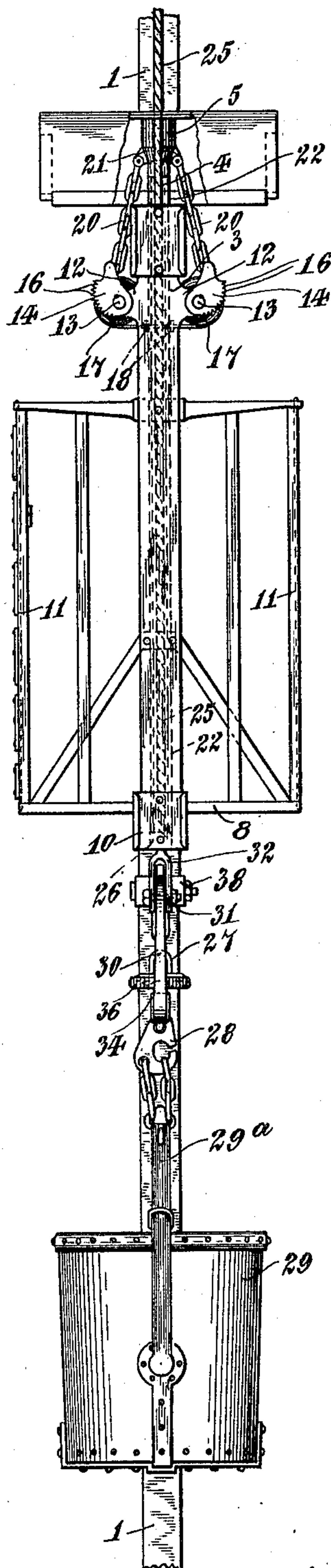
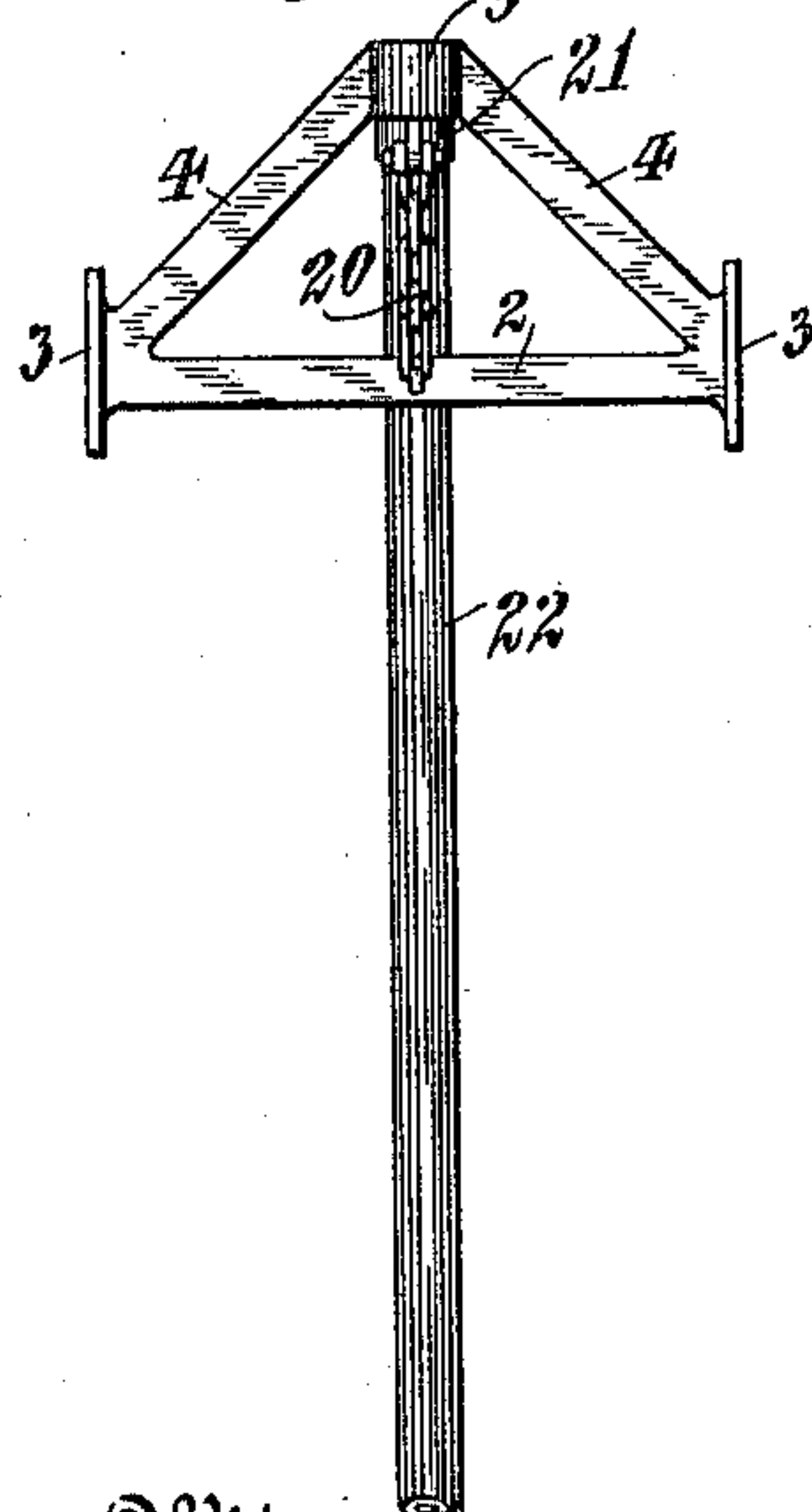
