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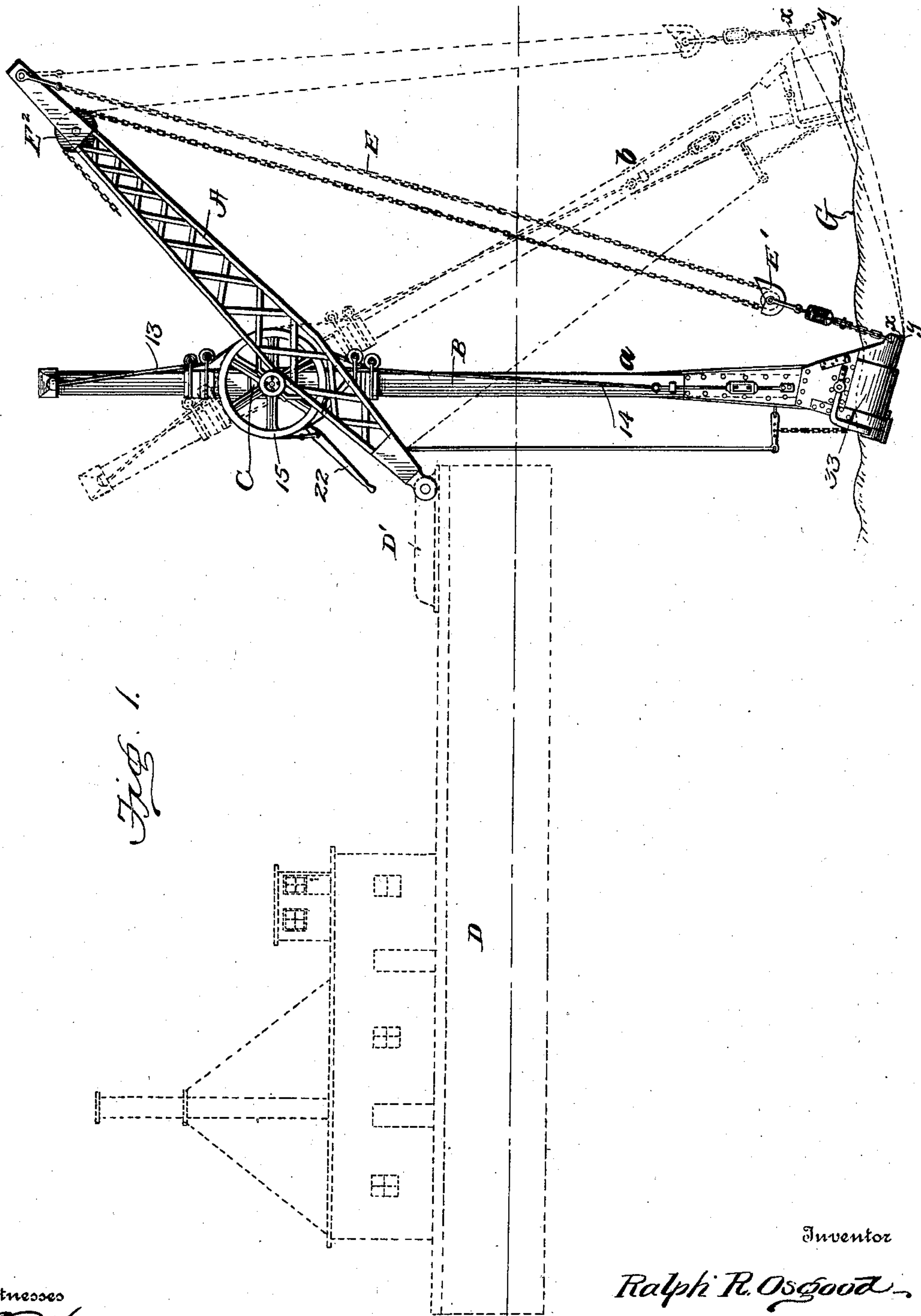
Patented Sept. 9, 1902.

R. R. OSGOOD.
DREDGE.

(Application filed Mar. 18, 1902.)

(No Model.)

