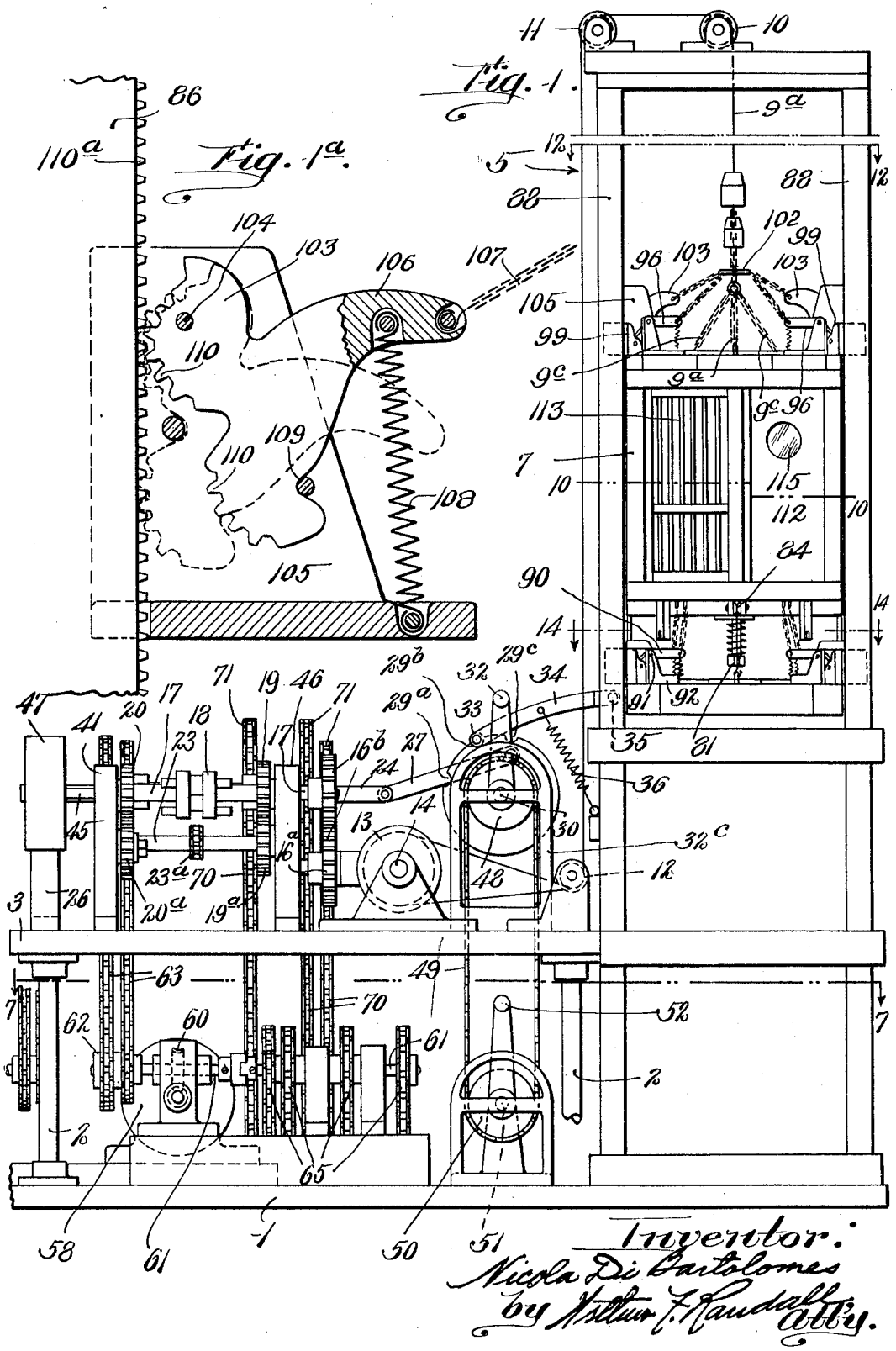
May 29, 1934. N. DI BARTOLOMES 1,960,869

ELEVATOR APPARATUS

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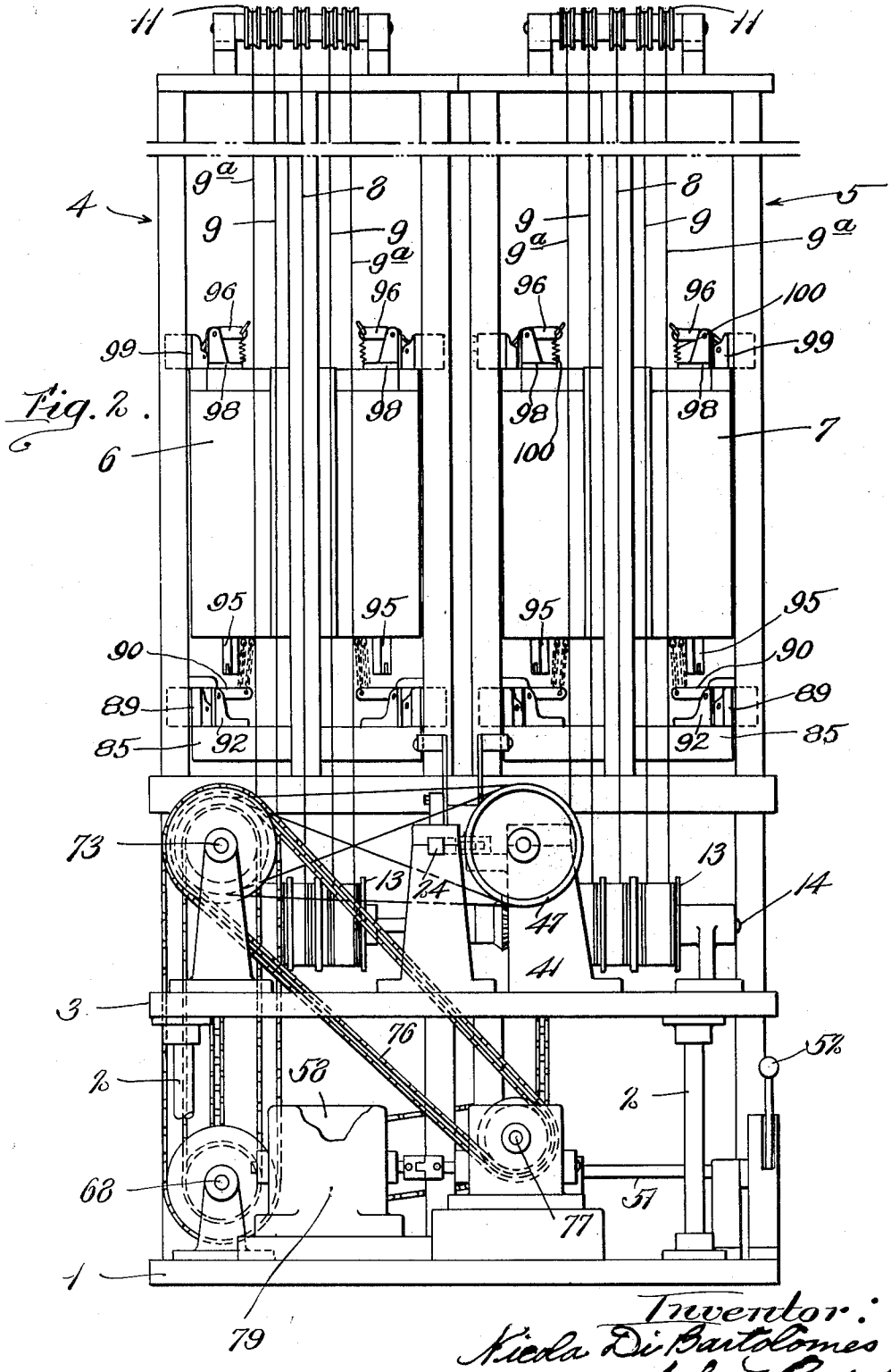


