

No. 767,312.

PATENTED AUG. 9, 1904.

S. OTIS.

MECHANISM FOR OPERATING DUMP CAR DOORS.

APPLICATION FILED MAY 11, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

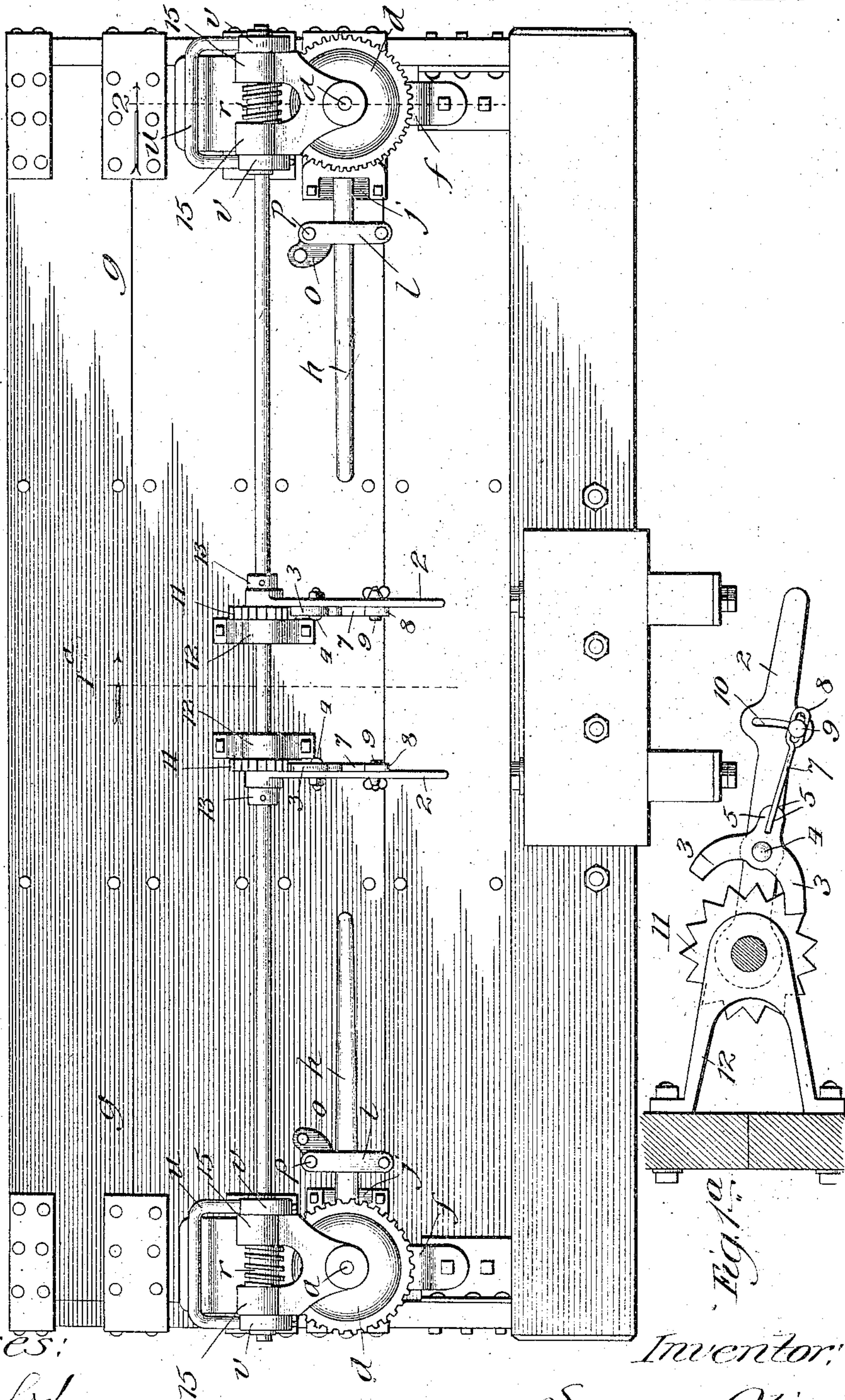


Fig. 1a.