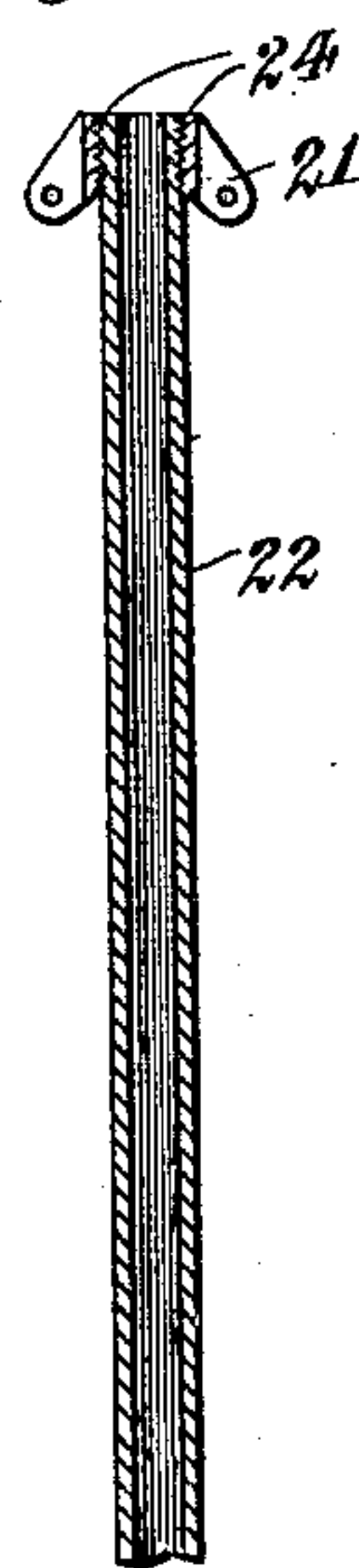


