

No. 827,300.

PATENTED JULY 31, 1906.

W. FERRIS.

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APPLICATION FILED DEC. 1, 1905.

2 SHEETS—SHEET 1.

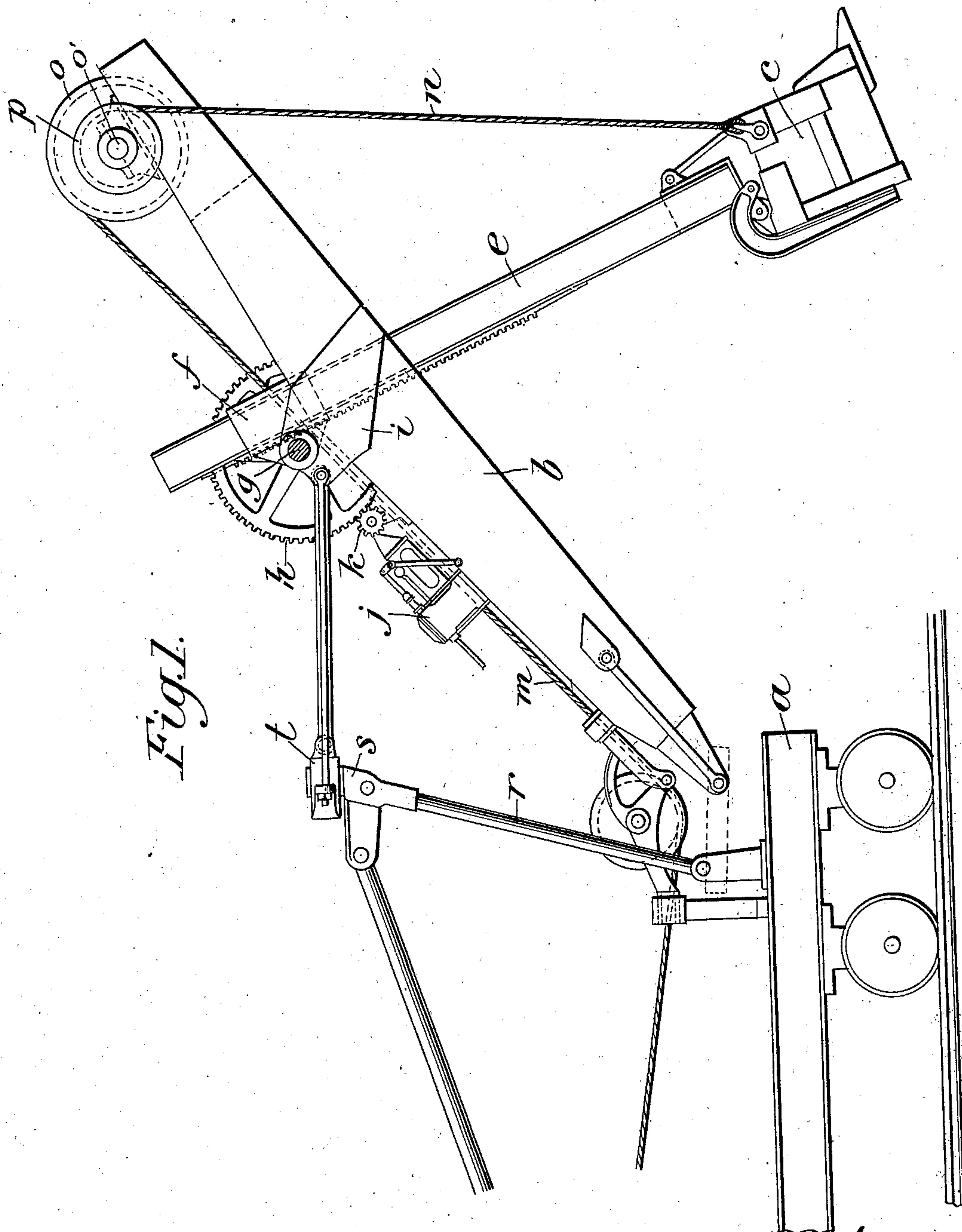


Fig. 1.