4 Sheets—Sheet 1.



Inventor

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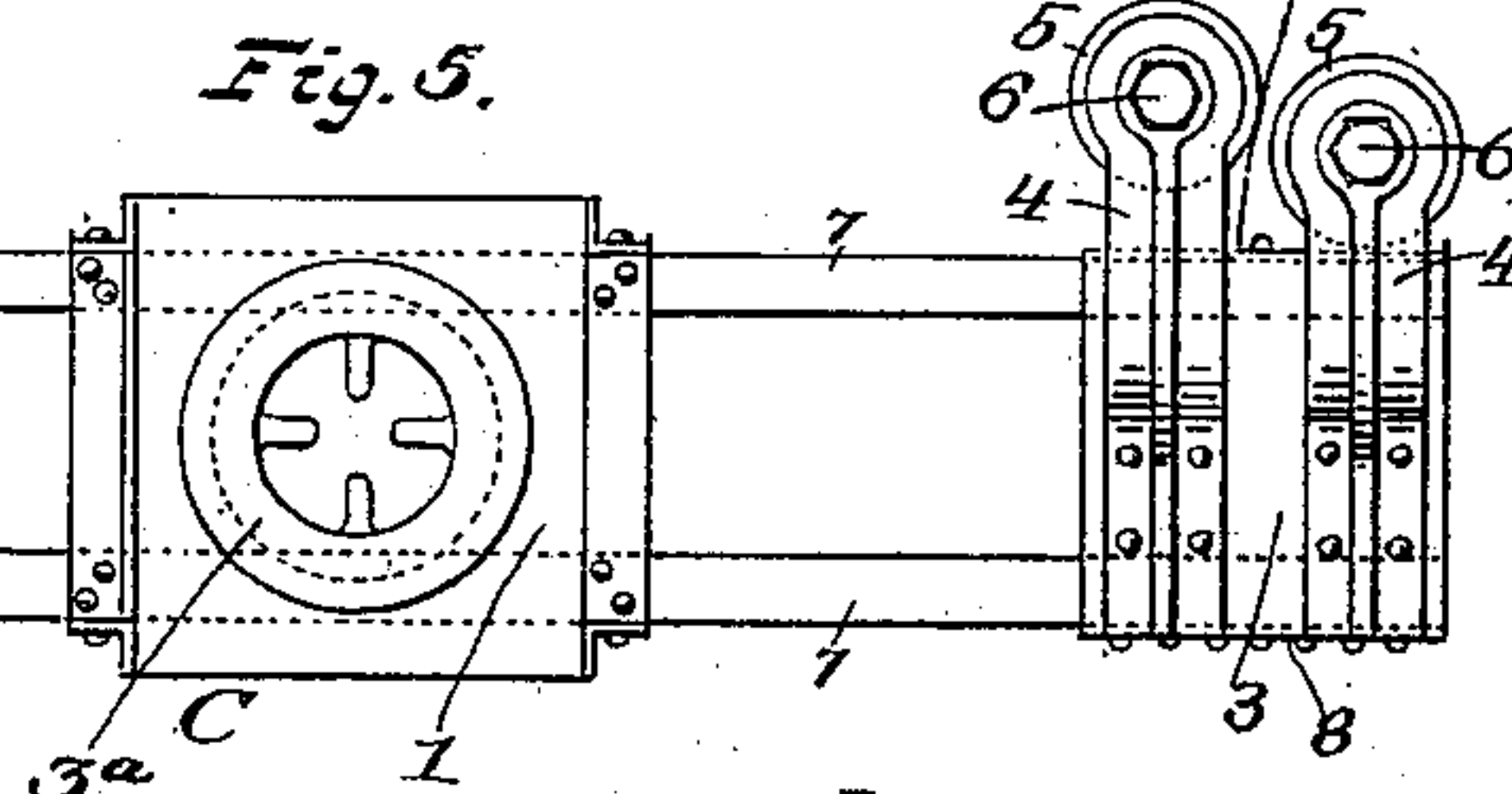
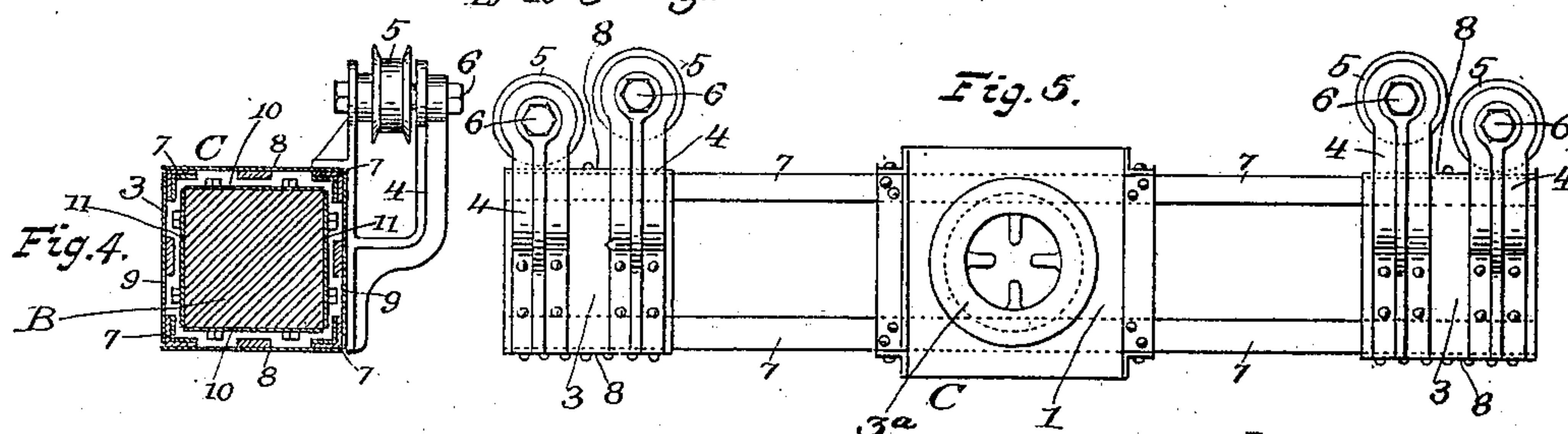
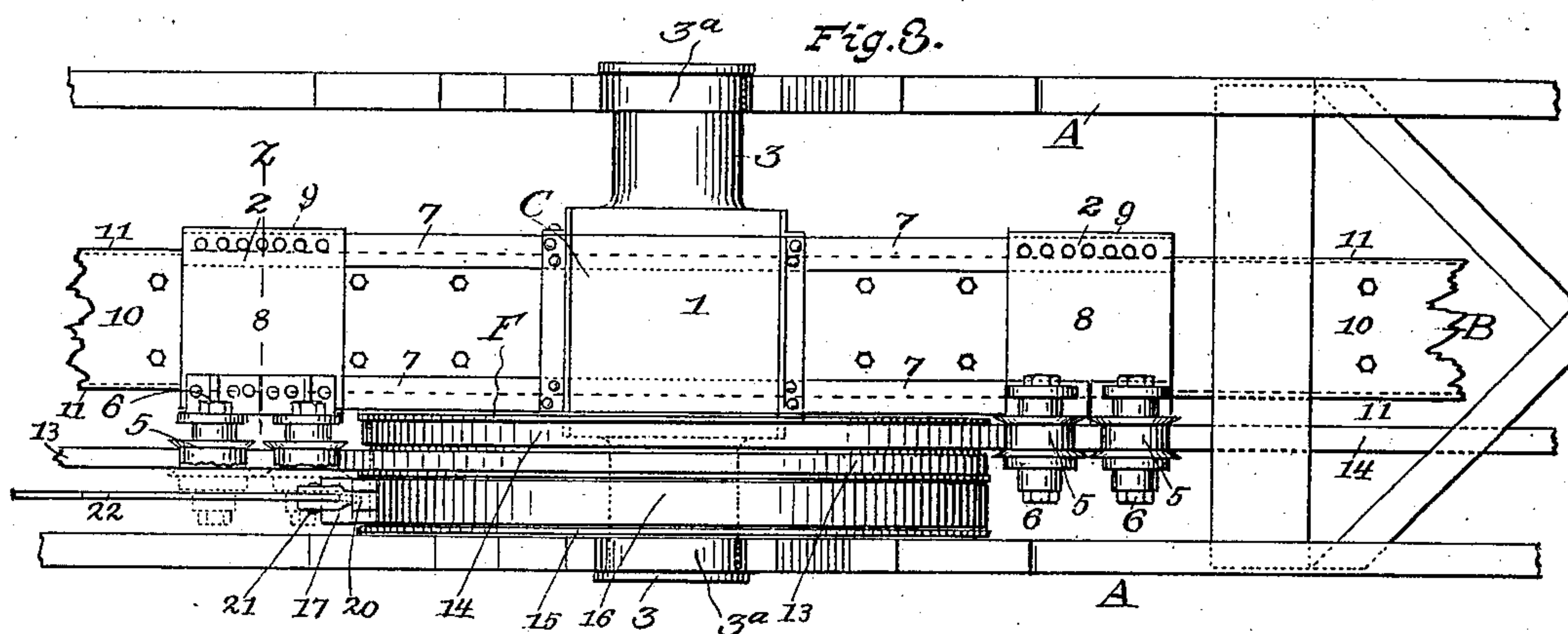
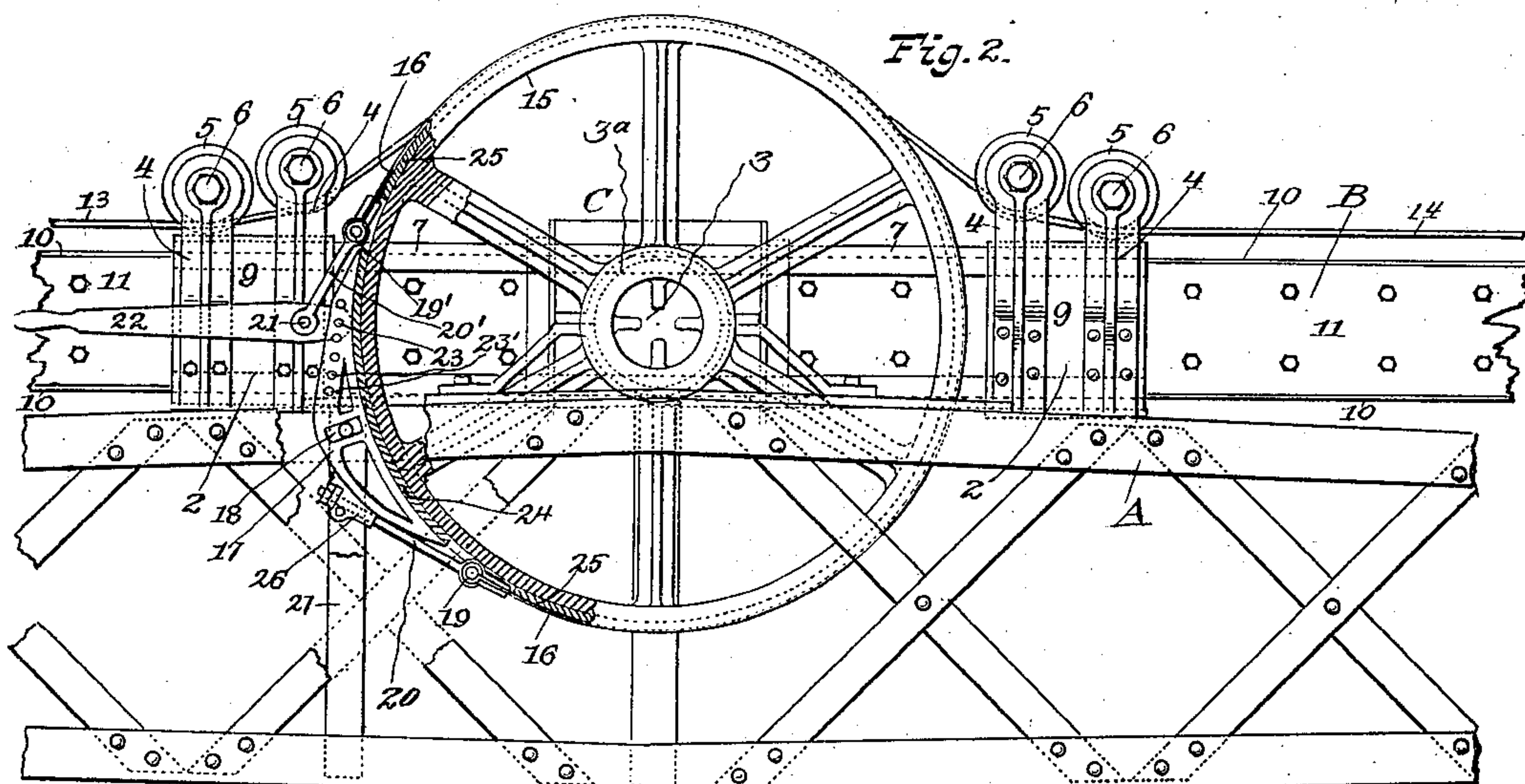