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2 SHEETS—SHEET 2.

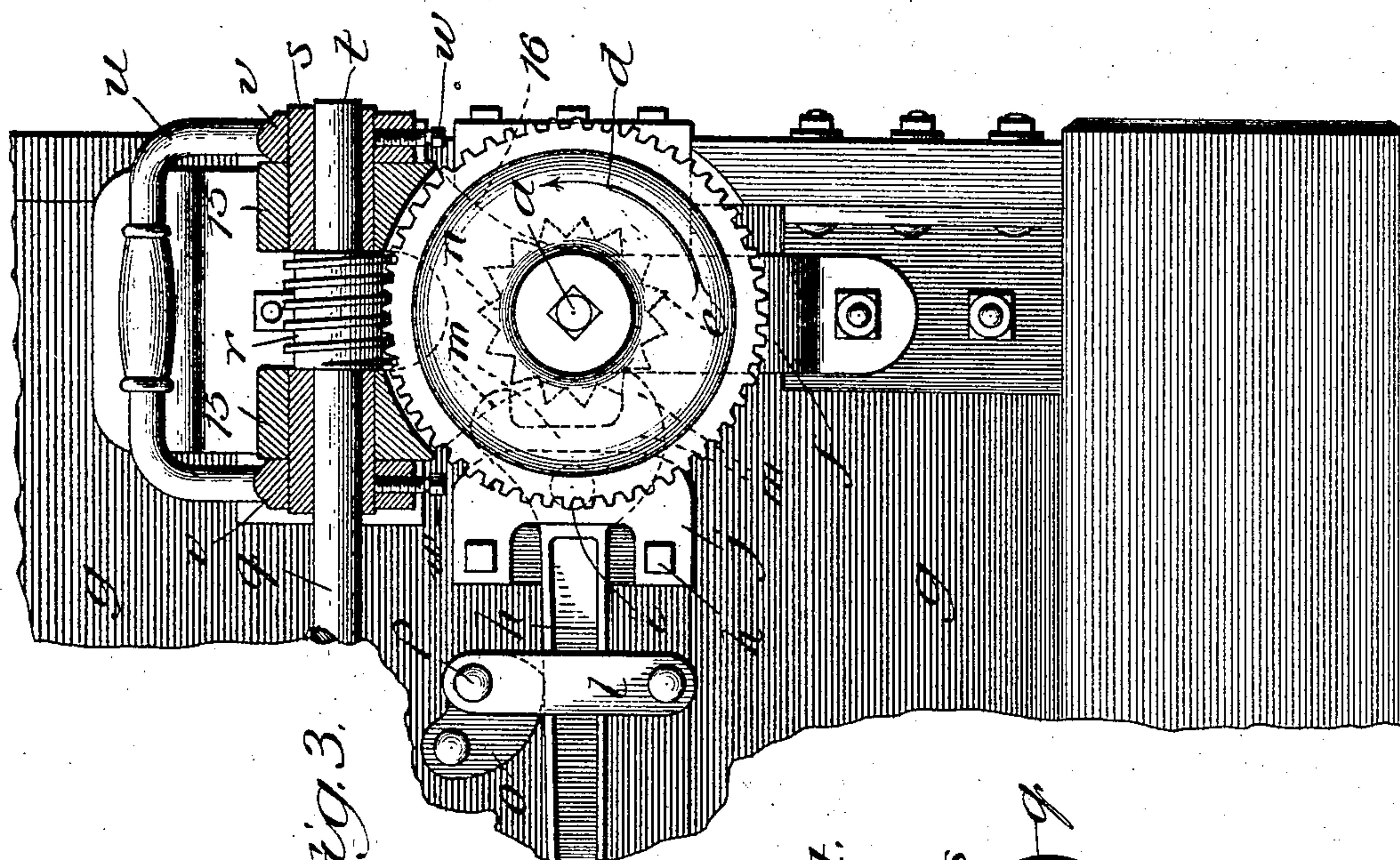


Fig. 3.

