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3 SHEETS--SHEET 1.

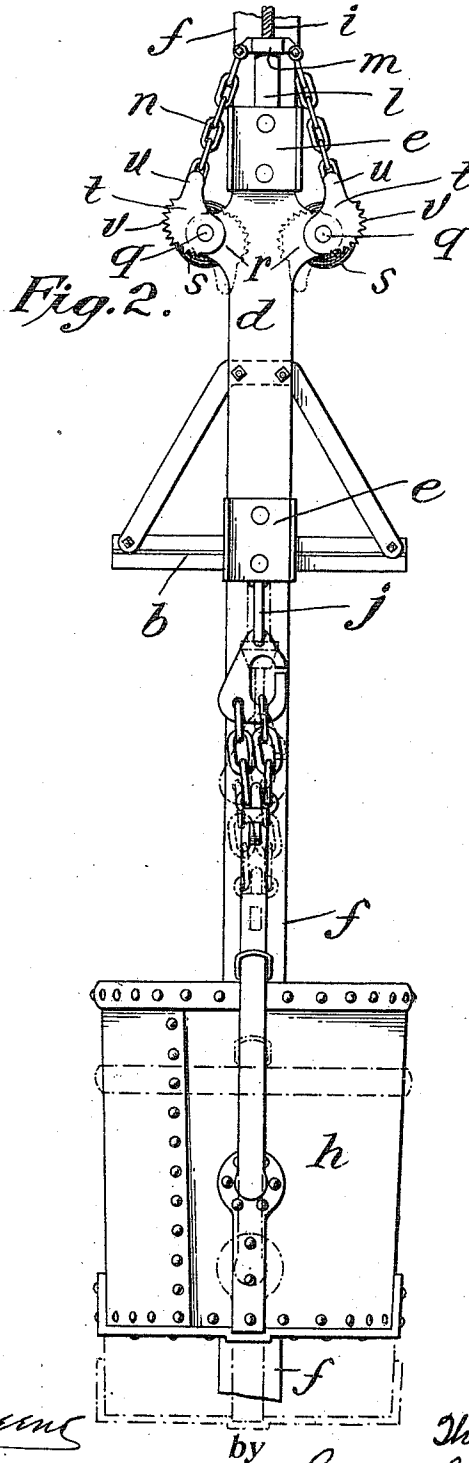
Inventor:
Thomas Bryant
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T. BRYANT.
SAFETY SHAFT SINKING CROSS HEAD.
APPLICATION FILED JUNE 25, 1908.

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Patented Jan. 31, 1911.

3 SHEETS—SHEET 2.



Attest:
Edgeworth Cross
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3 SHEETS—SHEET 3.

Fig. 3.

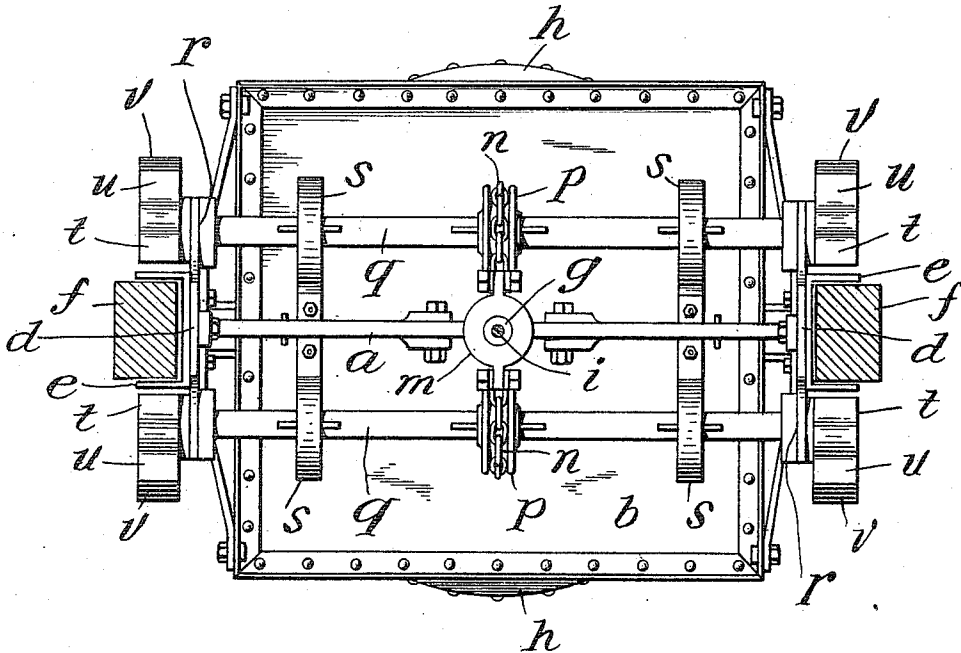
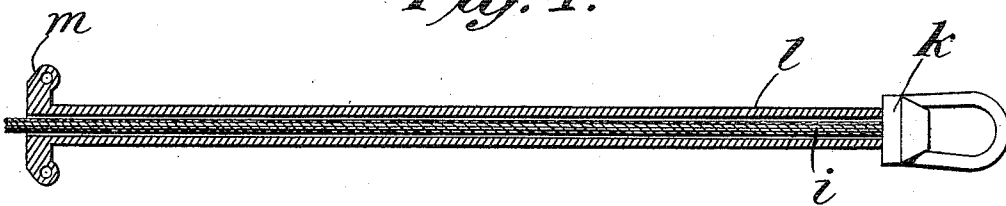