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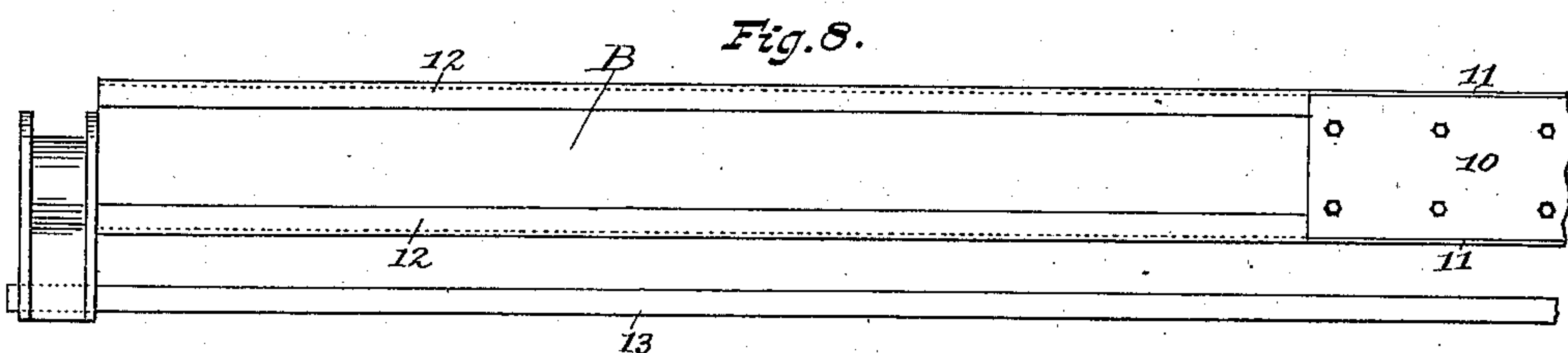
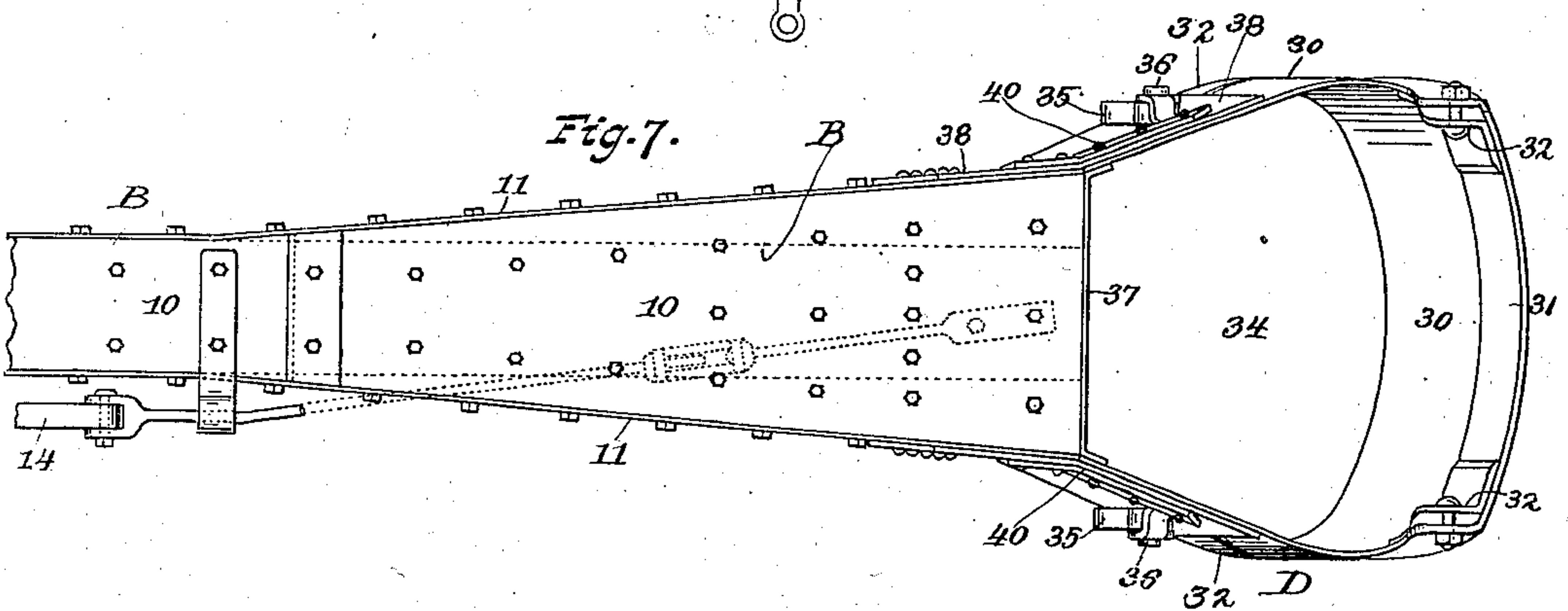
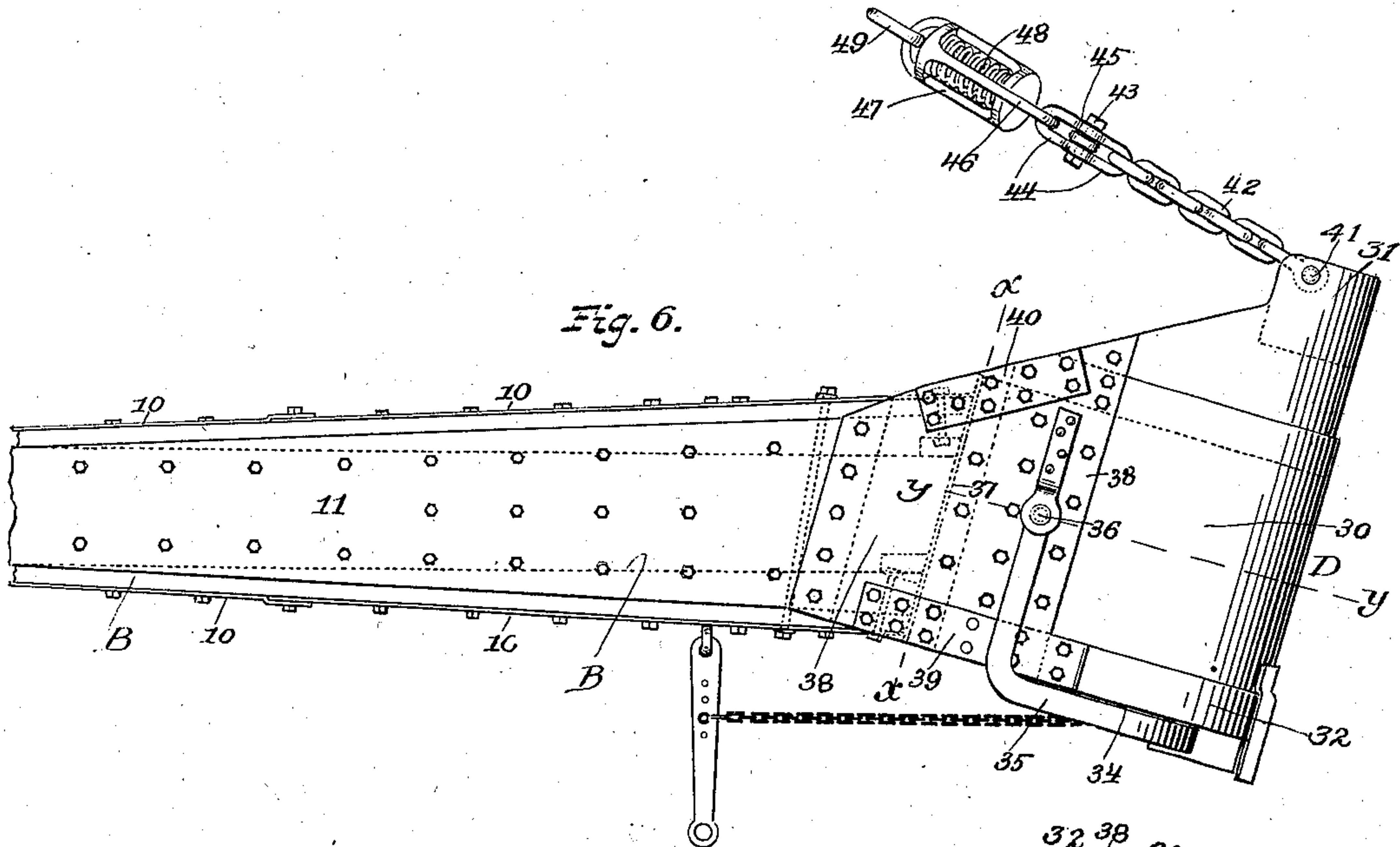
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(Application filed Mar. 18, 1902.)

