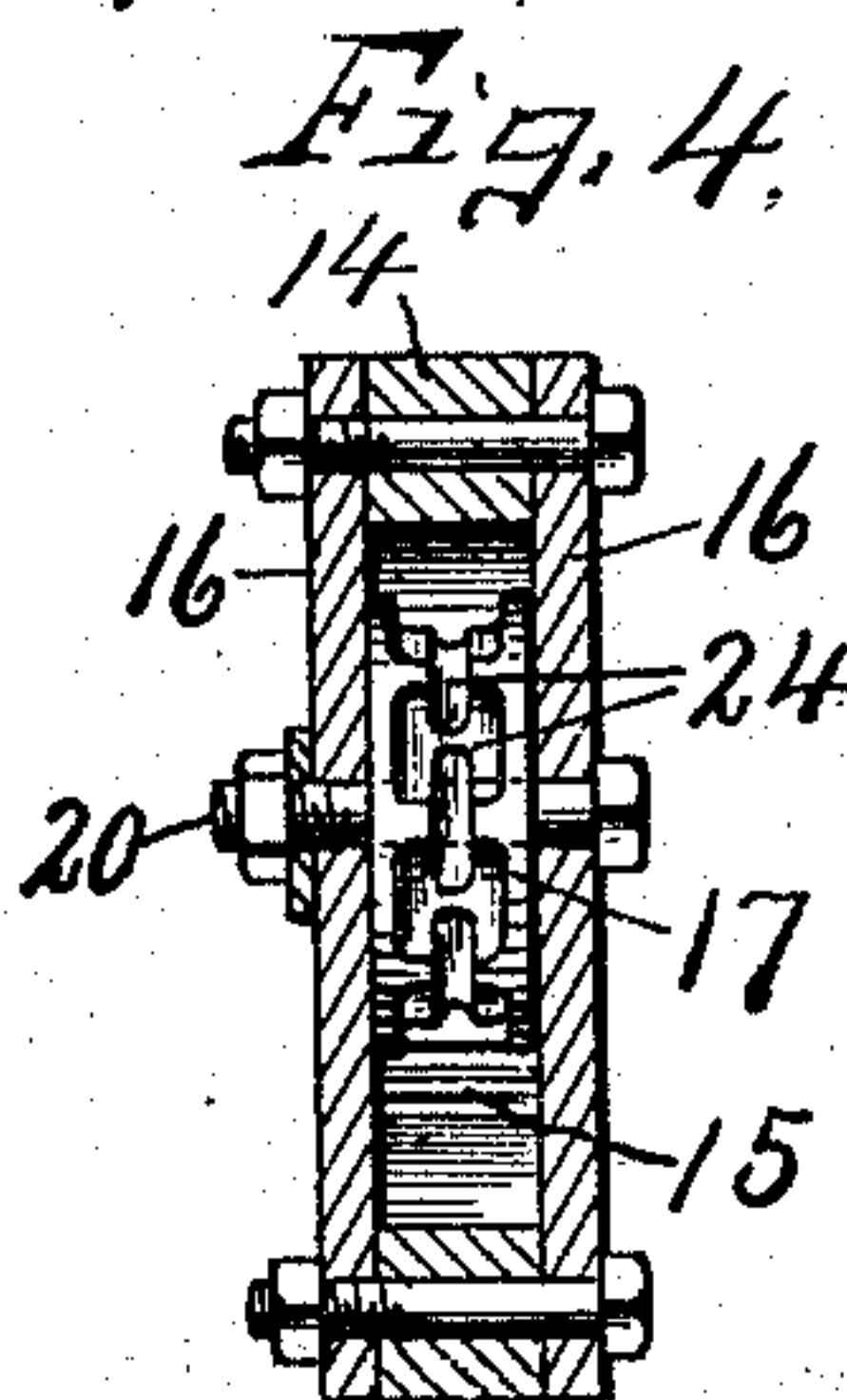