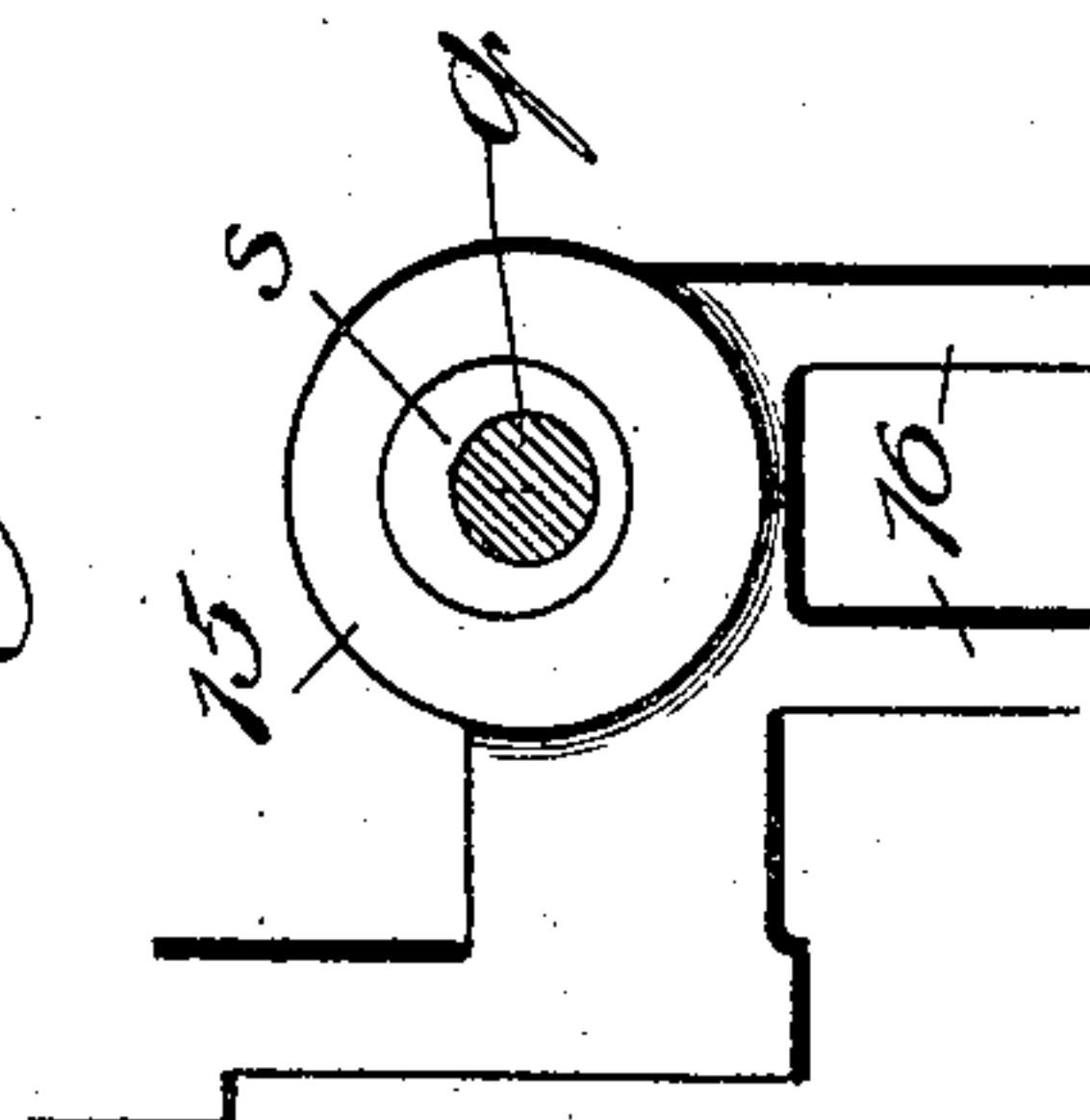


Fig. 4.