Fig. 2.

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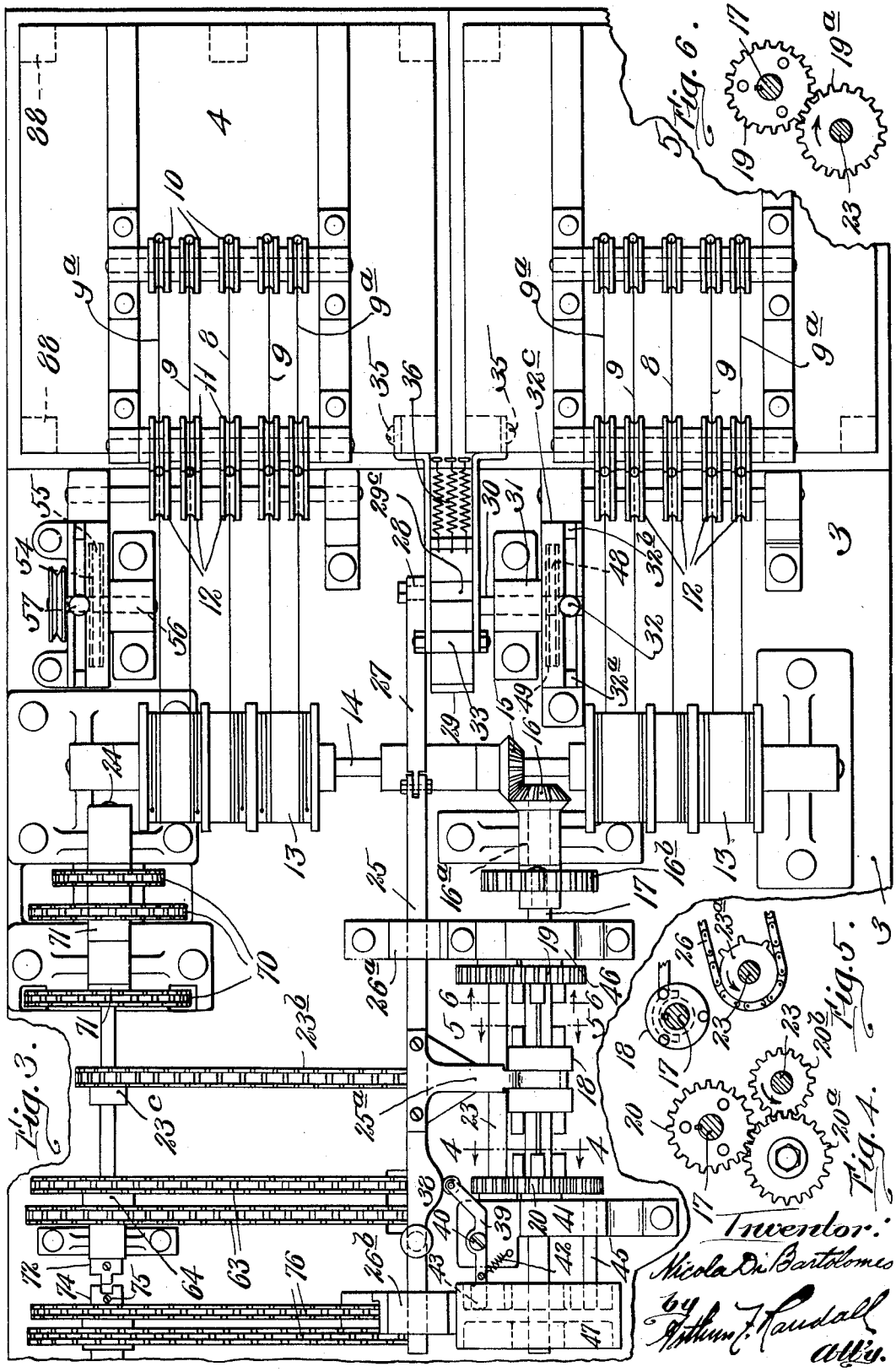


Fig. 3.

Fig. 5.

Fig. 4.

Fig. 6.