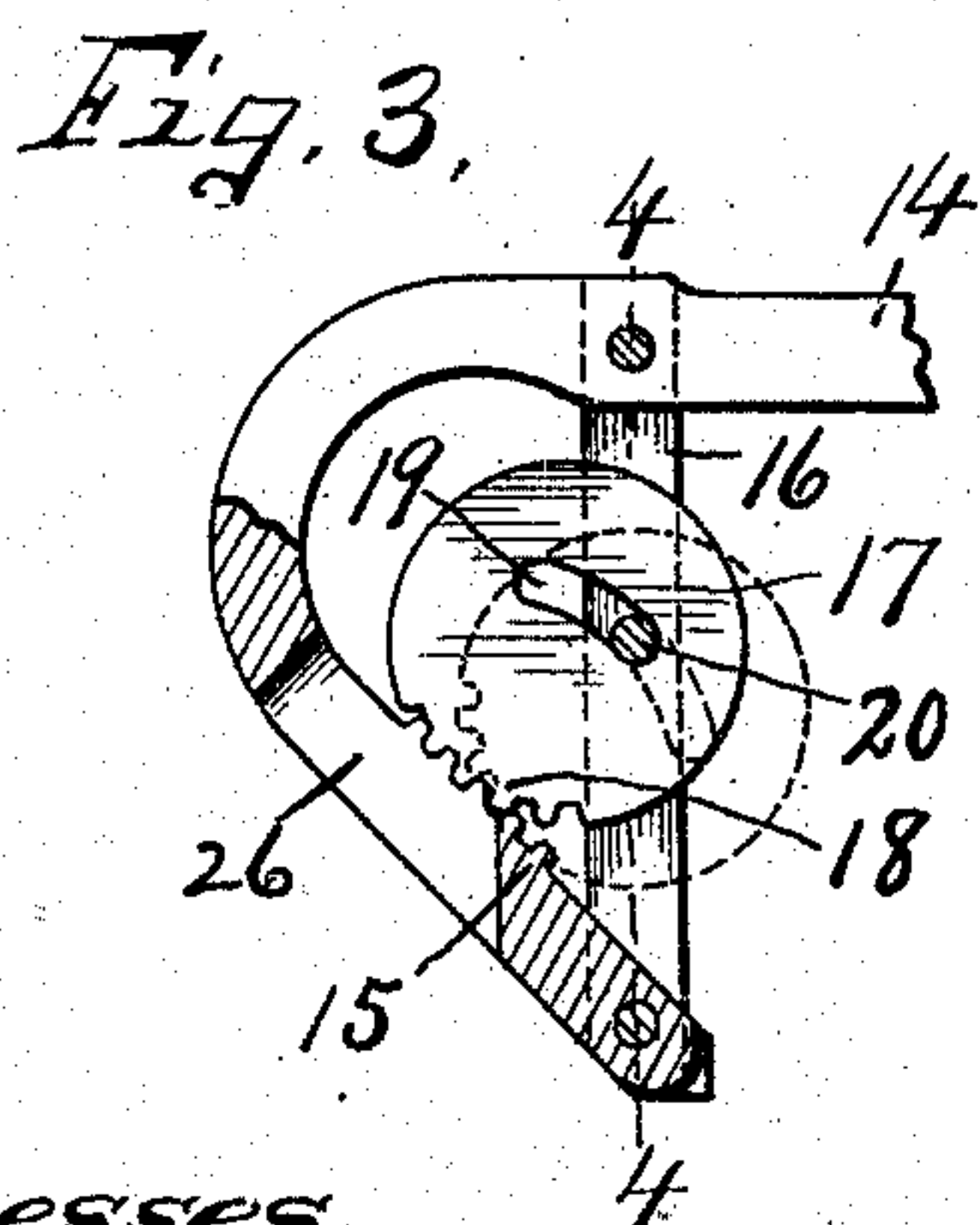
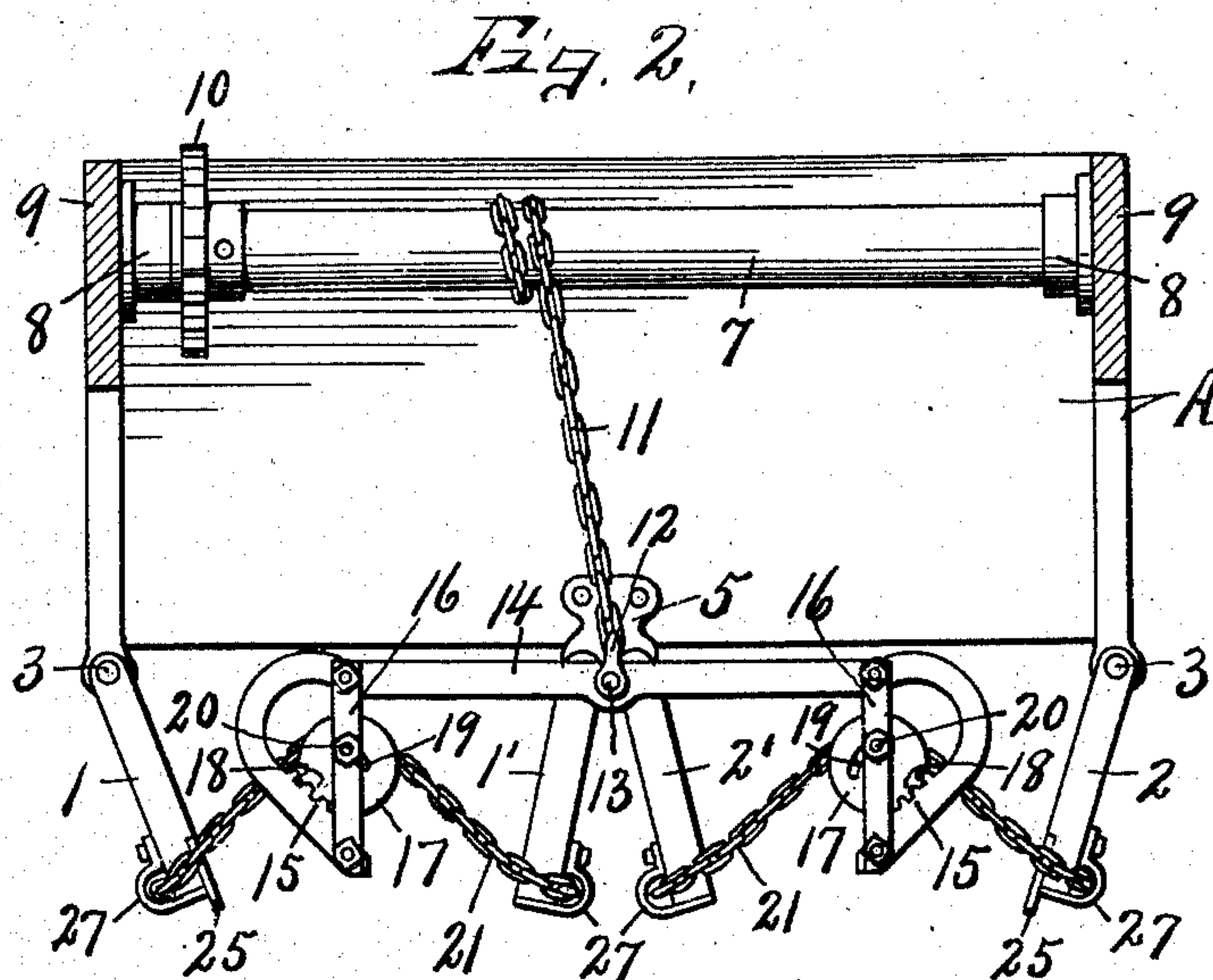