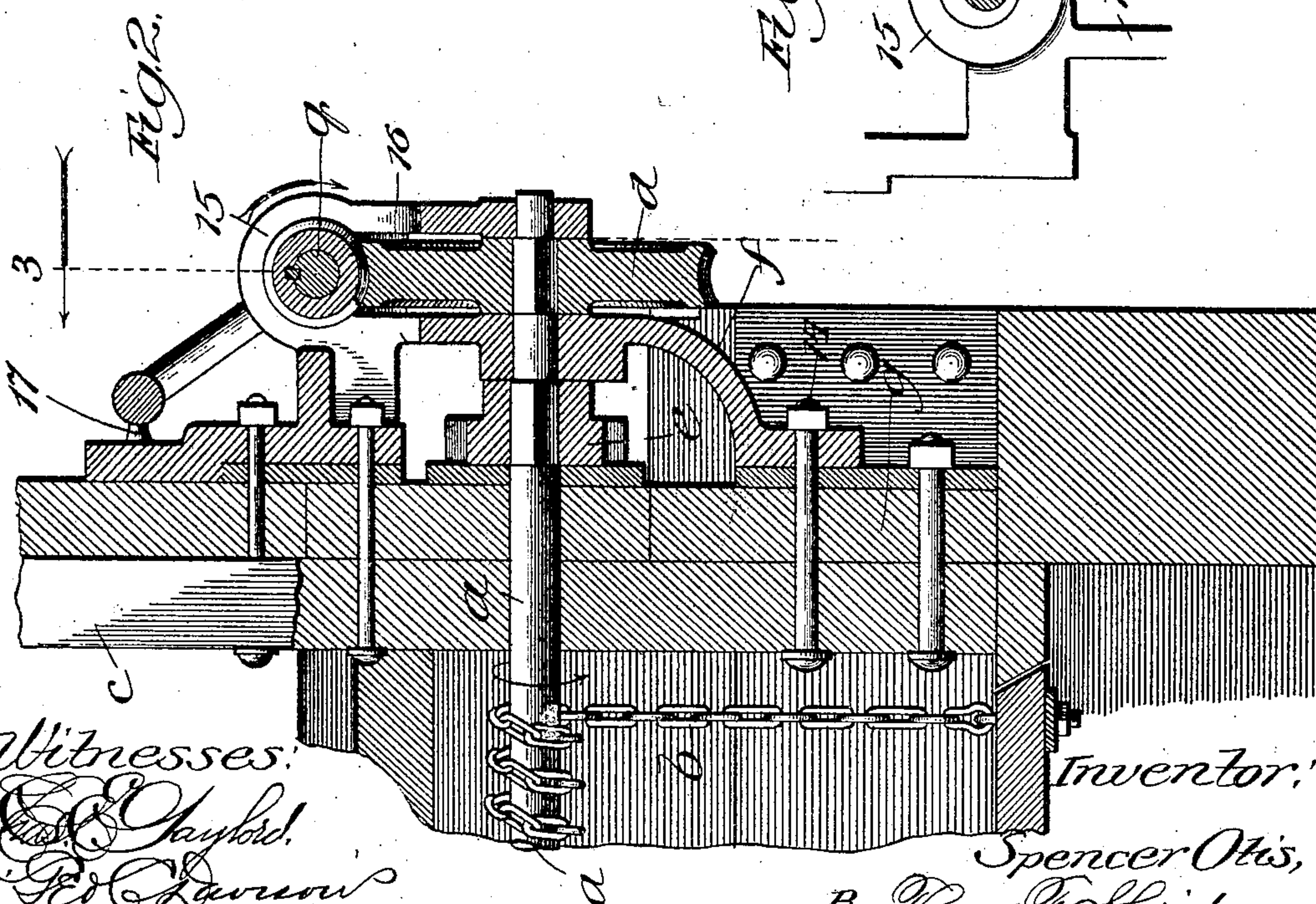


Fig. 2.

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# UNITED STATES PATENT OFFICE.

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## MECHANISM FOR OPERATING DUMP-CAR DOORS.

SPECIFICATION forming part of Letters Patent No. 767,312, dated August 9, 1904.

Application filed May 11, 1903. Serial No. 156,653. (No model.)

*To all whom it may concern:*

Be it known that I, SPENCER OTIS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have  
5 invented certain new and useful Improvements in Mechanisms for Operating Dump-Car Doors, of which the following is a specification.