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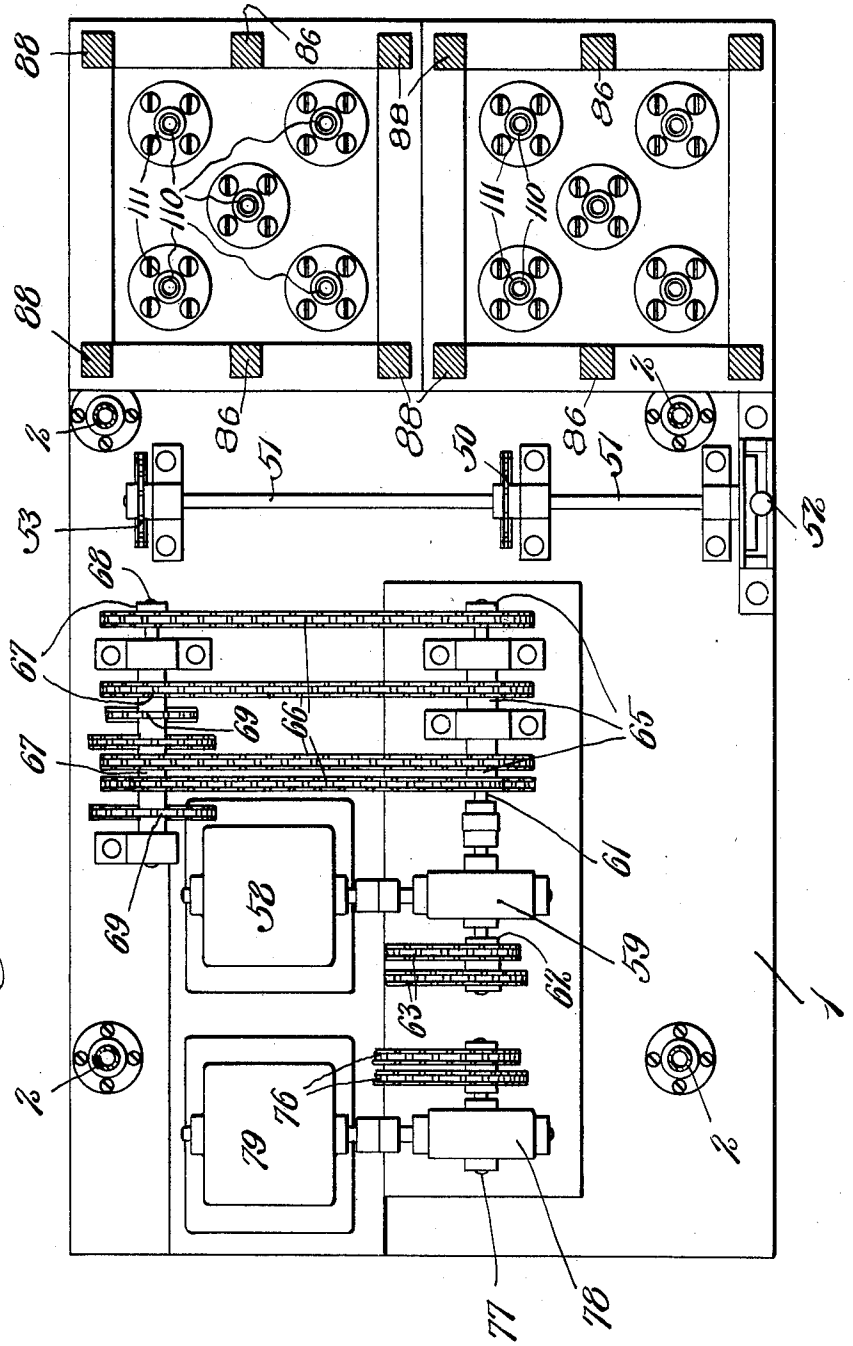


Fig. 7.

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Fig. 8.

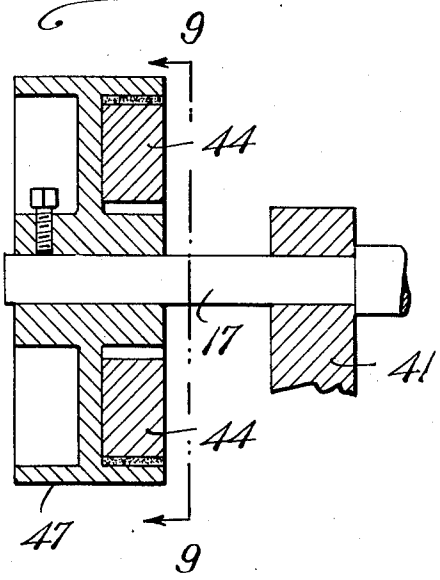


Fig. 9

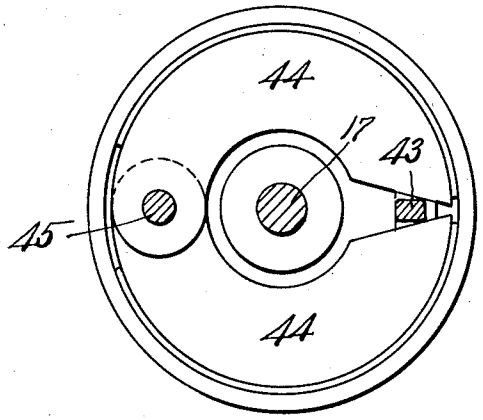


Fig. 11

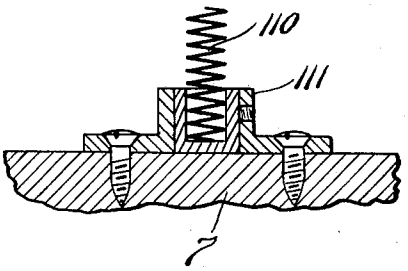
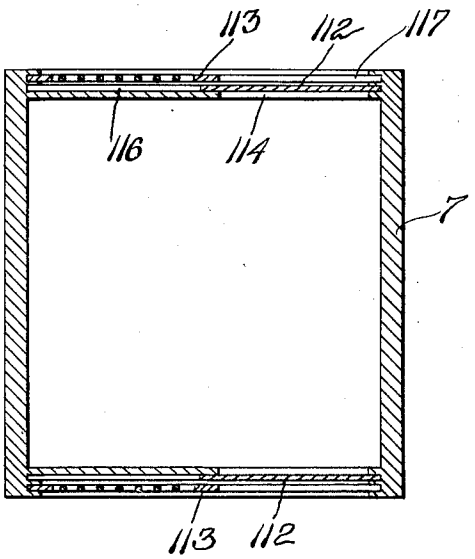


Fig. 10.