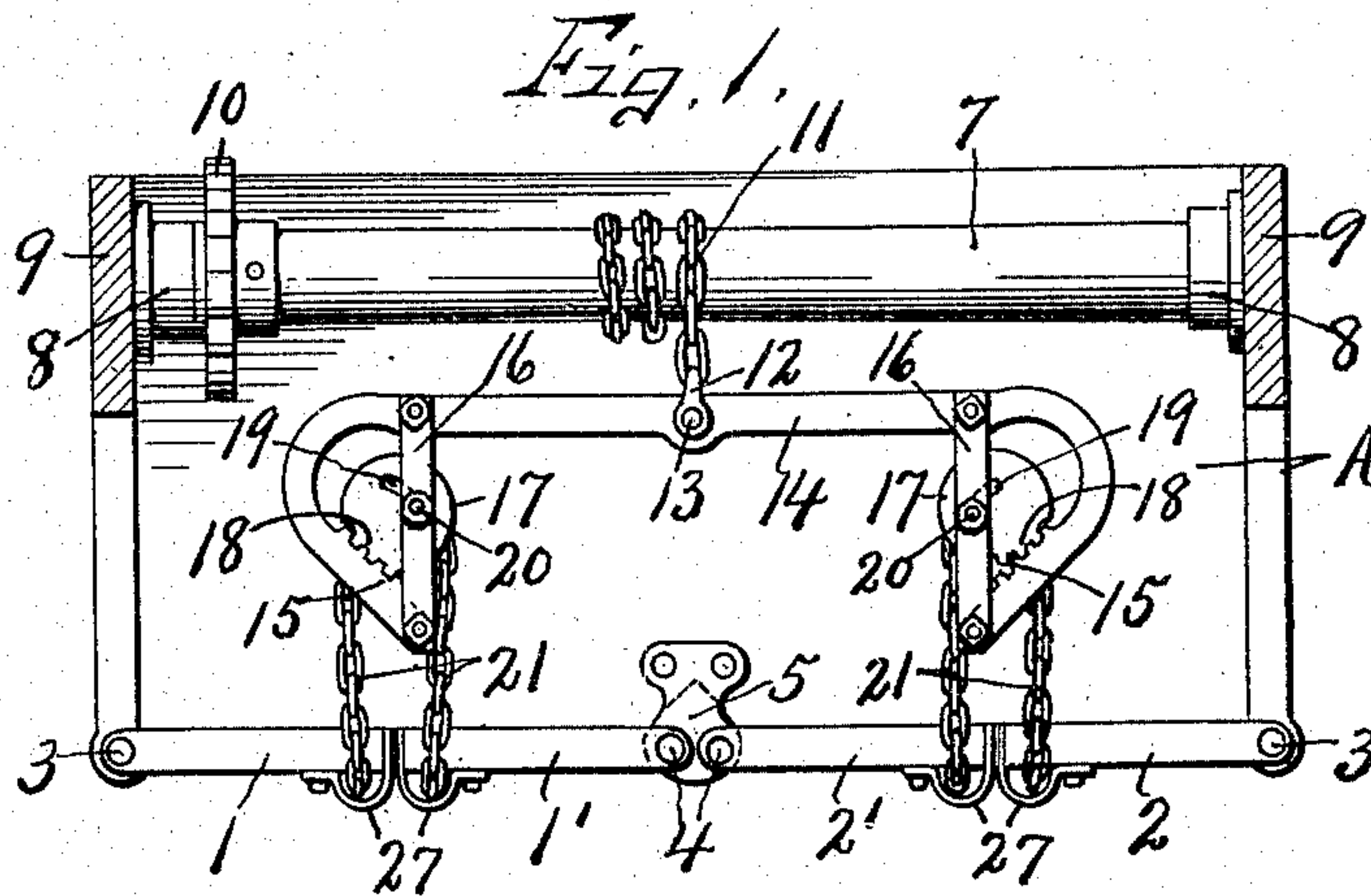