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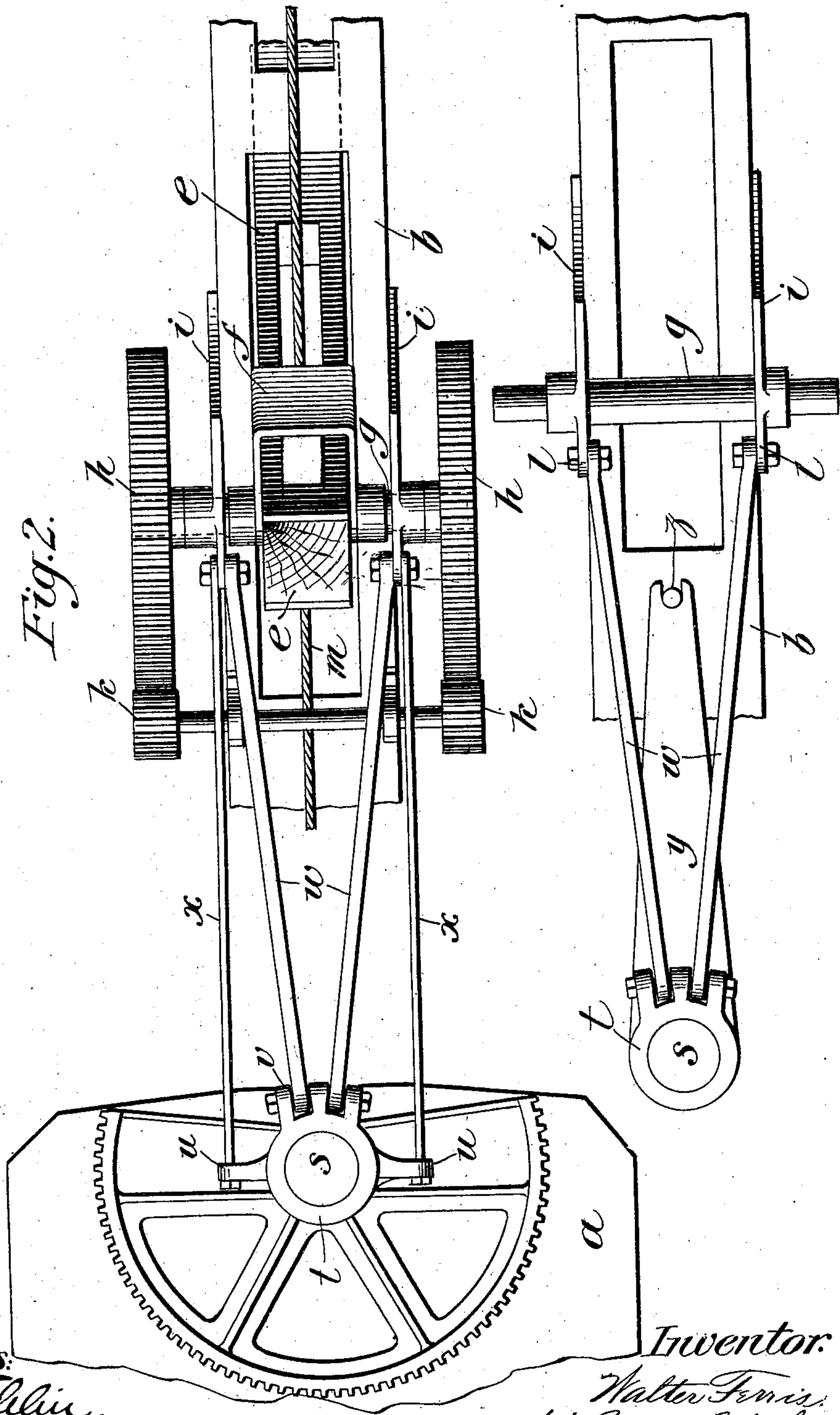
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UNITED STATES PATENT OFFICE

WALTER FERRIS, OF SOUTH MILWAUKEE, WISCONSIN, ASSIGNOR TO
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BOOM-GUY FOR STEAM-SHOVELS AND THE LIKE.

No. 827,300.

Specification of Letters Patent.

Patented July 31, 1906.

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To all whom it may concern:

Be it known that I, WALTER FERRIS, a citizen of the United States, residing at South Milwaukee, county of Milwaukee, State of Wisconsin, have invented certain new and useful Improvements in Boom-Guys for Steam-Shovels and the Like; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as it will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to steam-shovels and like excavator apparatus, and has for its object to provide a simple and efficient arrangement of guys for supporting the swinging boom of such apparatus, adapted to take up independently the loads imposed upon each side of the boom and to protect all portions of the boom below the points of the attachment of the guys from torsional strains.

To this end the invention comprises a pair of boom-guys connected to the sides of the boom, preferably at the saddle-block bearings just below the shipper-shaft and running thence in lines which if prolonged would intersect at the center of the A-frame collar. In order to provide for the turning of the A-frame collar as the boom swings to right or left without imposing bending strains on the guy-rods, said A-frame collar is preferably connected to the boom by suitable means which will insure the proper degree of movement of said collar with the boom.

In the accompanying drawings, Figure 1 is a side elevation of the forward end of a steam-shovel having the invention applied thereto. Fig. 2 is an enlarged plan view thereof, certain of the parts being omitted to avoid complication; and Fig. 3 is a similar view showing a slightly-modified form of the invention.

According to the usual engineering practice it has been customary to support the swinging booms of steam-shovels and like apparatus by means of two boom-guys arranged parallel to each other on opposite sides of the boom and connected to the outer end of the boom at one end and to laterally-projecting lugs on the A-frame collar at the other. With this arrangement of widely separated and substantially parallel boom-guys there is no connection between the guy on one side of the boom and the opposite side

of the A-frame collar, and therefore there is no way of loading one of these boom-guys heavier than the other. If the boom receives an excessive load on one side near the upper end, the tendency of the boom-guy on that side to receive and support such load merely results in the strain being delivered by means of the A-frame collar as an equalizer to the other boom-guy, and the unequal loading is eventually resisted by the torsional strength of the boom itself twisting against the foot-sockets. To obviate these difficulties and to relieve the boom of twisting strains at all points below the shipper-shaft, the present invention contemplates the provision of guy-rods which are connected at one point to an A-frame collar and diverge from the center of the latter to points where they are connected on opposite sides of the boom in the rear of the shipper-shaft.