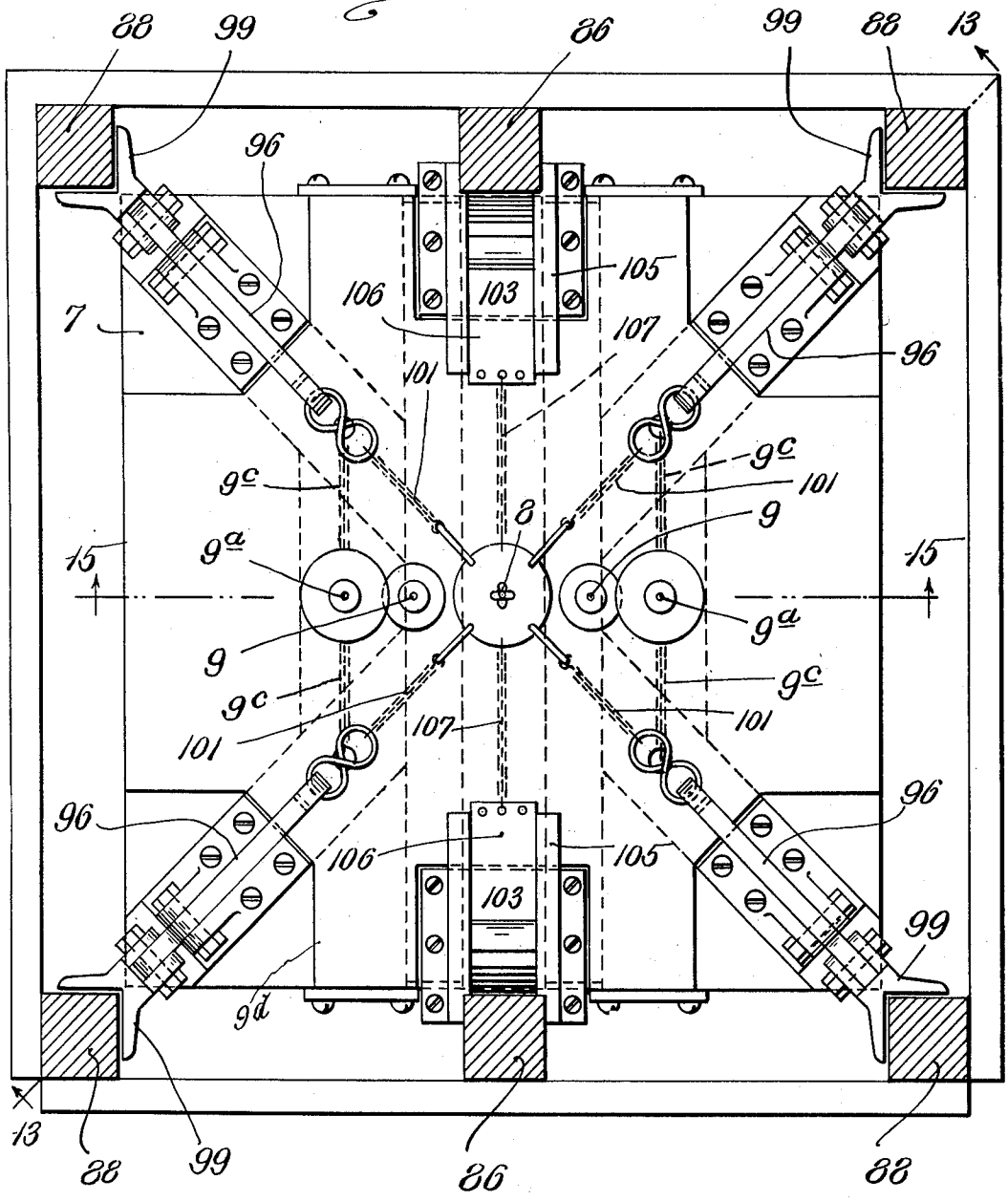
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Fig. 12.