948,358.

2 SHEETS--SHEET 1.



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DUMP WAGON.  
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2 SHEETS—SHEET 2.

Fig. 5.

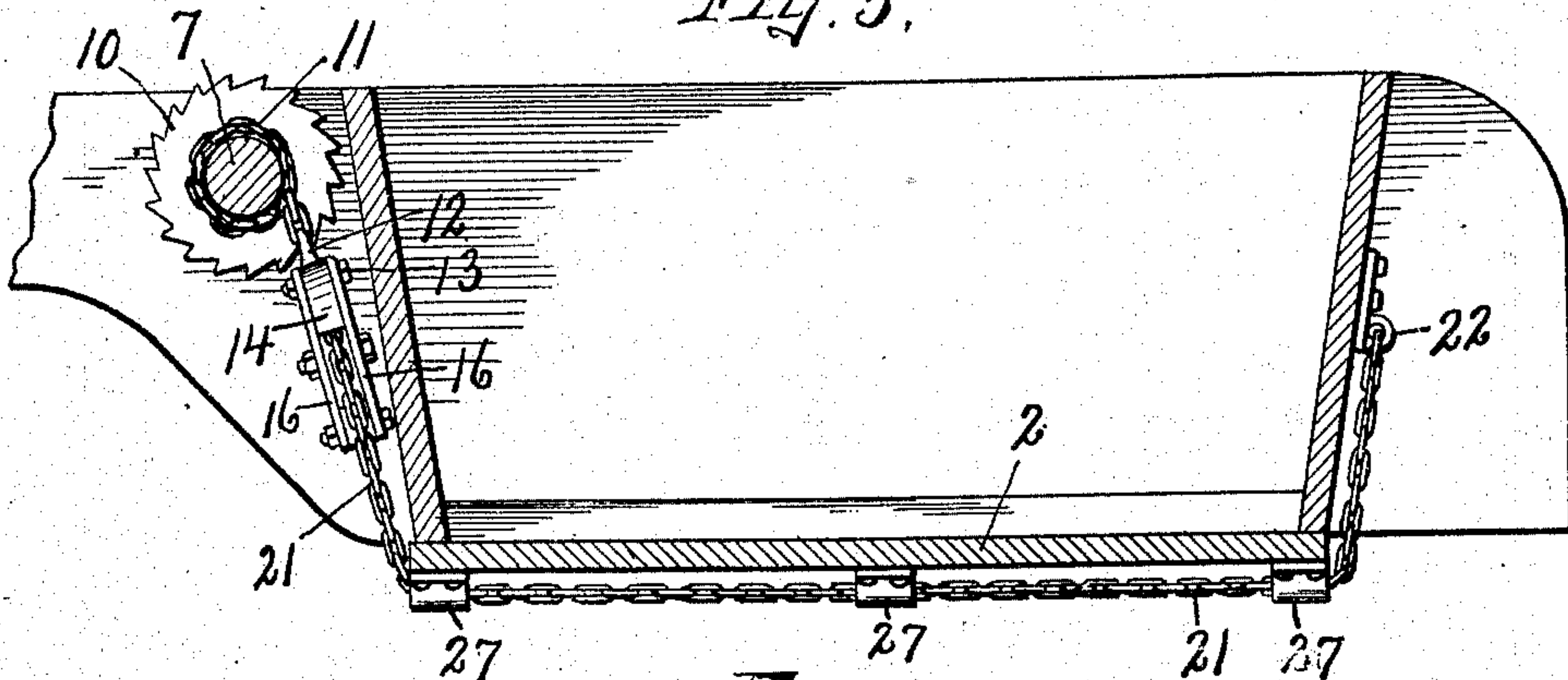


Fig. 6.