In the accompanying drawings, *a* indicates the car-body or other support of the steam-shovel, and *b* the swinging boom, which is mounted upon the usual rotatory platform. Passing through the boom *b* is the handle *c* of the dipper *c*, which dipper-handle is provided on its under face with the usual rack which engages the thrusting-pinions mounted upon the shipper-shaft *g*. This latter shaft is preferably mounted in bearings formed in the side plates or brackets *i*, secured to the sides of the boom. The thrusting-pinions are driven by gears *h*, likewise mounted upon the shipper-shaft and receiving rotatory motion from smaller gears *k* on the crank-shaft of the operating engine or motor *j*. The rack on the dipper-handle is held in proper operative engagement with the thrusting-pinions on the shipper-shaft by means of the usual saddle-block *f*, which is mounted upon the shipper-shaft and surrounds the handle, so that the latter may slide freely backward and forward through the saddle-block and said saddle-block may have the necessary rotatory movement with respect to the boom to permit the dipper and its handle to be raised and lowered, as will be understood by those skilled in the art.

The dipper is preferably operated by means of a double-cable suspension—that is to say, two cables *n* are connected to opposite points of the bucket, preferably near the upper rear corner thereof, and each cable is

connected to a winding-drum *p*, mounted upon a shaft *o'* on the end of the boom, so that as the shaft is driven the drums will be rotated at the same rate of speed to pay off or take in the two cables *n*, connected with the bucket. A large drum *o* is mounted upon shaft *o'* and serves to rotate the latter to take in the cables *n* as power-cable *m* is withdrawn from said drum *o* and wound upon the usual power-drum mounted upon the car-body of the apparatus.

It will be apparent that if the boom *b* were supported by the ordinary arrangement of parallel guys running from the lateral lugs of the **A**-frame collar to the end of the boom and an excessive load were imposed upon one side of the boom—as, for instance, when the bucket struck hard soil or rock at one corner—practically the entire strain would be imposed upon the boom, as a twisting moment transmitted to the boom from the guy on the side which received the overload, thence by way of the **A**-frame collar to the other guy. In this way the **A**-frame collar serves to act as an equalizer between the two separate boom-guys and serves to throw practically all the torsional strain into the boom itself. According to the present invention instead of connecting the boom-guys to the sides of the **A**-frame collar and the outer end of the boom the guys *w w* are connected to the boom by means of lugs or extensions on the plates or brackets *i*, which form the bearings for the shipper-shaft, and said guys run thence on converging lines, which would intersect at substantially the center of rotation of the **A**-frame collar *t*, said guys being connected by suitable lugs or ears *v* to said collar. In order to cause the **A**-frame collar to rotate as the boom swings to right or left, the said collar is connected to the boom by means of light rods *x x*, said rods being connected to the collar at one end by the usual lateral lugs *u* and to the boom at the other by the bolts which connect the guys with the plates *i*. These rods supply the necessary force to overcome the friction between the **A**-frame collar and its bearing and cause said collar to turn without putting lateral strain on the boom-guys, which being connected in line with the center of the **A**-frame have no turning moment on the collar. It will be apparent that by this arrangement the guys take up independently the loads

imposed upon each side of the boom and protect all portions of the boom below the point of attachment of the guys from torsional strains.

In the modified form of the invention the means for causing the **A**-frame collar to turn with the boom consists of a simple plate or frame *y*, rigidly attached to the collar and having at its outer end a fork which embraces a pin *z*, projecting from the upper surface of the boom, so that as said boom swings to the right or left a corresponding rotatory motion is imparted to the collar.

What I claim is—

1. In an excavator, the combination of a boom, an **A**-frame mounted near the foot thereof, and guy-rods connected to opposite points on the boom and to a common point on the **A**-frame collar.

2. In an excavator, the combination of a boom, an **A**-frame mounted near the foot thereof, and guy-rods connected to opposite points on the boom below the sweep of the dipper-handle, and to a common point on the **A**-frame collar.

3. In an excavator, the combination of a boom, an **A**-frame mounted near the foot thereof, and a pair of guy-rods attached to the boom at opposite sides thereof and to the **A**-frame collar in such manner that the prolongations of the medial lines of said guys would intersect at the center of the **A**-frame collar.

4. In an excavator, the combination of a boom, an **A**-frame mounted near the foot thereof, guy-rods connected to opposite points on the boom and to a common point on the **A**-frame collar, and means connecting the collar and boom to cause the latter to rotate as the boom swings.

5. In an excavator, the combination of a boom, an **A**-frame mounted near the foot thereof, guy-rods connected to a common point on the **A**-frame collar and to points on opposite sides of the boom, and auxiliary rods connecting points on the collar sides and corresponding points on the boom sides.

In testimony whereof I affix my signature in presence of two witnesses.

WALTER FERRIS.

Witnesses:

RIDGELY FLETCHER,
HARRY B. HAYDEN.