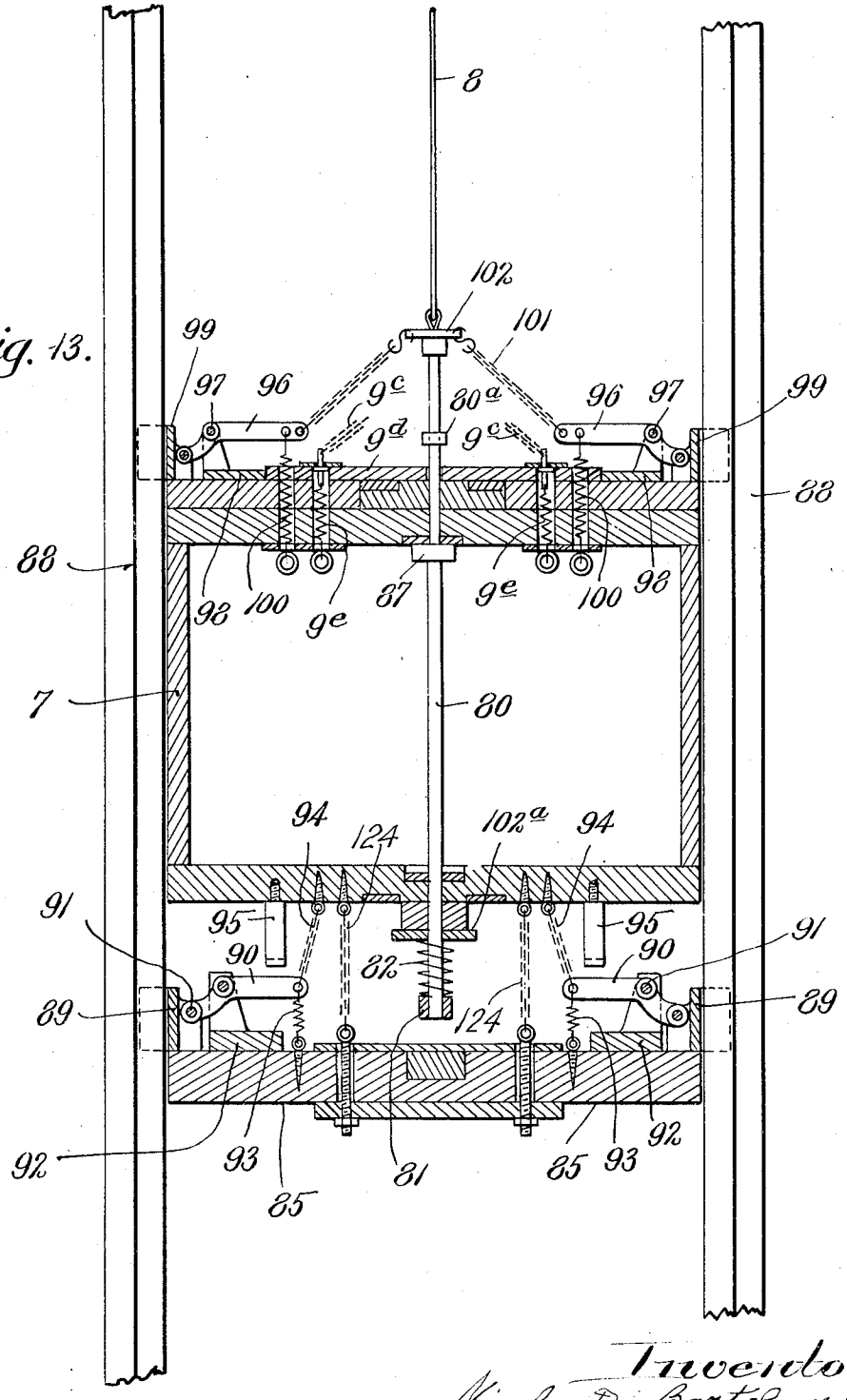
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Fig. 13.



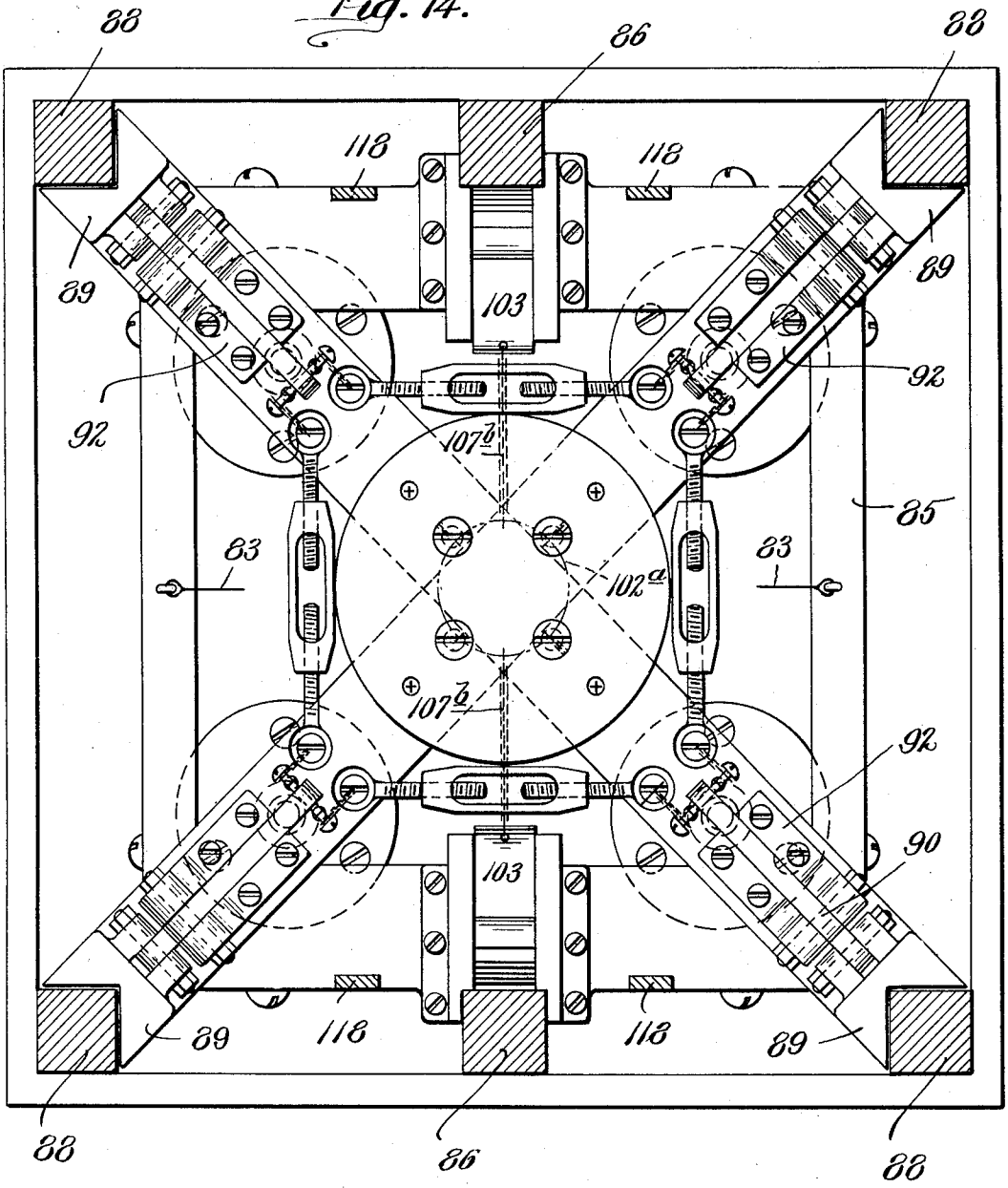
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Fig. 14.