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4 Sheets—Sheet 3.



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4 Sheets—Sheet 4.

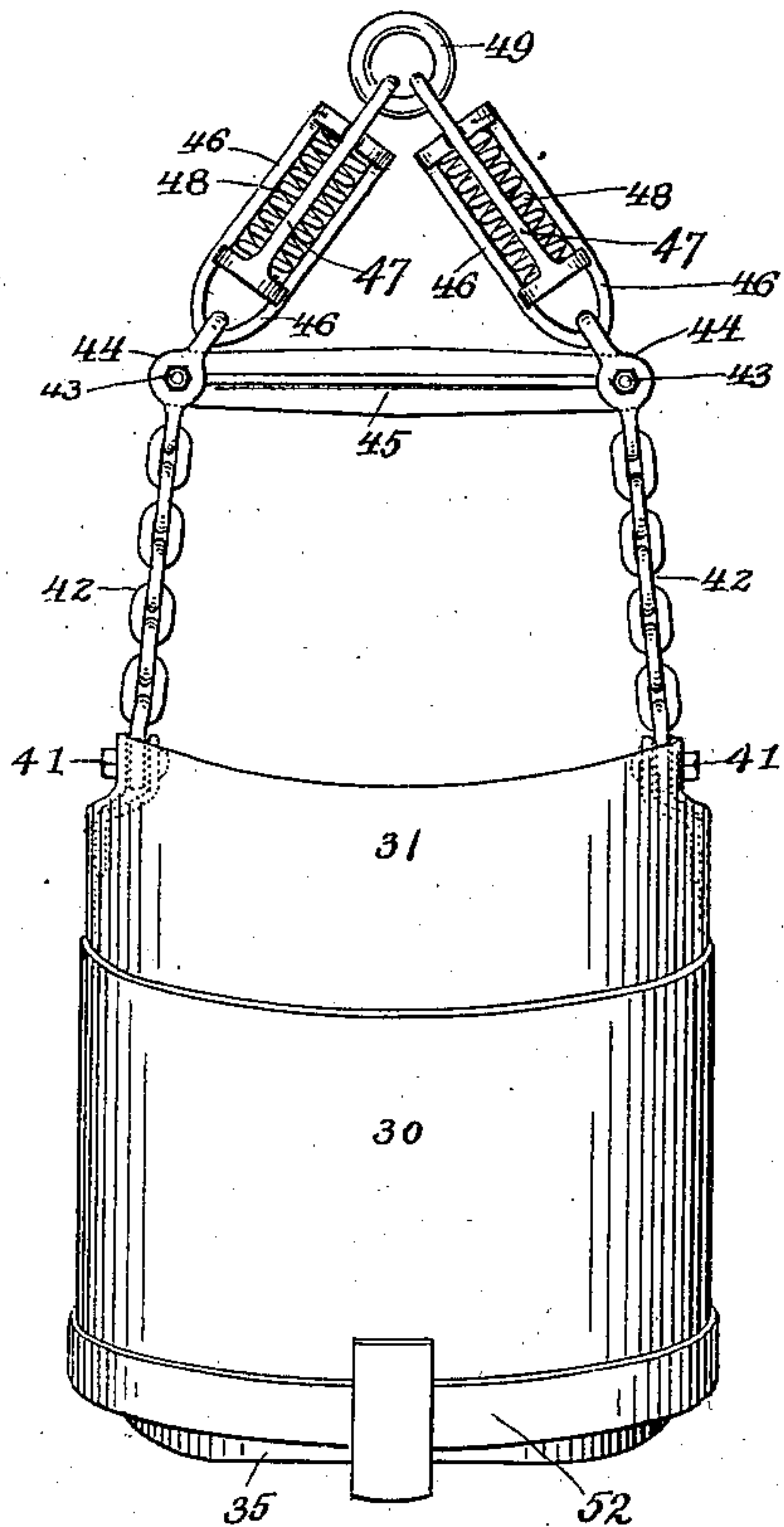


Fig. 9.