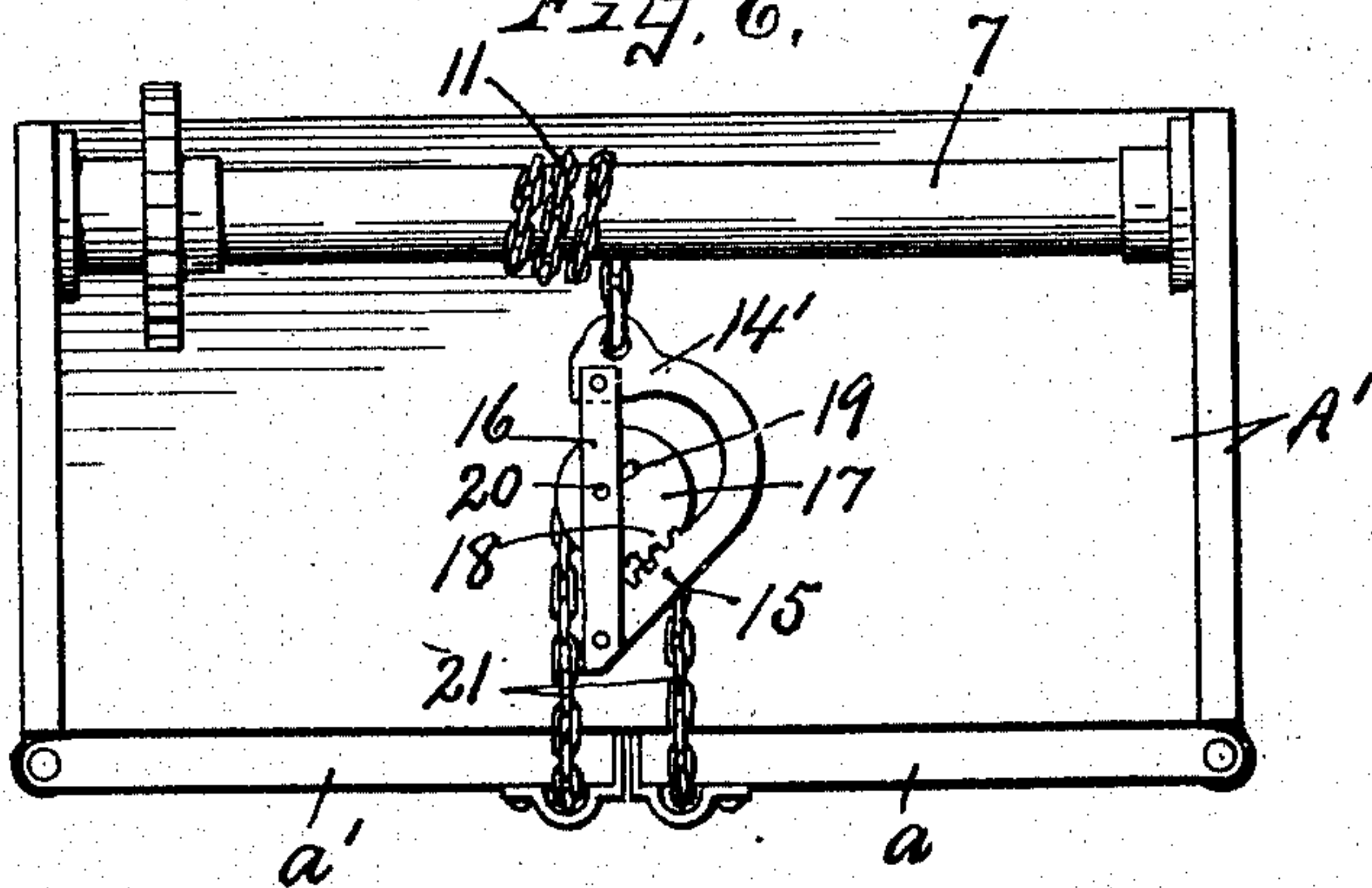
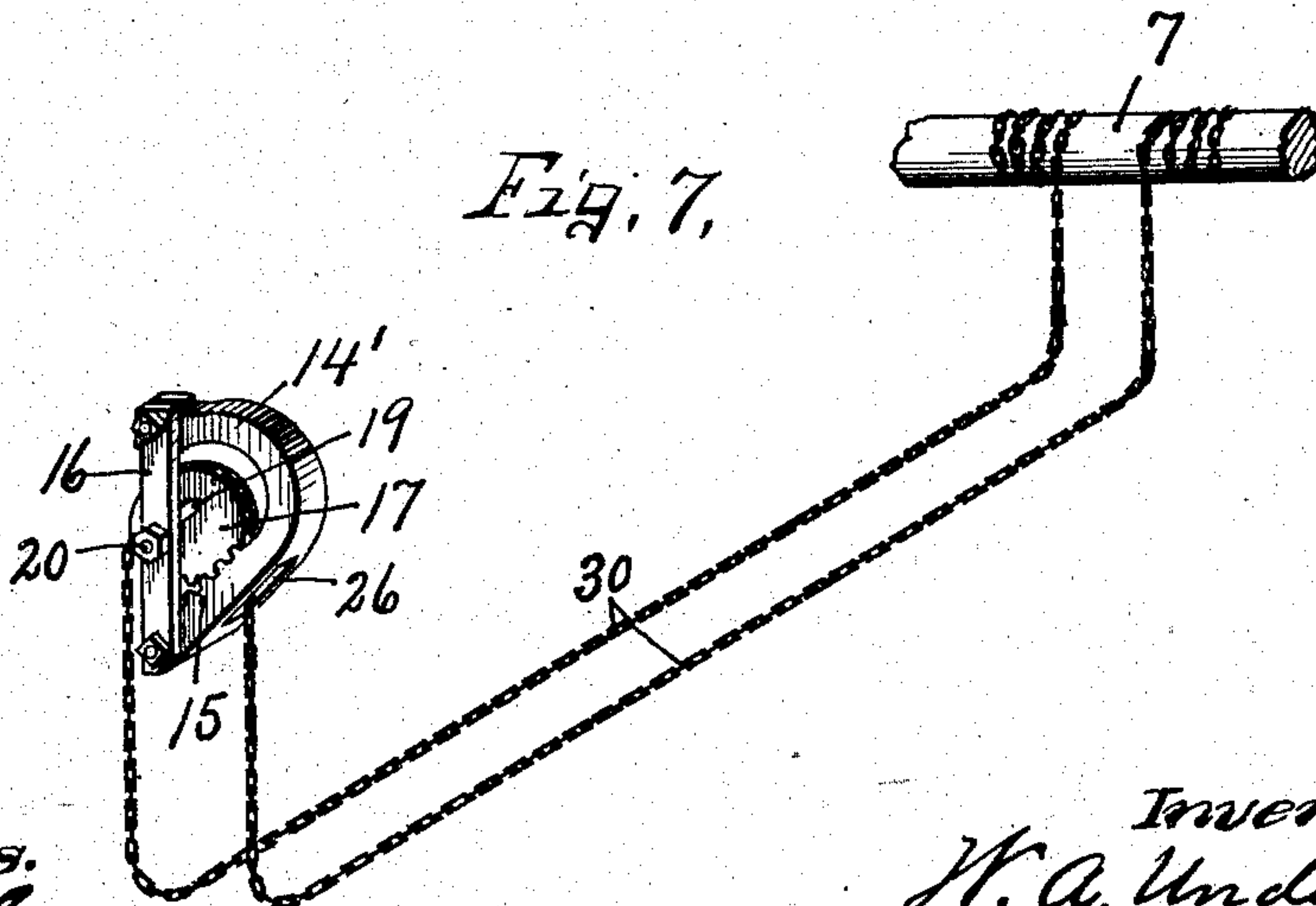