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Fig. 16.

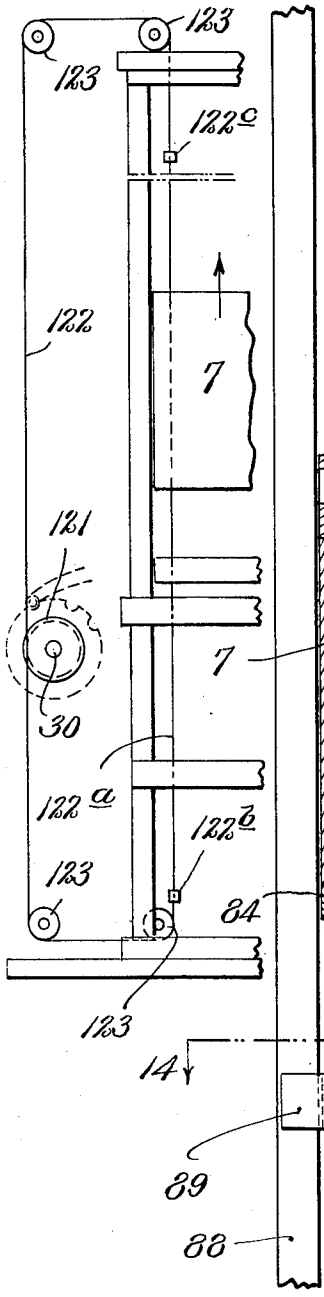


Fig. 15.

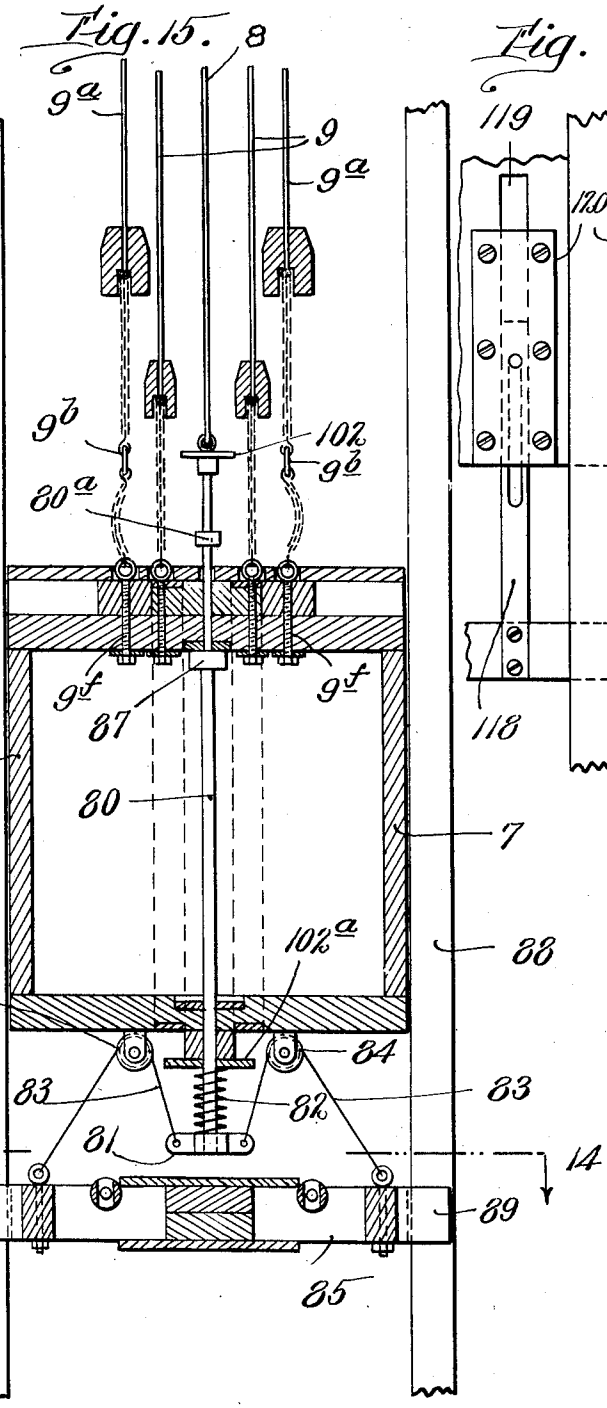


Fig. 17.

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UNITED STATES PATENT OFFICE

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ELEVATOR APPARATUS

Nicola Di Bartolomes, Brockton, Mass.

Application October 25, 1932, Serial No. 639,423

5 Claims. (Cl. 187—81)

My invention relates to elevator apparatus and, in one form thereof, is embodied in an elevator apparatus of that class wherein the car operating mechanism is manually controlled from a fixed station.

The primary object of the invention is to provide an improved elevator apparatus of the class referred to.

More especially the invention has for its object to provide an improved safety mechanism for the elevator car; to economize in the use of power and reduce the wear of parts; to prevent injurious stresses being imposed upon the car operating mechanism, and to provide improved means through which the car operating devices are manually controlled.

To these ends I have provided an improved elevator apparatus which may be constructed and operate as set forth in the following description, the several novel features of the invention being particularly pointed out and defined in the claims at the close thereof.

In the accompanying drawings:

Figure 1 is a side elevation of an elevator apparatus constructed in accordance with this invention.

Figure 1*a* is a detail of the automatic clutch hereinafter referred to.

Figure 2 is a front elevation of the apparatus shown in Figure 1.

Figure 3 is a plan view of the apparatus illustrated in Figures 1 and 2.

Figure 4 is a sectional detail on line 4—4 of Figure 3.

Figure 5 is a sectional detail on line 5—5 of Figure 3.

Figure 6 is a sectional detail on line 6—6 of Figure 3.

Figure 7 is a sectional plan on line 7—7 of Figure 1.

Figure 8 is a sectional detail relating to the brake mechanism hereinafter described.

Figure 9 is a section on line 9—9 of Figure 8.