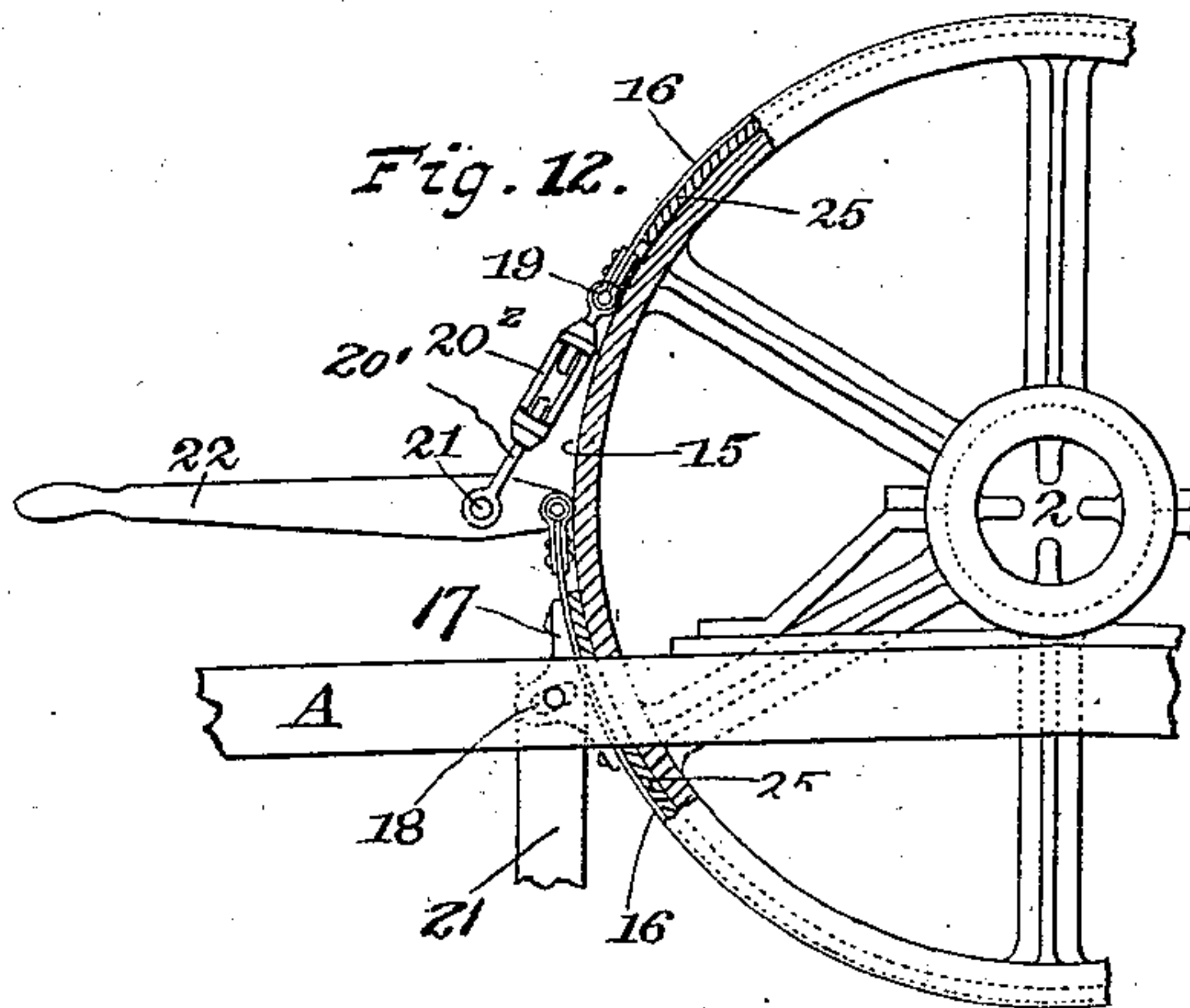


Fig. 12.

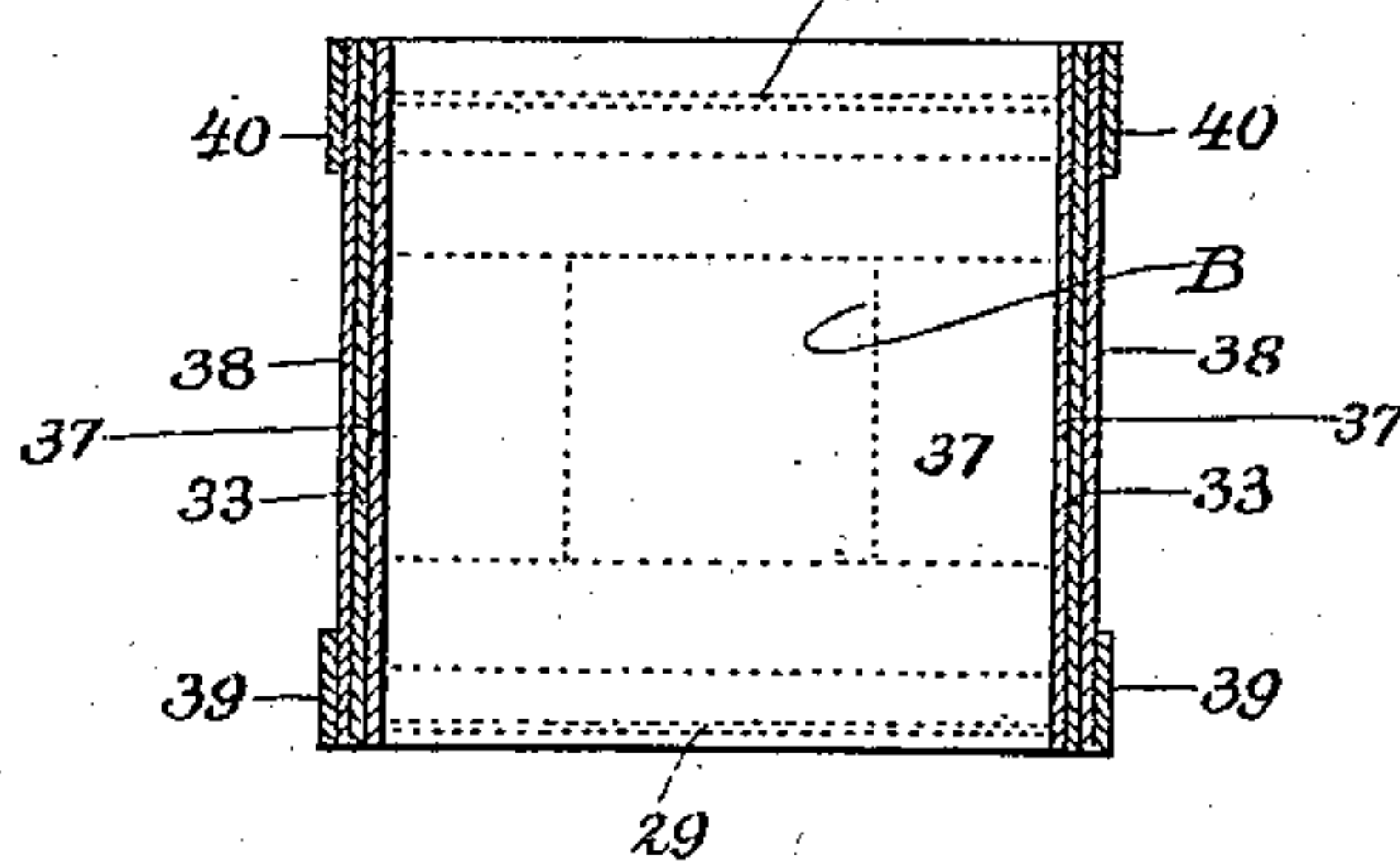


Fig. 10.