Fig. 3.



Witnesses:
Geo. H. May.
Sully Russo

Fig. 4.



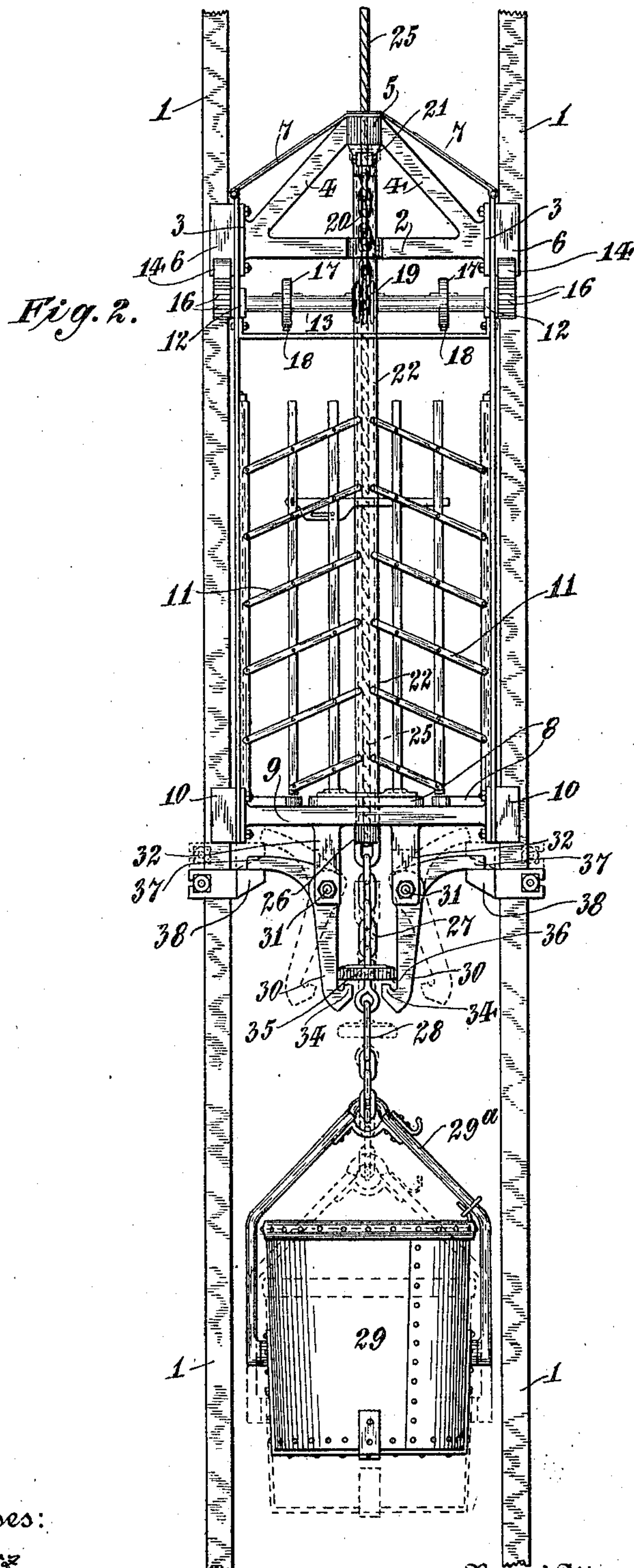
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3 SHEETS-SHEET 2.