Figure 10 is a sectional detail on line 10—10 of Figure 1 illustrating the construction of the car hereinafter described.

Figure 11 is a sectional detail of one of the buffer springs hereinafter described.

Figure 12 is a section on line 12—12 of Figure 1.

Figure 13 is a section on the diagonal line 13—13 of Figure 12.

Figure 14 is a section on line 14—14 of Figures 1 and 15.

Figure 15 is a section on line 15—15 of Figure 12.

Figure 16 illustrates the automatic car stopping mechanism hereinafter described.

Figure 17 is a detail relating to the construction of the car illustrated in Figures 12 to 15, inclusive.

The illustrated embodiment of my invention comprises a base 1 on which are mounted uprights 2 supporting a platform 3. The base 1 also has erected upon it two wells 4 and 5 within which are arranged, respectively, vertically movable cars 6 and 7, Figs. 1 and 2.

Each car has connected with its upper end a plurality of cables comprising a single main cable 8, two cables 9 and two auxiliary cables 9*a* Figs. 2, 12 and 15, which extend upwardly therefrom over sheaves 10 and 11 at the top of the shaftway or well and thence downwardly under sheaves 12 to drums 13 fast on a shaft 14 journaled in bearings provided upon the platform 3.

The cables of car 6 have their lower end portions wound on to their drums 13 in one direction, while the cables of the car 7 have their lower ends wound on to their drums 13 in the opposite direction.

All of the drums 13 are fast on a single shaft 14 carrying a beveled pinion 15, Fig. 3, that is in mesh with a beveled pinion 16 fast on a short shaft 16*a*, Figs. 1 and 3, journaled in bearings provided on platform 3. The short shaft 16*a* is connected by spur gears 16*b* with a main drive shaft 17. The drive shaft 17 has splined thereon a clutch member 18 disposed between two gears 19 and 20 that are loosely mounted on shaft 17.

Gear 20 is continuously rotated through an idler gear 20*a* by a gear 20*b* fixed in position upon a countershaft 23 as shown in Fig. 4 while gear 19 is driven directly from countershaft 23 by a gear 19*a* fast upon the latter, as shown, in Figure 6. Thus the gears 19 and 20 are continuously rotated in opposite directions. The faces of gears 19 and 20 adjacent to the clutch member 18 are made to co-operate as clutch members with the latter and it will therefore be clear that when clutch member 18 is shifted into mesh with gear 19 the main shaft 17 will be driven in one direction and when shifted into mesh with gear 20 said main shaft will be driven in the opposite direction.

Countershaft 23 carries a sprocket wheel 23*a*, Figs. 1 and 5, that is connected by a chain 23*b* with a sprocket wheel 23*c* fast on a horizontal shaft 24. In this way the drum shaft 14 is rotated in one direction or the other to raise or lower the cars and, as will be clear, when it is rotated in one direction the car 6 is raised while

car 7 is being lowered, and when rotated in the opposite direction the car 7 is raised while the car 6 is being lowered.

It will also be clear that each car counterbalances the other thus reducing stresses imposed upon the car operating mechanism, particularly gears 15 and 16, to a minimum.

Clutch member 18 is made with a circumferential groove that is occupied by an arm 25*a* projecting laterally from a shipper member 25 that is slidably supported in bearings 26*a* and 26*b* provided on platform 3. This shipper member 25 is connected at one end by a link 27, Figs. 1 and 3, with a wrist pin 28 provided upon one face of a disc 29 fast upon one end of a shaft 30.

The shaft 30 is journaled in a bearing 31 on platform 3 and has fastened to its opposite end a hand lever 32 by means of which the shaft and disc are manually turned on the axis of said shaft thereby to shift the shipper member 25 endwise in its bearings. Stop shoulders 32*a* and 32*b*, Fig. 3, on an upstanding bracket 32*c* limit the angular movement of lever 32 in each direction.

The disc 29 is made upon its periphery with three sockets 29*a*, 29*b* and 29*c* to co-operate with a roll 33 provided at the free end of a detent arm 34 that is pivotally mounted at 35 upon the frame of the apparatus and yieldingly urged toward the disc 29 by springs 36.

The shipper member 25 is adapted to occupy either of three positions where it is yieldingly held through the engagement of the roll 33 with one or the other of the sockets provided upon the periphery of disc 29. In Figs. 1 and 3 the shipper member 25, disc 29 and lever 32 are shown in their intermediate positions with clutch member 18 occupying its intermediate inoperative position. When lever 32 is thrown toward the right against stop 32*b* the shipper member is positioned to engage clutch member 18 with gear 19, and when lever 32 is swung from its intermediate position toward the left against stop 32*a*, the shipper member 25 is positioned to engage clutch member 18 with gear 20. Thus the stops 32*a* and 32*b* properly and positively locate clutch member 18 in its driving positions, while the engagement of the detent 34 with the notches 29*a* and 29*c* hold the shipper member in its adjusted position.

Shipper member 25 is made upon one side thereof with a cam 38 to co-operate with one end of a lever 39 that is fulcrumed at 40 on an upright 41 secured to the platform 3. A spring 42 serves to swing the lever 39 in one direction while the cam 38 serves to swing said lever in the opposite direction.

As shown in Fig. 9 one arm of lever 39 is made at its extremity with a wedge 43 occupying a position between the free ends of two brake shoes 44 which are pivotally supported upon a stud 45 projecting from the upright 41. The upright 41 and a second upright 46 provide bearings in which the main drive shaft 17 is journaled.

When disc 29 is rotated in a direction to shift shipper member 25 toward the left, Fig. 3, the cam 38 is carried away from lever 39 thus unsetting the brake and at the same time engaging clutch member 18 with gear 20 which then rotates the main drive shaft 17 in one direction. Or, if the disc 29 is turned in a direction to shift the shipper member 25 from its intermediate position, Fig. 3, toward the right, then the cam 38 is carried away from lever 39 and clutch member 18 is engaged with gear 19, thereby rotating the main drive shaft 17 in the opposite direction.