My invention relates to that class of mechanisms for operating dump-car doors having  
10 a pair of rotatable winding-shafts extending longitudinally of the car and provided with means for connecting them to the dump-car doors whereby the winding of the shafts will  
15 operate such doors, means for operating the winding-shafts, and thereby the dumping-doors, and with means for stopping the shafts in any desired position.

It relates particularly to the means for operating the winding-shafts and to the means  
20 for stopping and holding them, and thereby the dumping-doors, in any desired position either in connection with or independently of the mechanism for rotating such winding-  
25 shafts.

The principal object of my invention is to provide a simple, economical, and efficient mechanism for operating dump-car doors.

A further object of the invention is to provide a simple, economical, and efficient means  
30 for rotating the winding-shafts and adapted to be thrown into and out of operative engagement with such winding-shafts.

A further object of the invention is to provide, in combination with such a mechanism  
35 for operating the winding-shaft, means for stopping the rotation of the winding-shaft, and thereby the dump-car doors, in any desired position, either in connection with or independently of the mechanism for rotating  
40 the winding-shafts.

Other and further objects of the invention will appear from an examination of the drawings and the following specification and claims.

45 The invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is an end view in elevation of a device constructed in accordance with my improvements; 50  
Fig. 1<sup>a</sup>, a detail view in elevation of one of the operating ratchet-levers with its ratchet; Fig. 2, a longitudinal sectional elevation showing one of the winding-shafts with its worm-wheel and the worm removably in engagement therewith; Fig. 3, a sectional detail view  
55 in elevation of the parts shown in Fig. 2, showing in dotted lines the ratchet for stopping the rotation of the winding-shaft; and Fig. 4, a detail view of a portion of one of the  
60 shaft-supporting brackets, showing the eccentric bearing-sleeves for supporting the worm and moving it into and out of engagement with the winding-shaft.

In constructing a device in accordance with  
65 my improvements I provide a pair of winding-shafts *a*, having suitable chains *b* attached thereto and operatively connecting the shafts with the dumping-doors of a car *c*, which may be of any ordinary and well-known type. The  
70 winding-shafts are provided at one or both ends with a worm-wheel *d*, mounted thereon and rotatable therewith, and a ratchet *e*, also rotatable with the shaft, is mounted thereon intermediate the shaft-supporting bracket *f* 75  
and the end wall *g* of the car.

To permit the rotation of the winding-shafts in the desired direction to close the doors and stop the rotation thereof, and thereby hold the  
80 doors in any desired position, an escapement-lever *h* is pivotally mounted upon a pivot *i* in a bracket *j*, attached to the end wall of the car by means of bolts or similar elements *k*, the outer end of such lever being held movably in position by means of a guard *l* and the inner  
85 end thereof being provided with pawls *m*, adapted to engage the teeth *n* of the ratchet *e*, already described.

A locking-dog *o* is pivotally mounted adjacent to such escapement-lever upon a pivot *p*, 90  
which also supports the upper end of the guard, so as to permit such dog to be thrown into locking engagement with the lever when it is desired to hold the winding-shaft against rota-



tion and out of engagement with such lever when it is desired to permit or cause the rotation of such winding shaft or shafts.

In order to provide a simple, economical, and efficient means for operating the winding-shafts, and thereby the dumping-doors, a worm-shaft *g* is rotatably mounted, preferably at each end and transversely of the car, at right angles to the winding-shafts, each end of such worm-shafts being provided with a worm *r* in engagement with the worm-wheel mechanism of the winding-shafts.