Witnesses:
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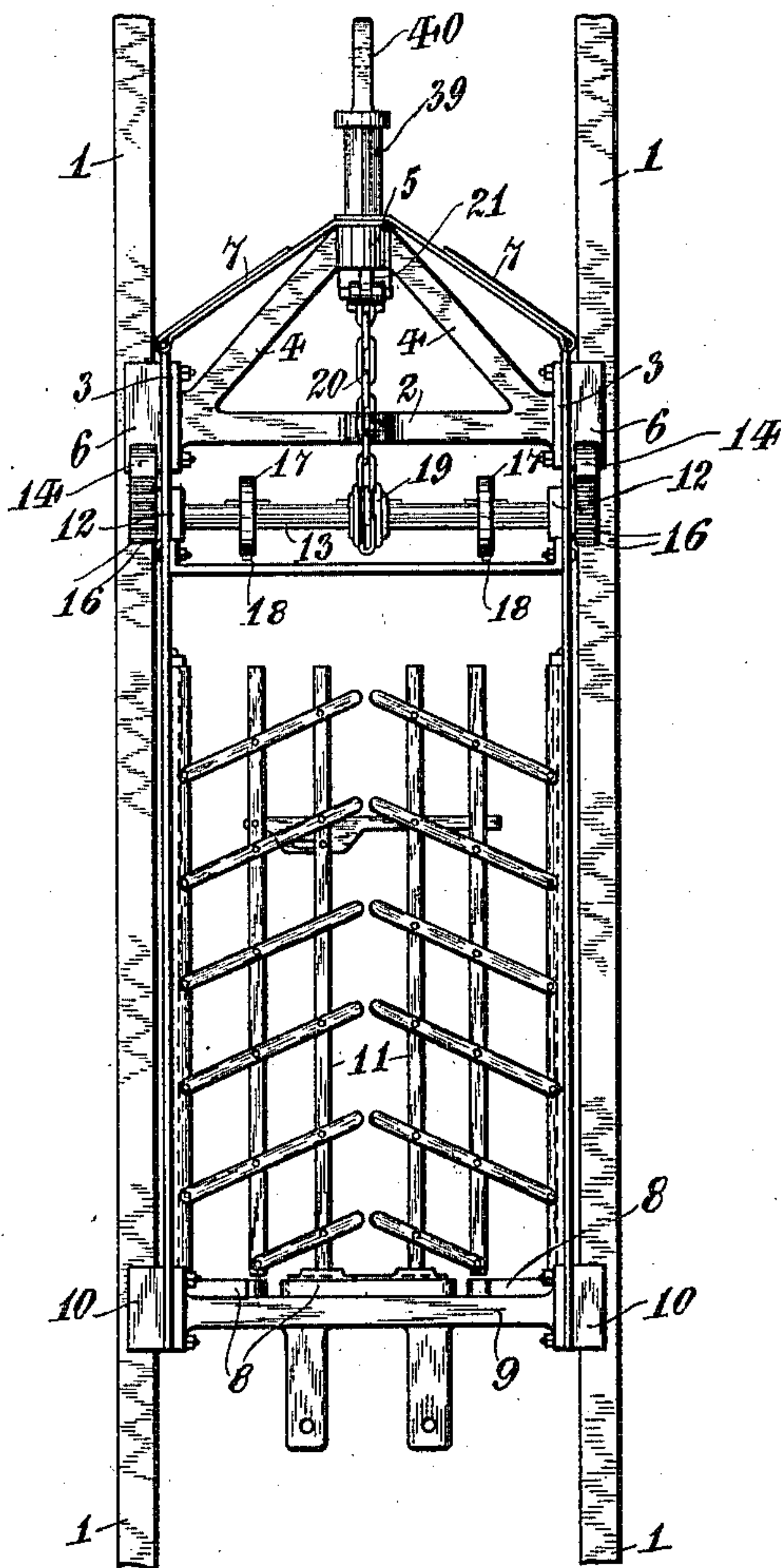
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3 SHEETS—SHEET 3.

Fig. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

THOMAS BRYANT, OF BUTTE, MONTANA, ASSIGNOR OF ONE-HALF TO ARTHUR H. WETHEY, OF BUTTE, MONTANA.

SAFETY DEVICE FOR SHAFT-SINKING.

998,599.

Specification of Letters Patent.

Patented July 25, 1911.

Application filed August 24, 1910. Serial No. 578,753.

To all whom it may concern:

Be it known that I, THOMAS BRYANT, a citizen of the United States, residing at Butte, in the county of Silverbow and State of Montana, have invented certain new and useful Improvements in Safety Devices for Shaft-Sinking, of which the following is a specification.

The invention relates to devices especially adapted for sinking vertical shafts, wherein various materials, such as stone, ore or water are hoisted to the surface, and also wherein workmen are hoisted from and lowered to the bottom of the shaft.

The principal object of the invention is to provide a device which will protect the lives of the workmen from accident while being conveyed in the shaft and which will also protect workmen at the bottom of the shaft from falling stone or ore or other material that may be carried through the shaft.

A further object of the invention is to provide means whereby a suitable carrier, such as a hoisting bucket may be lowered to the bottom of the shaft, and a considerable distance below the cross-head, so that the bucket can be readily filled, and which will also permit the bucket to be easily dumped when it has been hoisted to the surface.

A further object of the invention is to provide means whereby the cross-head will be instantly and securely held in the shaft against falling in event that the rope, cable or other hoisting means should break, and also for holding the cross-head positively against downward displacement whenever it is accidentally caught and held in the guides.

Heretofore many accidents have occurred because of the failure to provide a device which would hold the cross-head and the bucket or other carrier from falling if the rope or other traction member broke while workmen were being hoisted or lowered in the shaft. A still more frequent cause of accident, however, has been the accidental catching of the cross-head in the guides while the bucket or cage containing workmen was being lowered in the shaft, and its subsequent fall upon being released either by the jarring of the rope or through any other cause, thus dropping upon the men in the bucket or carrier. Accidents have also occurred because the stops on the guides for holding the cross-head while the bucket

was lowered to the bottom of the shaft have become weakened and broke under the weight of the cross-head, thus permitting it to fall on the workmen at the bottom of the shaft. By this invention accidents arising from any of these causes are effectually prevented, and various other objects are attained which are more fully set forth in the following description of one form of device embodying the invention, which consists in the new and novel features of construction and combinations of parts hereinafter set forth and claimed.