Fig. 4.



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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 SHAFT-SINKING CROSS-HEAD.

983,120.

Specification of Letters Patent.

Patented Jan. 31, 1911.

Application filed June 25, 1908. Serial No. 440,234.

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, in the State of Montana, have invented certain new and useful Improvements in Safety Shaft-Sinking Cross-Heads, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

One object of this invention is to provide automatically operating means to lock a movable crosshead firmly against movement, whenever the cross-head is accidentally caught or lodged in the shaft.

Another object of the invention is to provide means, whereby the bucket, car or other carrier may be lowered independently of the cross-head after same has become lodged and whereby the crosshead may be automatically released when the carrier is raised.

Still further objects will be set forth in the description of the invention, which consist in the new and novel features of construction and combination of parts hereinafter set forth and claimed.

In the accompanying drawings, Figure 1 represents a front view of a portion of a shaft with a cross-head and carrier therein comprising my improved mechanism. Fig. 2 represents an end view of the same, with one of the guides removed to more clearly show the parts of the mechanism. Fig. 3 is a plan view of the same. Fig. 4 is a detailed view, showing the tube or sheath.

Referring to the drawings and to the particular embodiment of my invention therein shown, the frame of the crosshead may be of the usual construction comprising upper and lower cross-bars *a*, platform *b*, braces *c*, and side arms *d*. The side arms are provided with shoes *e* which travel on guides *f* constructed in the shaft in the usual manner. The cross-bars are provided centrally with passages *g* such as are usually provided for the traction member which may be a cable, rope, chain or other hoisting means.

The skip, cage, bucket, car or other carrier *h* is secured to the traction member *i* by any suitable means as a shackle *j* preferably having a head *k* formed thereon which normally engages the bottom of the lower cross-bar and provides a central support for the crosshead.

A movable member comprising prefer-

ably a tube or sheath *l* incloses the lower portion of the traction member and is movably mounted on the cross-bars preferably in passages *g*. Normally this member *l* rests upon and is supported by the head *k* of the shackle, but when such support is withdrawn downward movement thereof is limited in any suitable manner as by a collar *m*. The upper part of the tube or sheath preferably projects a short distance above the upper cross-bar and has ropes or chains *n* secured to opposite sides thereof preferably to the collar *m*. Each chain is operatively connected with a pulley or sheave *p* keyed to a shaft *q* rotatable in suitable bearings *r* provided in the frame. One or more stout springs *s* are secured to each shaft near both ends thereof in such manner that they will act normally to rotate the shaft and wind up the chains upon the sheaves or pulleys *p*. A safety device to engage the guides comprising preferably a dog *t* is rigidly secured to the end of each shaft. Said safety dog is preferably segmental in form and is provided with a toe or extension *u* and with teeth *v* adapted to bite into and rigidly engage with the guide and hold the crosshead against movement.

When the crosshead is operating in its usual and normal manner, it rests upon the shackle or other holding means and moves up and down upon the guides with the traction member. The tube or sheath *l* is held in its raised position (shown in solid lines in Fig. 1) which pulls upon the chains *n* and holds the dogs *t* in their non-operative positions against the tension of the springs *s*. When, however, the crosshead strikes any obstruction or sticks accidentally or otherwise on the guides for any reason whatever while the traction cable is descending, then the rope with the carrier attached will continue its downward movement independently of the crosshead. The shackle disengages from the lower end of the sheath or tube *l* which thereupon drops, by gravity and under the tension of the springs *s*, into its lowermost position (shown in dotted lines in Fig. 1) and simultaneously the springs rotate the shafts *q* to bring the teeth *v* on the dogs into engagement with the guides. The crosshead will thus be securely held until the bucket or other receptacle is raised again and the traction cable engages with and raises the tube, thereby rotating the

shafts *g* by means of the chains *n* and returning the dogs to their non-operative positions against the tension of the springs *s*.