The opposite ends of the worm-shafts are mounted in the brackets *f*, which also support the winding-shafts, and in order to permit the worms to be moved into and out of engagement with the worm-wheels of the winding-shafts circular eccentric bearing-sleeves *s* are rotatably mounted in the shaft-supporting brackets on opposite sides of the worm and each provided with an eccentric longitudinal bore *t*, in which the worm-shaft is journaled. It is desirable that both of the bearing-sleeves for each worm operate simultaneously in raising the worm out of engagement or lowering it into engagement with the worm-wheel mechanism. A U-shaped operating-lever *u* is therefore provided having parallel end portions *v*, bored out to fit snugly over the cylindrical ends of the eccentric bearing-sleeves, to which such lever is firmly attached by means of set-screws *w*. By this arrangement it will be readily seen that by turning the eccentric bearing-sleeve so that the thinnest portion of the wall is adjacent to the worm-wheel the worm will be thrown into engagement with such wheel. By rotating the sleeve so that the relatively thick portion of its wall is intermediate the worm-shaft and worm-wheel the worm will be thrown out of engagement with the worm-wheel, and the winding-shafts can then be caused to unwind, so as to open the dumping-doors. To accomplish this, the locking-pawl of the escapement-lever is released from engagement with the ratchet-wheel of the winding-shaft and the rotation of the winding-shaft. The opening movement of the dumping-doors may be stopped at any desired point by throwing the locking-pawl of the escapement-lever into engagement with the ratchet of the winding-shaft. The weight of such lever, however, is sufficient to automatically accomplish this. The pawls of the escapement-lever are arranged at the desired angle with relation to the pivotal point of such lever and ratchet, so that the winding of the shaft is not affected by the escapement-lever, although the rotation of such shaft in the opposite direction may be stopped automatically by such lever and locked when desired by means of the pawl *o*, as already described.

In order to provide simple and efficient means for rotating the worm-shafts to operate the winding-shafts, and thereby the dumping-doors, I mount, preferably, a pair of op-

erating-levers 2 upon each of the worm-shafts, each of such levers being provided with a pair of pawls 3, pivotally mounted thereon by means of a pivot 4, such pawls being preferably integral and having a projecting arm 5 and a slot 6, in which is mounted a spring 7, such spring being provided at its outer end with a loop 8, having a securing-screw 9 mounted therein and extending through a transverse slot 10 in the operating-lever, whereby such spring, and thereby the pivoted pawls of the operating-levers, may be adjusted and held in the desired position with relation to the ratchet 11 upon the worm-shaft. By this means either pawl of the operating-lever may be thrown into or out of operative connection with the ratchet, according to the direction in which it is desired to rotate the shaft.

Suitable brackets 12 are mounted upon the end walls of the car to form bearings for the central portions of the worm-shafts. These brackets engage one side of the ratchets and in connection with collars 13, which are mounted upon the worm-shaft on the opposite sides of the ratchets and ratchet-levers, serve to hold such ratchets and levers in operative position with relation to each other. By providing a pair of levers for each worm-shaft, as above described, the worm-shaft may be rotated in the desired direction by operating each of such levers alternately to turn the shaft, employing the other to hold it against rotation during the return movement of the opposite lever, and vice versa. The winding-shafts, with their worm-wheels, are held in operative position with relation to the worm-shafts and worms by means of brackets *f*, already mentioned, which are attached to the walls of the car by means of bolts 14 at the upper and lower ends of such brackets. Each of these shaft-supporting brackets is provided with an upper socket portion 15, having outer and inner downwardly-extending arms 16, the lower ends of which are provided with bores therethrough at right angles to the upper socket portion for receiving the winding-shaft and forming a suitable bearing therefor. These downwardly-extending arms form between them an opening in the supporting-bracket for receiving the worm-wheel of the winding-shaft and holding it in operative position with relation to the worm. A rest 17 is provided at the upper extreme end of the bracket, against which the lever for operating the eccentric bearing-sleeves of the worm-shafts rests when the worm is in engagement with the worm-wheel.

I claim—

1. In a device of the class described, the combination of winding-shaft mechanism provided with worm-wheel mechanism thereon, worm mechanism mounted in engagement with such worm-wheel mechanism, and means for moving such worm mechanism into and



out of engagement with the worm-wheel mechanism of the winding-shaft mechanism, substantially as described.

2. In a device of the class described, the combination of a winding-shaft for operating dumping-door mechanism of a car, a worm-wheel mounted upon the end of such shaft, and a worm-shaft mounted at each end of the car extending transversely thereof from one winding-shaft to the other and provided with a worm at each end in engagement with the worm-wheel of the winding-shaft, substantially as described.