Fig. 7.



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## DUMP-WAGON.

948,358.

Specification of Letters Patent.

Patented Feb. 8, 1910.

Application filed May 16, 1908. Serial No. 433,317.

*To all whom it may concern:*

Be it known that I, WALTER A. UNDERHILL, of Auburn, in the county of Cayuga, in the State of New York, have invented  
5 new and useful Improvements in Dump-Wagons, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in dump wagons in which the box is provided with one or more sets of laterally swinging bottom doors and refers more particularly to the means for controlling the operation of said doors.

10 In this class of dump wagons it is customary to employ a rotary drum which is usually located at the front end of the box and connected to suitable cables running under the meeting edges of the bottom doors and suitably connected at the rear end of the box to control the opening and closing action of said doors. The meeting edges of these doors are preferably provided with overlapping plates to cover any gap which  
20 may exist at the meeting edges and thereby prevent leakage of the material from the box. Under such conditions it is necessary to close the door having the overlapping plate first, or slightly in advance of its companion door and one of the main objects of my present invention is to provide means for effecting this result and at the same time automatically take up the lag of the last closing door by the continued rotation of  
30 the drum in closing the doors. In other words, I have sought to provide a simple and practical equalizing device which will insure the positive closing of both doors by the continued rotation of the drum even though the under running chains may vary slightly in length.

Another object is to make the equalizer a part of the connection between the doors and drum and to locate such equalizer at  
45 the front end of the box although in some instances the essential principle of the equalizer may be embodied in a frame or support which is fixed to the rear end of the box.

In the drawings—Figures 1 and 2 are  
50 front elevations of the dump box having a plurality of, in this instance two, sets of laterally swinging bottom doors showing the equalizer as located at the front end of the box and forming a part of the connection  
55 between the drum and doors, said doors and operating parts being shown in their closed

position in Fig. 1 and in their open position in Fig. 2. Fig. 3 is an enlarged detail elevation partly in section of one side of the equalizer shown in Fig. 2. Fig. 4 is a sectional view taken on line 4—4, Fig. 3. Fig. 5 is a longitudinal vertical sectional view through the box seen in Fig. 2 showing the manner of attaching the under running cables to the rear end of the box and to the  
60 equalizer roller. Fig. 6 is a front end view of a dump box having a single set of two laterally swinging bottom doors and slightly modified form of equalizer, forming a part of the connection between the drum and  
70 doors. Fig. 7 is a further modified form of door operating mechanism showing the front ends of the under running cables as connected directly to the drum and the rear ends of the cables connected to a further  
75 modified form of equalizer which is mounted upon the rear end of the box.