By this construction the disasters caused
 5 by the falling of the crosshead upon the carrier, such as a bucket, skip or car, after being accidentally caught on the guides will be effectually prevented since the dogs engage automatically the moment that the crosshead
 10 is caught in any part of the shaft. At the same time the cable is always free to move independently of the crosshead and if the crosshead should be caught no delay is occasioned thereby as the cable can be lowered
 15 as far as desired and then, when raised again, the crosshead will be automatically released. In case the traction cable breaks it is obvious that the safety means will operate automatically in the same manner as
 20 when the crosshead is accidentally caught and will prevent the crosshead from falling to the bottom of the shaft.

Although my improved mechanism can be used in any situation it is especially adapted
 25 for use in shaft sinking and in various other places where it is necessary to lower the bucket or other receptacle below the end of the guides, since a stop or other obstruction placed at the ends of the guides will cause
 30 the safety device to operate and hold the crosshead positively and independently while the bucket is lowered to the bottom. It is obvious, however, that the crosshead or an equivalent thereof can be used in connection
 35 with hoists, elevators or carriers of any kind which move in guides and which require safety appliances that will work automatically to hold the same positively against movement in one direction.

40 Various changes and modifications in the details of the structure shown and described herein will readily occur to those skilled in the art, but all such changes and modifications are within the scope of my invention
 45 provided the means set forth in the following claims be employed.

I claim as my invention:

1. In a safety shaft sinking device the combination of a cross-head, a traction member
 50 freely movable with respect to said cross-head and provided with means normally supporting same, and a safety device on said cross-head normally held in non-operative position by the traction member while the
 55 cross-head is supported by said traction member, said safety device being operated immediately to prevent positively downward movement of the cross-head whenever the cross-head is supported independently of
 60 the traction member.

2. In a safety shaft sinking device, the combination with guides and a cross-head movable on said guides, of a traction member
 65 freely movable with respect to said cross-head and provided with means normally

supporting same, and a safety device on said cross-head comprising gripping members normally held in non-operative position by the traction member while the cross-head is supported by said traction member, said
 70 safety device being immediately operated to engage positively with the guides to prevent downward movement of the cross-head whenever the support provided by the traction member is withdrawn. 75

3. In a safety shaft sinking device, the combination with a cross-head and a safety device on said cross-head, of a movable tube operatively connected with said safety device and movable independently of the cross-
 80 head, a traction member normally supporting the cross-head and provided with means normally engaging said movable tube to hold the safety device in its non-operative position, and means causing said safety de-
 85 vice to operate immediately when said traction member moves independently of the cross-head to hold the cross-head positively against downward movement.

4. In a safety shaft sinking device, the 90 combination of guides, a cross-head movable on said guides, a traction member freely movable with respect to said cross-head and provided with means normally supporting
 95 same, a safety device on said cross-head comprising gripping members adapted to engage the guides in their operative position, an operating member mounted on the cross-head and movable with relation thereto and operatively secured to the gripping mem-
 100 bers, said operating member normally engaging with the traction member while the cross-head is supported thereby to hold said gripping members in non-operative position and being automatically released to permit
 105 operation of said gripping members when the traction member moves independently of the cross-head and the support provided thereby is withdrawn, and means for causing
 110 said safety device to operate immediately when said traction member moves independently of the cross-head to hold the cross-head positively against downward movement.

5. In a safety shaft sinking device, the 115 combination with guides, a cross-head comprising a rigid frame having upper and lower cross-bars, safety devices mounted on said cross-head adapted to engage the guides in their operative position, and a tube
 120 mounted on the upper and lower cross-bars and movable independently thereof and connected with the safety devices, of a traction member freely movable with respect to and normally supporting said cross-head and en-
 125 gaging said tube to hold the safety devices in their non-operative position, and means for actuating said safety devices immediately to engage the guides whenever the cross-head is supported independently of
 130 the traction member.

6. The combination with guides and a cross-head guided by said guides, of a hoisting cable adapted to normally support said cross-head and to move freely and independent of said cross-head in the direction of motion thereof; a carrier supported by said hoisting cable and adapted to receive a load and located beneath said cross-head and free at all times to move away therefrom; a safety device carried by said cross-head, means for causing said safety device immediately to engage positively with the guides when said carrier moves away from said cross-head; and means carried by and movable with said hoisting cable and adapted to normally engage said safety device to hold it in its inoperative condition, said means serving also as a support for said cross-head.