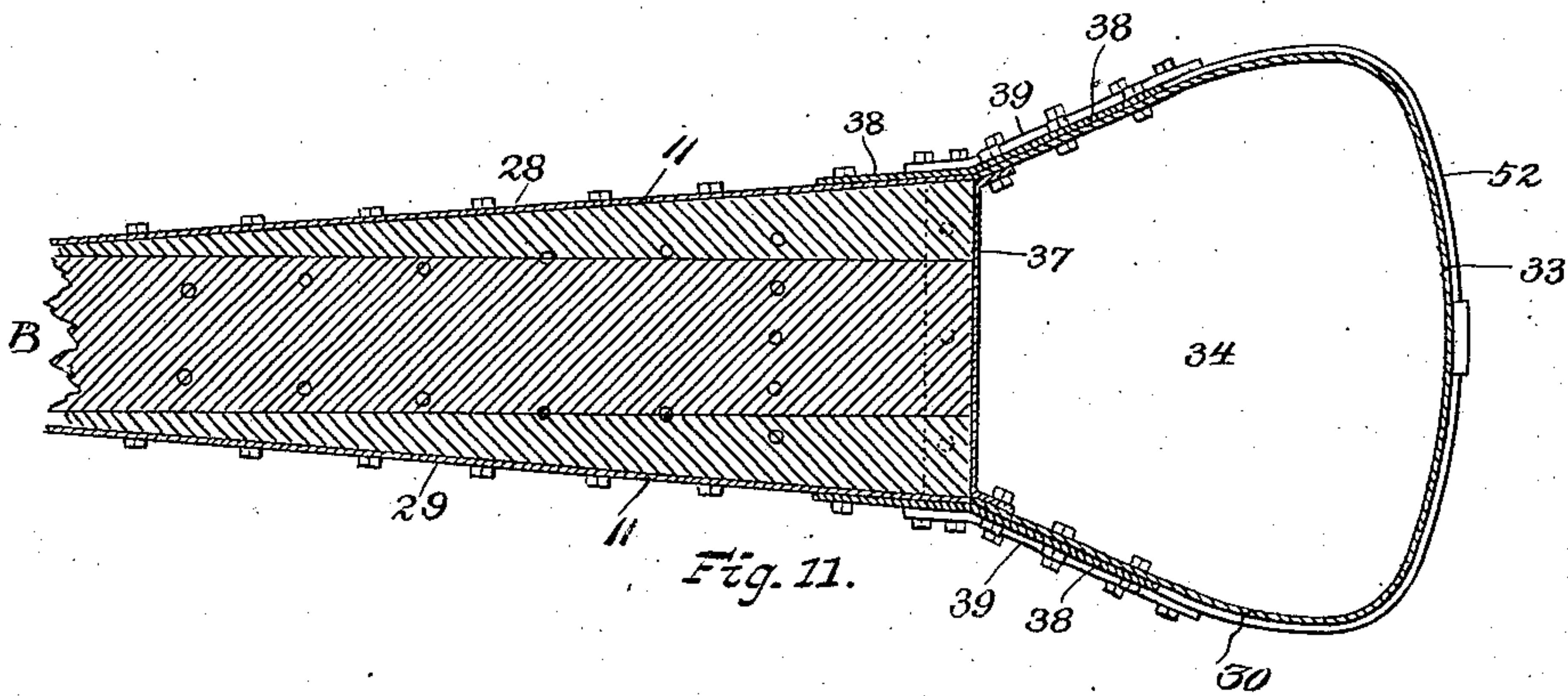


Fig. 11.

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UNITED STATES PATENT OFFICE.

RALPH R. OSGOOD, OF UPPER TROY, NEW YORK.

DREDGE.

SPECIFICATION forming part of Letters Patent No. 708,658, dated September 9, 1902.

Application filed March 18, 1902. Serial No. 98,802. (No model.)

To all whom it may concern:

Be it known that I, RALPH R. OSGOOD, a citizen of the United States, residing at Upper Troy, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Dredges; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in dredges, and particularly to the excavating-dippers and dipper-handles of dredges and to means for controlling the operation of the same.

The object of the present invention is to provide an improved construction of dipper-handle and controlling mechanism of the type shown in my prior patents, No. 659,489, dated October 9, 1900, and No. 662,462, dated November 27, 1900, in which the dipper-handle slides in a trunnion-sleeve and oscillates on the trunnions of said sleeve, the specific object in view being to generally improve the construction of the handle as well as the sleeve and the means for controlling the movements of the handle, so as to increase the strength and practical efficiency of these parts; and a further object of the invention is to improve the construction of the dipper and its connections, so as to reduce to the minimum liability of injury to the parts from strain and so as to secure a firm and stable connection between the dipper and handle.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in certain novel features of construction and combination and arrangement of parts, which will be hereinafter fully described, defined in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a view in side elevation of the dipper-handle and its supporting and operating connections of my improved dredge, the boat and submerged parts being indicated in outline by dotted lines. Fig. 2 is an enlarged side elevation of a portion of the dipper-handle, the sleeve, cable-drum, and brake-band mechanism, a portion of the latter appearing in section. Fig. 3 is a top plan view of the parts shown in Fig. 2. Fig. 4 is a cross-section on the line *z z* of Fig. 3. Fig. 5 is a side view of the trunnion-sleeve and parts detached. Fig. 6 is a side view of the dipper and the adjacent end of the handle. Fig. 7 is a top plan view of the same. Fig. 8 is a side view of the opposite end of the handle. Fig. 9 is a front view of the dipper and the means for connecting the same to the hoisting-cable. Fig. 10 is a vertical cross-section through the dipper and handle on line *xx* of Fig. 6. Fig. 11 is a horizontal section through the dipper and handle on line *yy* of Fig. 6. Fig. 12 is a detail view illustrating a modification in the brake mechanism.

Referring now more particularly to the drawings, the letter A represents the boom; B, the dipper-handle; C, the slideway-support, and D the boat, provided with the turntable D', which supports the boom A, which carries the dipper mechanism. The body of the dredge and immersed portions of the mechanism are represented by dotted lines in Fig. 1.

The dipper-handle B, which is preferably formed of wood, with reinforcements, as hereinafter described, and is also preferably made square or rectangular throughout the greater portion of its length, is mounted in the slideway-support C, which consists of a rectangular box or trunnion-sleeve 1, having extensions 2, said trunnion-sleeve being provided with trunnions 3, supported in bearings 3^a on the boom A in the usual way. The sleeve extensions 2 are formed as part of or a continuation from the ends of the trunnion-sleeve 1 and are provided with side brackets 4, in which are mounted pulleys 5, journaled to rotate on shafts 6, the purpose of which will be hereinafter explained. The extensions provide a long bearing for the dipper-handle B and are connected by corner angle-iron arms 7 with the sleeve 1 and are preferably in the form of boxes composed of top, bottom, and side plates 8 and 9, connected at the corners by said arms 7 and suitable joint-pieces, the whole being bolted or riveted together. The handle B is reinforced by top, bottom, and side plates 10 and 11, which are secured thereto by bolts 11^a. The heads of the bolts and the nuts thereon project beyond the plates to enable them to be readily and conveniently tightened up to compensate for shrinkage of the handle, which is liable to

occur when the dredge has been allowed to lie idle for a time. The arms 7 form guides for the handle B and hold the same properly centered with relation to the sleeve and its extensions, thus permitting of the free reciprocatory movements of said handle within the sleeve and extensions without liability of the projecting portions of the bolts coming in contact with said sleeve or extensions.