In Figs. 1 and 2 I have shown a substantially rectangular dump box —A— as provided with two sets of laterally swinging  
80 doors —1—, —1'—, —2— and —2'— all of which when closed lie in substantially the same horizontal plane, the outer doors —1— and —2— being hinged at —3— to the lower edges of the sides of the box to swing  
85 downwardly and outwardly while the intermediate doors —1'— and —2'— are hinged at their inner edges at —4— to suitable brackets —5— centrally on the front and rear ends of the box.

A horizontal drum —7— is journaled at its ends in suitable bearings —8— on forward extensions —9— on the sides of the box and is provided near one end with a ratchet wheel —10— adapted to be operated  
95 by the usual pawl and lever, not necessary to herein illustrate or describe, as any means may be employed for rotating the drum.

A single cable or chain —11— is connected at one end to the drum —7— and has  
100 its other end connected to a stirrup —12— to which is centrally pivoted at —13— a rocking yoke —14—, said yoke being, therefore, pivoted upon the depending free end of the cable —11— at the front end of the  
105 box and is movable vertically with said cable during the operation of closing and opening the doors, the opposite ends of the yoke —14— extending laterally directly over the front ends of the meeting edges of  
110 each set of doors and terminating in downwardly and inwardly inclined toothed racks



—15—, the free ends of which are tied to the upper end of the yoke by suitable tie bars or braces —16— to reinforce the yoke at this point and to resist excessive strains to which the inner ends of the racks —15— are subjected.

With each of the racks —15— is associated a roller —17— having a toothed segment —18— which meshes with the teeth of the rack —15— and is located between the adjacent tie pieces —16—, the latter serving to retain the drum —17— in operative relation with the rack —15— against lateral displacement. Each of these rollers —17— is provided with an eccentric slot —19— for receiving a bolt —20— which is passed through the tie pieces —16— and slot —19— and forms a limiting stop for engaging the ends of the slot —19— and preventing rotary displacement of the roller from the rack —15—, said slots being of sufficient length to permit the rollers to roll limited distances along their respective racks —15—. These rollers —17— are located directly over the front ends of the meeting edges of the doors with which they are connected by suitable chains —21— running under the meeting edges of the doors and anchored at their rear ends to fixed anchorages —22— on the rear end of the box —A— as best seen in Fig. 5.

The rollers —17— constitute what may be termed rolling sheaves having recesses —24— in their peripheries opposite the toothed segments —18— for receiving the links of the intermediate portion of the corresponding chains —21— so as to avoid slipping of the chains upon the rollers thereby producing a positive drive in the manner of the sprocket and chain although the chain and roller may be adjusted relatively to each other by reinserting certain links in different recesses —24— to take up any excessive slack in either side of the chain. It now appears that the yoke —14— is suspended entirely from one end of the cable —11— while the meeting edges of the doors are suspended entirely from the rollers —17— which in turn are supported wholly upon the inclined racks —15— and when the doors are released, these rollers gravitate downwardly toward each other along their respective racks until limited by the slot —19— and pins —20— which pass through said slots, the pins serving to retain the rollers against undue rolling movement upon their respective racks.

The yoke —14— with its inclined racks —15— and rollers —17— constitutes an equalizer adapted for two sets of doors.

It is evident from the foregoing description taken in connection with Figs. 1 and 2 of the drawings that when the drum —7— is released, the gravity of the doors aided by the load will open said doors thereby draw-

ing the equalizer downwardly and unwinding the cable —11— from the drum during which operation the rollers —17— roll by gravity down their respective inclined racks —15— thereby lengthening the inner sides of the cable —21— and shortening the outer sides of said cable which causes the inner doors —1'— and —2'— to open a greater distance than the outer doors.

In rewinding the drum to close the doors, the outer doors which are provided with overlapping plates —25— at their meeting edges will be closed first, as the equalizer yoke —14— and parts carried thereby are elevated and as soon as the outer doors —1— and —2— are closed in the manner just described, the adjacent sides of the chains are prevented from further movement and by the continued rotation of the drum —7— and consequent elevation of the yoke —14— the rollers —17— will be rolled up their respective inclined racks —15— thereby closing the inner doors —1'— and —2'— with their meeting edges against the under side of the overlapping plates —25— as shown in Fig. 1.