3. In a device of the class described, the combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon such winding-shafts, worm-shafts mounted at right angles to the winding-shafts and extending transversely across the car from one to the other of such winding-shafts, and worm mechanism mounted upon such worm-shafts in engagement with the worm-wheels of such winding-shafts, substantially as described.

4. In a device of the class described, the combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon such winding-shafts, worm-shafts mounted at right angles to the winding-shafts extending horizontally across the car to such winding-shafts, worm mechanism mounted upon such worm-shafts in engagement with the worm-wheels of such winding-shafts, and means for rotating the worm-shaft with its worms and thereby operating the winding-shafts and dumping-doors, substantially as described.

5. In a device of the class described, the combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon such winding-shafts, worm mechanism mounted in engagement with the worm-wheels of such winding-shafts, and means for moving such worm mechanism into and out of engagement with the worm-wheel mechanism of the winding-shafts, substantially as described.

6. In a device of the class described, the combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon such winding-shafts, worm-shafts mounted at right angles to the winding-shafts, worm mechanism mounted upon such worm-shafts in engagement with the worm-wheels of such winding-shafts, and eccentric bearing-sleeves rotatably mounted and each provided with an eccentric longitudinal bore in which such worm-shaft is mounted, substantially as described.

7. In a device of the class described, the combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon

such winding-shafts, worm-shafts mounted at right angles to the winding-shafts, worm mechanism mounted upon such worm-shafts in engagement with the worm-wheels of such winding-shafts, and provided with eccentric bearing-sleeves mounted on opposite sides of each worm, each of such sleeves being provided with an eccentric longitudinal bore in which such worm-shaft is journaled, substantially as described.

8. In a device of the class described, the combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon such winding-shafts, worm-shafts mounted at right angles to the winding-shafts, worm mechanism mounted upon such worm-shafts in engagement with the worm-wheels of such winding-shafts, eccentric bearing-sleeves mounted on opposite sides of each worm, and each provided with an eccentric longitudinal bore in which such worm-shaft is journaled, and means for rotating the bearing-sleeves to throw the worm into and out of engagement with the worm-wheel mechanism of the winding-shafts, substantially as described.

9. In a device of the class described, the combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon such winding-shafts, worm-shafts mounted at right angles to the winding-shafts, worm mechanism mounted upon such worm-shafts in engagement with the worm-wheels of such winding-shafts, eccentric bearing-sleeves mounted on opposite sides of each worm, each provided with an eccentric longitudinal bore in which the worm-shaft is journaled, and means for connecting such bearing-sleeves, substantially as described.

10. In a device of the class described, the combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon such winding-shafts, worm-shafts mounted at right angles to the winding-shafts, worm mechanism mounted upon such worm-shafts in engagement with the worm-wheels of such winding-shafts, eccentric bearing-sleeves mounted on opposite sides of each worm, each provided with an eccentric longitudinal bore in which the worm-shaft is journaled, and an operating-lever connecting such eccentric bearing-sleeves, substantially as described.

11. In a device of the class described, the combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon such winding-shafts, worm-shafts mounted at right angles to the winding-shafts, worm mechanism mounted upon such worm-shafts in engagement with the worm-wheels of such winding-shafts, and pawl-and-lever mechanism mounted upon such worm-wheel shafts



for operating them and thereby the winding-shafts and dumping-doors, substantially as described.

12. In a device of the class described, the  
5 combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon such winding-shafts, worm-shafts mounted at right angles to the winding-shafts, worm  
10 mechanism mounted upon such worm-shafts in engagement with the worm-wheels of such winding-shafts, ratchet and ratchet-lever mechanism mounted upon such worm-shafts, and means for moving the worms into and out  
15 of engagement with the worm-wheels of the winding-shafts, substantially as described.

13. In a device of the class described, the combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon  
20 such winding-shafts, worm-shafts mounted at right angles to the winding-shafts, worm mechanism mounted upon such worm-shafts in engagement with the worm-wheels of such winding-shafts, a pair of ratchets upon each worm-shaft, and a pair of oppositely-movable pawl-levers mounted in engagement with such  
25 ratchets, substantially as described.