By the use of the above-described features of my invention it is possible to employ a dipper-handle of extreme length, but of comparatively small weight, which can be easily and quickly manipulated in the operation of the dipper, and at the same time, by means of the long or extended sleeve, to make such a handle equal in strength to those formerly employed of extreme size. When desired, the dipper-handle can be further diminished in bulk and weight by omitting the plates 10 and 11 at the upper end of said handle to a point near the lower end of the sleeve and within said sleeve when the handle is slid outward to its fullest extent and substituting in lieu thereof angle corner-strips 12, which prevent undue wear on the upper portion of the handle and at the same time give it the necessary strength to withstand all strains.

Reciprocating and oscillating movements may be imparted to the dipper and dipper-handle in any known manner. The dipper-handle is adapted to reciprocate in its slideway-support, and I have devised improved means for securely locking the handle at any desired point in its reciprocating path, which form a part of this invention and will be hereinafter fully described. The dipper and handle when thus locked against reciprocatory movement in the slideway-support may be caused to oscillate in a vertical plane on the axes of the trunnions by means of the hoisting-chain E, connected at one end to the outer end of the boom and passing thence downwardly and around a sheave or pulley E', connected with the dipper, and thence upwardly over a sheave or pulley E², mounted in the outer end of the boom, the other end of said chain being connected with a power-actuated drum or windlass. (Not shown.) When the dipper-handle is released and left free to reciprocate in its slideway-support, reciprocating movements can be imparted thereto by means of said chain E and its connections, as described.

Connected to the dipper-handle at points near its opposite ends are cables 13 and 14, which are connected at their inner ends to a drum F, loosely mounted upon one of the trunnions 3. These cables pass under the pulleys 5 and are wound in opposite directions around the drum and may be separate pieces of flat or round wire cable or the like each having one end fixed to the drum, or they may be formed in a single piece having its middle portion fixed to the drum, in either case the connection being so made that a rotary movement of the drum in either direc-

tion serves to wind up one cable upon the drum and at the same time to unwind the other, thus causing the dipper to reciprocate in the trunnion-sleeve.

As a means for controlling the movement of the cable-drum I have shown fixed thereto a band-wheel 15, around which is passed a friction band or strap 16, which is connected at one end with a block or shoe 17 and at the opposite end with a suitable actuating-lever. As shown in Fig. 2, the block or shoe 17 is slotted to receive a pin 18 on the bar 27, fixed to the boom A, whereby said block is held from moving around with the wheel 15, but is adjustable toward and from said wheel. One end of the band 16 is connected by a bolt 20, pivoted thereto at 19, with the block, said bolt passing through a bearing or socket 26 on said block, while the other end of the band has pivoted thereto at 19' a similar bolt 20', which has a pivotal connection at 21 with the actuating-lever 22, said lever being adapted for connection at its inner end by a pivot pin or bolt 23 with either one of a series of openings 23', formed in the block 17 on the opposite side of its center from said socket 26, so that when the lever is moved in one direction the band 16 and block 17 will be drawn inward, forming a practically continuous braking-surface to engage the wheel 15, while a reverse movement of the lever will expand the band and withdraw the block, leaving said wheel free to turn with the drum. The block and band are provided with renewable wooden linings 24 and 25, which form a friction-surface to bear upon the periphery of the wheel 15.

By the construction of the parts of the band-brake in the manner shown and described it will be seen that a powerful and effective leverage may be exerted to lock the friction wheel and drum against movement, that the lever may be adjusted to compensate for wear and variations in the length of the band, and that the block 17 is adapted to subserve the function of a brake-shoe, thus increasing the friction between the brake members and the power of the brake, so that the movements of the drum may when required be quickly arrested.

In some cases the block 17 may be secured directly upon one end of the band 16 and the lever 22 pivotally connected with both ends of the band, and the connection 20' may be provided with a turnbuckle 20², whereby the parts may be adjusted to compensate for wear and variations in the length of the band, as shown in Fig. 12.

By means of the lever 22 the band 16 can be wound upon the wheel 15 to apply brake-pressure, so as to lock the drum against rotary movement, the drum being thus temporarily fixed to the boom. When the brake is released and the drum is free to rotate, reciprocating movements of any desired degree can be imparted to the dipper-handle by means of the chain E, such reciprocating

movements causing one of the cables to unwind from the drum and the other to be wound thereupon, accompanied by a rotary movement of the drum. When the brake is applied and the drum thereby fixed against rotary movement, the action of the chain E will cause the dipper-arm to swing upon the axes of the trunnions. This swinging movement of the handle accomplishes the winding of one cable upon the fixed drum and the unwinding of the other therefrom in accordance with the degree of such swinging movements, and I am able to utilize this winding and unwinding of the cables by the swinging movements of the handle to render the dredging operation of the dipper more effective.

When the dipper-handle is in an approximately vertical position, as shown in Fig. 1, it will be seen that by extending the cable 13 first to the forward side of the drum, as shown, when the handle is swung forward in the direction of its work the cable connected with the outer end of the dipper-handle will be wound upon the brake-locked drum, causing such cable to be shortened and the handle to be forced downwardly in its trunnion-sleeve, and this downward movement will continue as long as the swinging movement of the handle continues with the drum held in a locked position.

In swinging the dipper from the position indicated by the full lines *a* to that indicated by dotted lines *b* in Fig. 1 the effective length of the dipper-handle will be gradually increased, causing the nose of the dipper to traverse the path indicated by dotted lines *xx* through the bottom or soil *G*. The path traversed by the nose of the dipper when given a similar swinging movement in the manner heretofore employed is indicated by dotted line *yy* in Fig. 1.

By comparison of the two paths *yy* and *xx* it will be seen that by means of my improved construction I am able to secure longer and much more effective engagement of the dipper with the soil or material to be excavated than has been possible without the use of separate positively-driven mechanism.

The only power necessary with my improved construction is that for swinging the dipper-handle, the reciprocating movement which causes the variation in the effective length of the handle being induced by its swinging movements. The degree of reciprocating movement thus imparted to the handle may be varied by the use of drums of different sizes adapted to the character of the work to be accomplished.

The outer end of the dipper-handle *B* is gradually tapered and enlarged by applying to the opposite sides thereof tapered pieces 28 and 29, which are bolted or riveted to the body of the handle, bolts being preferably employed, as they may be more readily and conveniently removed and replaced in making repairs, &c. By thus enlarging the outer end of the handle the strength of the same is in-

creased without making the handle cumbersome and unwieldy, and at the same time the plates 11 are made to come even or in line with the rear ends of the side walls of the body portion 30 of the dipper *D*, enabling the latter to be securely fastened to the handle, as hereinafter described. The said body portion 30 of the dipper has formed thereon or attached thereto the scoop or cutting edge 31 and is reinforced at its lower edge by a ring or band 32 and provided with the usual hinged bottom 34, carried by a yoke or swinging arms 35, hinged or pivoted to the dipper-body at 36. The back of the body is closed by a back wall 37. The dipper is attached to the handle *B* by means of bridge-plates 38 and top and bottom reinforcing-plates 39 and 40, which overlap the plates 11, said plates 38, 39, and 40 being bolted or riveted in place and forming a rigid connection whereby the dipper is firmly fastened onto the dipper-handle. By removing the bolts or rivets connecting the plates with the dipper the latter may be withdrawn, leaving the plates in position upon the end of the handle for the attachment of the dipper again. This manner of connecting the dipper to the handle is deemed important, as all the breakages usually occur at the point where the ordinary braces that hold the dipper upon the handle are attached to the handle. My construction strengthens the connection at that point and fastens the dipper so securely to the handle as to practically eliminate all danger of the dipper becoming disconnected by the breakage of the fastenings.