The outer sides of the cables —21— render through suitable openings —26— in the rack —15— as best seen in Fig. 3 while the inner sides of the cables travel past the inner ends of the rack as the doors are opened and closed, both sides of the chains assuming a substantially vertical position when the doors are closed as seen in Fig. 1 thereby exerting a direct upward lift or pull upon the meeting edges of said doors which may be tightened at any time by rotating the drum —7— to additionally wind the cable —11— thereon, the under running portion of the cable being guided in suitable loops —27— on the undersides of the doors as best seen in Fig. 5.

Should one set of doors close before the others, the equalizer yoke —14— is free to rock under the action of the cable —11— and continued rotation of the drum will close the other set of doors.

In Fig. 6 I have shown a dump box —A'— as provided with a single set of two laterally swinging bottom doors —a— and —a'— meeting at substantially the longitudinal center of the box and operating in practically the same manner as either one of the sets of doors shown in Fig. 2.

The equalizer shown in Fig. 6 is also similar to that shown in Figs. 1 and 2 except that a single rack —15— is employed in connection with the toothed roller —17— which latter is the same as that previously described, the rack —15— forming a part of a yoke —14'— which is substantially the same as one end of the yoke —14— shown in Figs. 1 and 2, said yoke —14'— being connected to the lower end of the rack —15— by tie bars —16—. This yoke



—14'— and rack —15— together with the roller sheave —17— constitutes an equalizer which forms a part of the connection between the drum and doors.

5 When the doors are closed as shown in Fig. 6 the roller —17— is moved up the inclined rack —15— so that the stop pin —20— is in the lower end of the slot and when the drum is released to permit the  
10 opening of the doors —a— and —a'—, the equalizer descends under the force of gravity of the doors and load thereon thereby unwinding the cable —11— from the drum —7— and allowing the roller —17— to  
15 gravitate down the rack —15— until limited by the pin —20— engaging the upper end of the slot —19—. This latter operation causes the lengthening of the chain connected to the door —a'— and shortens  
20 the side connected to the door —a— which causes the door —a'— to open a greater distance than the door —a— so that in closing the doors by rewinding the cable upon the drum, the roller —17— remains  
25 in its down position causing the door —a— to close first or in advance of the door —a'—. The continued winding of the cable —11— upon the drum after the door —a— is closed causes the roller —17— to  
30 ride up the rack —15— thereby drawing the door —a'— to its closed position.

In Fig. 7, I have shown a still further modified manner of applying my improved equalizer in which a yoke —14'— similar to  
35 that shown in Fig. 6 is secured to the rear end of the box and supports an inclined rack —15— and roller —17—, the latter being of the same construction and mounted in the same manner as shown in Fig. 6 except that the yoke —14'— is rigidly secured  
40 to the rear end of the box instead of being suspended upon the end of a cable. In this instance the intermediate portion of a cable as —30— is passed around and engaged  
45 with the top or upper portion of the equalizer —17— and its opposite ends are passed underneath the meeting edges of the doors forwardly and upwardly around the drum —7— but the action of the equalizer —17—  
50 upon its rack —15— is substantially the same as that construction in Figs. 1, 2, 5 and 6.

What I claim is:

1. In combination with the swinging doors  
55 of a dump wagon and operating means therefor comprising an inclined rack, a roller riding on the rack and cables engaged with

the roller and operatively connected to the doors.

2. In combination with laterally swinging  
60 bottom doors of a dump wagon, a drum and connections between the drum and doors including a toothed rack and a toothed roller meshing with and movable along the rack for taking up the lag of one door after the  
65 other door is closed by the continued operation of the drum.

3. In combination with the laterally swinging bottom doors of a dump wagon box, cables passing under the meeting edges of  
70 the doors and anchored to the rear end of the dump box, a toothed roller connected to the cables at the front end of the box, a yoke having a toothed rack meshing with and supporting the toothed roller, an additional  
75 cable connected to and supporting the yoke, and means for winding and unwinding said additional cable.

4. In combination with the laterally swinging bottom doors of a dump wagon box,  
80 cables running under the meeting edges of the doors and anchored to the rear end of the box, a toothed roller supporting the front end of the cables, an inclined toothed rack meshing with and supporting the roller and  
85 upon which said roller is adapted to roll, an additional cable connected to and supporting the rack, and means for winding and unwinding said additional cable.

5. In combination with the laterally swinging  
90 bottom doors of a dump wagon, a rotary drum, a cable having one end attached to the drum and adapted to be wound and unwound thereon and therefrom, an inclined toothed rack attached to and supported wholly  
95 by the opposite end of the cable, a toothed roller rolling upon said rack, and cables attached to said roller and operatively connected to the doors.

6. In combination with laterally swinging  
100 bottom doors of a dump wagon, means for controlling the operation of said doors comprising an inclined toothed rack, a toothed roller meshing with and riding upon said toothed rack, a cable passed around the roller  
105 and connected to the doors, and means for raising and lowering the rack.

In witness whereof I have hereunto set my hand this 11th day of April 1908.

WALTER A. UNDERHILL.

Witnesses:

MARION A. ALDRICH,  
E. B. CLAUDIUS.