14. In a device of the class described, the  
30 combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon such winding-shafts, worm-shafts mounted at right angles to the winding-shafts, worm mechanism upon such worm-shafts in engagement  
35 with the worm-wheels of such winding-shafts, ratchet and ratchet-lever mechanism mounted upon such worm-shafts, means for moving the worms into and out of engagement with the worm-wheels of the winding-shafts, ratchet  
40 mechanism mounted upon each winding-shaft, and escapement pawl-and-lever mechanism in engagement with such ratchets, substantially as described.

15. In a device of the class described, the combination of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon  
45 such winding-shafts, worm-shafts mounted at right angles to the winding-shafts, worm mechanism mounted upon such worm-shafts in engagement with the worm-wheels of such winding-shafts, operating pawl-and-lever mechanism for rotating such worm-shaft, means for  
50 throwing the worms into and out of engagement with the worm-wheels of the winding-shafts, ratchets upon each winding-shaft, and escapement pawl-and-lever mechanism in engagement with the ratchets of the winding-shafts, substantially as described.  
60

16. In a device of the class described, the combination of a pair of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels  
65 mounted upon each of such shafts, a worm-

shaft mounted at each end of the car provided with a worm at each end thereof in engagement with the worm-wheels of the winding-shafts, means for rotating the worm-shafts to operate the winding-shafts and thereby the  
70 dumping-doors, eccentric bearing-sleeves rotatably mounted and each provided with an eccentric longitudinal bore in which such worm-shafts are journaled, and means for rotating such bearing-sleeves, substantially as  
75 described.

17. In a device of the class described, the combination of a pair of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels  
80 mounted upon each of such shafts, a worm-shaft mounted at each end of the car provided with a worm at each end thereof in engagement with the worm-wheels of the winding-shafts, means for rotating the worm-shafts to  
85 operate the winding-shafts and thereby the dumping-doors, means for throwing the worms into and out of engagement with the worm-wheels of the winding-shafts, and means for stopping the rotation of the winding-shafts  
90 and thereby the movement of the dumping-doors at any desired position, substantially as described.

18. In a device of the class described, the combination of a pair of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels  
95 mounted upon each of such shafts, a worm-shaft mounted at each end of the car provided with a worm at each end thereof in engagement with the worm-wheels of the winding-shafts, means for rotating the worm-shafts to operate the winding-shafts and thereby the  
100 dumping-doors, circular eccentric bearing-sleeves rotatably mounted and each provided with an eccentric longitudinal bore in which such worm-shafts are journaled, means for rotating such bearing-sleeves, and a plurality of brackets each provided with winding-shaft-supporting sockets and having a worm-shaft-supporting socket extending therethrough at  
105 an angle to the winding-shaft-supporting socket, substantially as described.

19. In a device of the class described, the combination of a pair of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels  
115 mounted upon each of such shafts, a worm-shaft mounted at each end of the car provided with a worm at each end thereof in engagement with the worm-wheels of the winding-shafts, means for rotating the worm-shafts to operate the winding-shafts and thereby the  
120 dumping-doors, and a plurality of shaft-supporting brackets each provided with winding-shaft-supporting sockets and having a worm-shaft-supporting socket extending at right angles to the winding-shaft-supporting  
125 socket, substantially as described.

20. In a device of the class described, the 130



combination of a pair of winding-shafts extending longitudinally of the car for operating the dumping-doors thereof, worm-wheels mounted upon each of such shafts, a worm-shaft mounted at each end of the car provided with a worm at each end thereof in engagement with the worm-wheels of the winding-shafts, means for rotating the worm-shafts to operate the winding-shafts and thereby the dumping-doors, a plurality of shaft-supporting brackets each provided with winding-shaft-

supporting sockets and having a worm-shaft-supporting socket extending at right angles to the winding-shaft-supporting socket, and eccentric bearing-sleeves mounted in the worm-shaft-supporting sockets of such brackets in which such worm-shafts are journaled, substantially as described.

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