At the ends or sides of the cutting edge 31 are mounted clevis-bolts 41, to which are attached the lower ends of two side suspending chains or cables 42. These chains or cables are connected at their upper ends by bolts 43 to clevises 44 and to a spreader-bar 45, which bar holds the said chains spaced the proper distance apart. To the clevises are attached yokes or guide-frames 46, two in number, in each of which is slidably fitted a follower 47. The followers are normally pressed downward by coiled springs 48 and are connected to a ring 49, suspended from the pulley or sheave *E'*. The chains with the spreader and springs are employed in lieu of the usual bail. By connecting the chains to the dipper at or near its cutting edge the cutting power of the dipper is enhanced, and by holding said chains spread apart by the bar 45 the collapsing strain is taken off the dipper and the material taken up allowed to pass into the dipper without interference by the chains. It has been found in practice that when a bail-suspended dipper is caught on one side by an obstruction a heavy twisting strain is thrown upon the dipper, which frequently causes breakage of the handle. This objection is obviated by the use of the spreader and springs, which yield or give under like conditions and prevent any undue amount of strain from falling on the dipper and handle, thus mate-

rially increasing the life of the dipper and rendering the apparatus less liable to injury and more effective.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

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

1. In an excavator, a dipper-handle having a ponderous flaring outer end, reinforcing-plates applied to said outer end, and a dipper directly abutting said plates and detachably connected to the handle, substantially as described.

2. In an excavator, the combination with a trunnion-supported sleeve; of extensions from said sleeve comprising embracing members at the front and rear of the trunnion-sleeve and arms connecting the extensions and sleeve, the extensions thus being open between the embracing members and trunnion-sleeve, and a dipper-handle reciprocatory in said sleeve and reinforced by bolted or riveted plates, the ends of the bolts or rivets projecting and being exposed through the open portions of the extensions of the sleeve, substantially as specified.

3. In an excavator, the combination with a rectangular trunnion-supported sleeve; of rectangular extensions from said sleeve comprising boxes and angle-arms connecting said boxes with the trunnion-sleeve, a rectangular dipper-handle reciprocatory in said sleeve, plates upon the handle, and bolts or rivets connecting said plates to the handle and having projecting ends, the angle-arms serving as guides to prevent interference between the bolt or rivet ends and sleeve and boxes as the dipper-handle reciprocates, substantially as specified.

4. In an excavator, the combination with a trunnion-supported reinforcing-sleeve; of a dipper-handle reciprocatory in said sleeve, plates reinforcing the dipper-handle and secured thereto by bolts or rivets having projecting ends, and spacing means for guiding the handle through the sleeve and preventing interference between said sleeve and the projecting ends of said bolts or rivets, substantially as described.

5. In an excavator, the combination of a rectangular trunnion-supported sleeve, a rectangular dipper-handle reciprocatory in said sleeve, boxes embracing the handle on opposite sides of the sleeve, and angle-iron arms connecting the corners of the boxes with the corners of the sleeve, substantially as specified.

6. In an excavator, the combination with a dipper-handle, a dipper carried thereby, and controlling means for regulating the action of the handle and dipper; of chains or cables attached to opposite sides of the dipper, a spreader-bar spacing the outer ends of the

chains and pivotally connected thereto to allow said chains to yield independently, guide-frames connected to the outer ends of the chains, followers movable in said frames, springs acting on said followers, and an attaching device connected to both followers for connecting the same with the controlling-cable, substantially as specified.

7. In an excavator, a dipper-handle having a tapered or outwardly-flaring outer end, plates reinforcing the handle, a dipper the walls of which aline with said plates, and metallic straps or plates detachably connecting the dipper with the said tapered end of the handle, substantially as specified.

8. In an excavator, a dipper-handle, tapered pieces giving a flaring formation to the outer end of the dipper-handle, plates reinforcing the handle, a dipper the wall of the shell of which alines with said plates, bridge-plates overlapping the dipper and reinforcing-plates, and bolts or rivets securing said bridge-plates to the dipper, handle and reinforcing-plates, substantially as described.

9. In an excavator, the combination with a dipper-handle, a dipper carried thereby, and a hoisting-chain; of yielding connections between the sides of the dipper and said hoisting-chain, substantially as specified.

10. In an excavator, the combination with a dipper-handle, a dipper carried thereby, and a hoisting-chain; of yielding connections between the sides of the dipper and said hoisting-chain, and a spreader spacing said connections, substantially as set forth.

11. In an excavator, the combination with a dipper-handle, a dipper carried thereby, and a hoisting-chain; of suspending chains or cables attached to opposite sides of the dipper, a spreader spacing the suspending-chains, and means for connecting the suspending-chains to the hoisting-chain, substantially as and for the purpose described.

12. In an excavator, the combination with a dipper-handle, a dipper carried thereby, and a hoisting-cable; of suspending chains or cables attached to opposite sides of the dipper, a spreader spacing the suspending-chains, means for connecting the suspending-chains to the hoisting-chain, guide-frames connected to the suspending-chains, followers attached to said connecting means, and springs in said frames acting on the followers and adapted to allow either side of the dipper to yield without throwing undue strain on the handle, substantially as described.

13. In an excavator, the combination with a trunnion-supported sleeve, a dipper-handle reciprocatory therein, and means for oscillating said handle; of a winding-drum, cables operatively connecting the drum with the dipper-handle near its opposite ends, a band-wheel fixed to the drum and having a friction-surface, a friction-band adapted to engage said surface but held from rotating with the wheel, and a lever operatively connected with the ends of the band for moving the same

into and out of engagement with said friction-surface, substantially as set forth.

14. In an excavator, the combination with a trunnion-supported sleeve, a dipper-handle reciprocatory therein, and means for oscillating said handle; of a winding-drum, cables operatively connecting the drum with the dipper-handle near its opposite ends, a band-wheel fixed to the drum and having a friction-surface, a friction-band adapted to engage said surface but held from rotating with the wheel, an operating-lever connected with one end of the band, and means for adjustably connecting the lever with the opposite end of the band, substantially as and for the purpose set forth.

15. In an excavator, the combination with a boom, a trunnion-supported sleeve thereon, a dipper-handle reciprocatory in said sleeve, and means for oscillating said handle; of a drum having connected thereto cables operatively connected to the dipper-handle near its opposite ends, a band-wheel fixed to the drum and provided with a friction-surface, a friction-band adapted to engage said surface, a block having a slot-and-pin connection with the boom and connected to the band, and a

lever operatively connected to the ends of the band for moving the same into and out of engagement with said friction-surface, substantially as set forth.

16. In an excavator, the combination with a boom, a trunnion-supported sleeve thereon, a dipper-handle reciprocatory in said sleeve, and means for oscillating said handle; of a drum having connected thereto cables operatively connected to the dipper-handle near its opposite ends, a band-wheel fixed to the drum and provided with a friction-surface, a friction-band adapted to engage said surface, a block having a slot-and-pin connection with the boom and connected to one end of the band, said block forming a brake-shoe, and an operating-lever connected to the opposite ends of the block and band, substantially as and for the purpose specified.

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

RALPH R. OSGOOD.

Witnesses:

CORNELIUS A. WALDRON,
FRANK A. WALDRON.