In the accompanying drawings: Figure 1 is a side elevation of a cross-head, cage and carrier, embodying my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a detail view showing the movable tube. Fig. 4 is a detail view partly in section of the movable tube showing the means for attaching the same. Fig. 5 is a front elevation of the apparatus showing the movable tube and the bucket removed.

Referring to the particular embodiment of my invention shown in the accompanying drawings, the safety devices are employed in connection with a cross-head comprising a cage, which may be used with a bucket, skip or other carrier, or which may be used independently as desired.

The cross-head is movable upon the guides 1, which are arranged on opposite sides of the shaft in the usual manner, and which may extend to the bottom of the shaft, or which may end a suitable distance above the bottom of the shaft to avoid injury in case the shaft is sunk to greater depth. The cross-head comprises the cross-bar 2 and the side pieces 3, and the braces or arms 4, which form a centrally arranged collar or bearing 5. The shoes 6, which embrace the guides and slide thereon, are secured to the cross-head in the usual manner, and the cross-head may also be provided with the hinged protecting cover 7 as desired. The cage is preferably formed integral with the cross-head, and comprises the platform 8 provided upon the cross-bars 9. Shoes 10 are preferably secured to or opposite the cross-bars, and if desired a safety gate 11 may be provided of any well known construction.

The side pieces 3 of the cross-head are provided with lateral extensions 12, which form bearings for the parallel shafts 13,

which project beyond the side pieces opposite the guides. Safety dogs 14 are eccentrically mounted upon the projecting ends of the shafts 13 and have their faces contiguous to the guides provided with teeth 16, so that when the shafts are rotated the toothed faces of these dogs will engage the sides of the guides. Also mounted upon and secured to the shafts 13 are strap springs 17 which are arranged in alinement with each other and have their ends tied together as at 18, thus connecting the shafts 13 together with the said strap springs. Said springs actuate both shafts simultaneously and are always in tension, tending to rotate the toothed faces of the safety dogs into engagement with the guides. A chain sheave 19 is secured to the center of each of the shafts 13 and a chain 20 is secured at one end to each of these sheaves, the other end of said chain being attached to a movable collar or bushing 21 which seats against the bearing 5. In case a bucket, skip or other carrier is being used, a tube 22 is secured to said collar by any suitable means, as the threads 24 provided thereon, and projects a short distance below the bottom of the cage. Said tube provides a passage for the traction member, such as the cable 25, which is provided at its lower end with a socket 26 adapted to engage with the lower end of the tube 22. A chain or other flexible connection 27 is attached to the socket and is provided with a bucket hook 28 of any well known construction. The bucket 29 which may be of any well known construction, has its bail 29^a secured to the bucket hook.

The tube 22 is movable vertically with respect to the cage and the cross-head, and is connected with the safety dogs through the chain 20, so that, whenever the tube moves downward and the chains 20 are released, the springs 17 will instantly rotate the safety dogs into engagement with the guides. The tube is normally held in its raised position and the dogs held out of engagement with the guides by any suitable means provided on the traction member, as the socket 26. Consequently if the means provided on the traction member disengages from the tube for any reason whatsoever, accidental or otherwise, the tube will immediately drop by gravity and under the tension of the springs, which will immediately rotate the safety dogs into engagement with the guides and hold the cross-head against falling.

In order to prevent the bucket itself from falling to the bottom of the shaft in event that the traction member should break, two or more safety catches 30 are pivoted as at 31 to depending lugs 32 secured to the bottom of the cage. Said catches comprise the safety hooks 34, which normally rest in line

with a disk 35, secured to the chain or other flexible member 27. Said disk is preferably cup-shaped in section so as to provide a depending lip 36 which will sit securely in the hooks 34. The safety catches also comprise outwardly extending arms 37 adapted to engage with stops 38 secured in any desired location to the guides. Said stops will cause the catches to rotate on their pivots and throw the hooks out of line with the disk 35, thus permitting the bucket to descend freely. Just as soon as the bucket and traction member move independently of the cross-head and tube, however, the safety dogs are immediately actuated, thus holding the cross-head and cage securely against falling if the stops should break.