7. The combination with guides and a cross-head guided by said guides, of a hoisting cable adapted to normally support said cross-head and to move freely and independent of said cross-head in the direction of motion thereof; a carrier supported by said hoisting cable and adapted to receive a load and located beneath said cross-head and free at all times to move away therefrom; a safety device carried by said cross head and normally inoperative, means for causing immediate operation of said safety device when said carrier moves away from said cross-head to hold the cross-head positively against downward movement; and means carried by and movable with said hoisting cable and adapted to normally engage said safety device to hold it in its inoperative condition, said means serving also as a support for said cross-head.

8. The combination with guides and a cross-head guided by said guides, of a hoisting cable adapted to normally support said cross-head and to move freely and independently of said cross-head in the direction of motion thereof; a carrier supported by said hoisting cable and adapted to receive a load and located beneath said cross-head and free at all times to move away therefrom; a safety device carried by said cross-head and comprising movable members normally out of contact with said guides but adapted to come into contact therewith when said carrier moves away from said cross-head; means for operating said movable members immediately when the carrier moves away from the cross-head to hold said cross-head positively against downward movement; and means carried by and movable with said hoisting cable and adapted to normally engage said operating means to hold said movable members out of contact with said guides, said means serving also as a support for said cross-head.

9. The combination with guides and a cross-head guided by said guides, of a hoist-

ing cable adapted to normally support said cross-head and to move freely and independent of said cross-head in the direction of motion thereof; a carrier supported by said hoisting cable and adapted to receive a load and located beneath said cross-head and free at all times to move away therefrom; a safety device carried by said cross-head and comprising swinging gripping members normally out of contact with said guides but adapted to come into contact therewith when said carrier moves away from said cross-head; a movable tube carried by said cross-head and through which said hoisting cable passes; means connecting said tube and said gripping members and through which motion is transmitted from said tube to said gripping members; means for causing said gripping members to engage immediately with said guides to hold the cross-head positively against downward movement; and means carried by and movable with said hoisting cable and adapted to normally engage said tube to hold said gripping members out of contact with said guides said means serving also as a support for said cross-head.

10. The combination with guides and a cross-head guided by said guides, of a hoisting cable adapted to normally support said cross-head and to move freely and independent of said cross-head in the direction of motion thereof; a carrier supported by said hoisting cable and adapted to receive a load and located beneath said cross-head and free at all times to move away therefrom; a safety device carried by said cross-head and comprising swinging gripping members normally out of contact with said guides but adapted to come into contact therewith when said carrier moves away from said cross-head; means acting upon said gripping members immediately whenever the cross-head is supported independently of the hoisting cable to move them into positive contact with said guides; a movable tube carried by said cross-head and through which said hoisting cable passes; means connecting said tube and said gripping members and through which motion is transmitted from said tube to said gripping members; and means carried by and movable with said hoisting cable and adapted to normally engage said tube to hold said gripping members out of contact with said guides said means serving also as a support for said cross-head.

11. The combination with guides and a cross-head guided by said guides, of a hoisting cable adapted to normally support said cross-head and to move freely and independent of said cross-head in the direction of motion thereof; a carrier supported by said hoisting cable and adapted to receive a load and located beneath said cross-head and free

at all times to move away therefrom; a safety device carried by said cross-head and comprising swinging gripping members normally out of contact with said guides but adapted to come into contact therewith when said carrier moves away from said cross-head; a spring acting upon said gripping members to move them immediately into positive contact with said guides when the carrier moves away from the cross-head; a movable tube carried by said cross-head and through which said hoisting cable passes; means connecting said tube and said gripping members and through which motion is transmitted from said tube to said gripping members; and means carried by and movable with said hoisting cable and adapted to normally engage said tube to hold said gripping members out of contact with said guides, said means serving also as a support for said cross-head.

12. The combination with guides and a crosshead guided by said guides comprising horizontal members provided with central openings therein; a tube movably mounted in said openings; a hoisting cable freely and independently movable in said tube; a car-

rier supported by said hoisting cable and adapted to receive a load and located beneath said crosshead; a safety device carried by said crosshead and comprising swinging gripping members normally out of contact with said guides but adapted to come into contact therewith when said carrier moves away from said crosshead; a spring acting upon said gripping members to move them into positive contact with said guides immediately when the carrier is supported independently of the cross-head; means connecting said tube and said gripping members through which motion is transmitted in one direction from said tube to said gripping members; and means carried by and movable with said hoisting cable and adapted to normally engage the tube to hold said gripping members out of contact with said guides and to support the crosshead.

This specification signed and witnessed this 12th day of May, A. D., 1908.

THOMAS BRYANT.

Signed in the presence of—

W. C. MESSIAS,
JAMES DOUEL.