In case it is desired to use the cross-head and cage without the bucket or other carrier, the tube 22 is detached from the carrier and removed, thus leaving the platform free for any use desired. A sliding bolt 39 having its lower end threaded to engage with the collar 21 is then substituted for the tube, and is secured to the traction member by any suitable means, as the eye 40. Said bolt is movable in the bearing 5 and holds the safety dogs out of engagement with the guides so long as the cross-head and cage are supported by the traction member, but in case the traction member should break, or if the cross-head should become caught on the guides, then the bolt will move downward through the bearing, together with the collar 21, thus permitting the springs to actuate the safety dogs into engagement with the guides and hold the cross-head and cage securely against falling until the weight is again supported by the traction member.

By means of this construction all of the most common sources of accident in connection with shaft sinking or the transportation of workmen and materials through the shaft are prevented. The accidental catching of the cross-head upon the guides, which has been a most fruitful source of fatal accident, causes the safety dogs to operate instantly and thus hold the cross-head securely against falling, even though it may become loosened by the constant passing out of the traction member. In event that the rope or cable breaks, the safety dogs are instantly actuated, and in case the bucket is being used, not only will the cross-head be supported, and held by the safety dogs, but the bucket itself will be prevented from falling by the safety catches provided on the bottom of the cage or cross-head. At the same time the cross-head is available for use in shaft sinking, since, by removing the safety catches or by interposing stops to move them out of line with the safety disk, the bucket and traction member are free at once to move independently of the cross-head in a downward direction.

tion. Even though the safety catches are used, and stops are employed of sufficient strength to normally support the cross-head, yet by this construction the safety dogs are
 5 caused to operate as soon as the bucket and traction member move downward independently of the cross-head, thus affording additional protection to workmen who may be at the bottom of the shaft.

10 Although I have shown a preferred form of mechanism embodying the invention, it is obvious that many changes within the skill of the mechanic may be made in the details thereof without departing from the spirit of
 15 the invention, provided the means set forth in the following claims be employed.

I claim as my invention:

1. In a safety device for shaft sinking, the combination with the cross-head and cage,
 20 guides for said cross-head, safety devices on the cross-head adapted to engage with the guides to support the cross-head and cage, a tube secured to said safety devices and movable in respect to said cross-head and cage to
 25 operate said safety devices, said tube being removable whereby the cross-head and cage may be supported at a point above the cage, and a traction member movable freely in
 30 said tube and provided with means to engage said tube below said cross-head and normally to support said cross-head and cage at a point below the bottom of the cage.

2. In a safety device for shaft sinking, the combination with a cross-head and cage,
 35 guides for said cross-head, safety devices on the cross-head adapted to engage with the guides to support the cross-head and cage, a tube secured to said safety devices and movable in said cross-head and through the cage
 40 to operate said safety devices, said tube being removable from the safety devices to permit the supporting of the cross-head through the safety devices and a traction

member movable freely in said tube and provided with means to engage said tube and
 45 normally support the cross-head and cage.

3. In a safety device for shaft sinking, the combination with a cross-head and cage, guides for said cross-head, safety devices on the cross-head adapted to engage with the
 50 guides and support the cross-head and cage, a movable collar operatively connected with said safety devices and permanently secured thereto, a seat for said collar permanently
 55 secured to the cross-head and arranged centrally above the same, a tube detachably secured to said collar and extending downward through the cage, a traction member
 60 freely movable in the tube, and means on said traction member to engage with the bottom of said tube below the cage and
 normally to support the cross-head and cage.

4. In a safety device for shaft sinking the combination with a cross-head and cage, guides for said cross-head and cage, safety
 65 devices on said cross-head adapted to engage with the guides and support the cross-head and cage, a tube detachably secured to said safety devices and movable through said
 70 cross-head and cage to operate said safety devices, a traction member movable in said tube and provided with means to engage said tube below the cage and normally to support
 75 the cross-head and cage and hold the safety devices in their nonoperative position, a bucket secured to said traction member, and means dependent from the bottom of the
 cage and below the tube to support the bucket when said cage is supported by the
 80 safety devices.

This specification witnessed this 6th day of August, A. D. 1910.

THOMAS BRYANT.

Signed in the presence of—

A. G. ROWE,

T. M. KELLEY.