Whenever the cam 38 is moved out of engagement with the lever 39 the spring 42 swings said lever in a direction to unset the brake shoes 44, Figs. 8 and 9, and when shipper member 25 is returned to its intermediate position on the loose pulleys the cam 38 positively swings the lever 39 in a direction to wedge apart and set the brake shoes 44. These shoes 44 are disposed within a drum 47 Figs. 3, 8 and 9, fast on the main drive shaft 17.

On the shaft 30 of the belt shipper mechanism, Figs. 1 and 3, is fixed a sprocket 48 connected by a chain 49 with a sprocket 50 fast on a shaft 51, journaled in bearings provided on base 1. Shaft 51 is provided at one end thereof with an upwardly extending hand lever 52, Figs. 1 and 7, that is accessible to the operator while he is on the ground and at one side of the apparatus, the hand-lever 32 being accessible to him while he is upon the platform 3 and at the same side of the apparatus.

Adjacent to the opposite side of the apparatus the shaft 51 is provided with a sprocket wheel 53 connected by an upwardly extending chain 54 with a sprocket wheel 55, Fig. 3, fast upon the inner end of a short shaft 56 journaled in bearings upon the top side of platform 3.

At its outer end the shaft 56 is provided with a second upstanding hand lever 57 accessible to the operator while upon the adjacent side of the apparatus and standing upon platform 3.

The three hand levers enable the operator to control and operate the disk 29 from different positions.

Fixed in position upon the base 1 is an electric motor 58, Figs. 1, 2 and 7, whose armature shaft acts through a worm and worm gear mechanism 59 to continuously drive a shaft 61, Fig. 7, journaled in bearings on base 1.

Shaft 61 has fixed upon it a double sprocket wheel 62 connected by a pair of chains 63 with a double sprocket wheel 64, Fig. 3, fast on the countershaft 24. Thus the countershaft 24 and gears 19 and 20 are continuously driven.

The shaft 61 may also be provided with additional sprocket wheels 65, Fig. 7, connected by chains 66 with a set of sprocket wheels 67 provided upon an intermediate shaft 68 journaled in bearings on base 1. Other sprocket wheels 69 Fig. 7, provided on intermediate shaft 68 are connected by chains 70, Figs. 1 and 3, with sprocket wheels 71 provided on shaft 24. Thus several power transmitting devices connecting the shaft 61 with the shaft 24 are provided so that in the event of failure or breakage of either or some of these devices, the others will maintain the apparatus in operative condition and in operation.

At its outer end the shaft 24, Fig. 3, has a clutch member 72, that is disposed in axial alinement with the inner end of a short shaft 73, Fig. 2, said inner end being provided with a complementary clutch member 74 that is shown in Fig. 3, normally held out of engagement with the clutch member 72 by a set screw 75. The short shaft 73 is connected by power transmitting gearing including chains 76 with a short shaft 77, Figs. 2 and 7, journaled in bearings provided on base 1. This short shaft is connected by means of a worm and worm gear transmission 78 with the armature shaft of a supplemental electric motor 79 which is normally inoperative. Upon failure of the motor 58 the clutch member

74, Fig. 3 is adjusted into engagement with the clutch member 72 and the motor 79 is then used instead of the motor 58.

As shown in Figs. 13 and 15 one end of the cable 8 of each car is connected with the upper end of a rod or bar 80 which extends downwardly therefrom through the car and beyond the floor of the latter where it is provided with a head 81 between which and the floor of the car is arranged a spring 82 that is normally under compression. The head 81 has fastened to it a pair of cables 83 which extend upwardly therefrom over sheaves 84 and thence downwardly to a rectangular supplemental car section 85 to which their outer ends are fastened. Through the connections just described the supplemental car section 85 is caused to move up and down with its car, said supplemental section being guided in its vertical movements by the pair of oppositely disposed side rails 86 of the well within which it is disposed. Normally a portion of the weight of the car 7 is borne by rod 80 and cable 8 through the engagement of a collar or the like 87 provided on rod 80 with the under side of the roof structure of the car.

The shaftway or well within which each car is mounted includes four vertical corner rails 88, Figs. 7, 14 and 15, and the supplemental car section 85 is provided upon its top side with four brake shoes 89, Figs. 13 and 14, each co-operatively disposed with relation to one of the corner rails 88.

Each brake shoe 89 is pivotally connected with one arm of a lever 90, that is pivotally mounted at 91 upon a bracket 92 secured to the top side of the supplemental car section 85. The other arm of each lever 90 is yieldingly urged downwardly by a spring 93 whereof one end is connected with lever 90 and its opposite end with the supplemental section 85. This arm of each lever 90 is also connected by a chain 94 with the bottom of the car and normally the chain 94 serves to hold the lever 90 in a position where the brake shoe connected with it is maintained out of engagement with its rail 88 and with spring 93 under tension.

Directly above the inner arm of each lever 90, and fixed to the bottom of the car, is an abutment 95, adapted to co-operate with said inner arm as presently to be described.

Normally the weight of the car serves to hold the roof structure thereof against collar 87 of rod 80, but in the event that the cable 8 breaks the spring 82 thrusts the rod 80 downwardly and it acts through the cables 83 to lift the supplemental section 85 slightly relatively to car 7.

This movement of the supplemental section 85 toward the car 7 slackens the chains 94 and permits the springs 93 to operate the levers 90 so as to thrust the brake shoes 89 against the rails 88. Thus if the supporting cables 9, 8 and 9, break, the brake shoes 89 are automatically set against the rails 88 and at the same time the descent of the car relatively to the supplemental section 85 brings the abutments 95 into engagement with the levers 90 thus supplementing the brake setting action of springs 93 by the weight of the car. In this way the car is prevented from falling to the bottom of the well in the event that its operating cables 9, 8 and 9 are broken.

Upon the top of each car I may provide another set of four levers 96, Figs. 12 and 13, each pivotally mounted at 97 upon a bracket 98 secured to the top of the car and having one arm thereof pivotally connected with a brake shoe 99 co-operatively disposed with respect to one of the corner rails 88 as shown. The inner arm of each lever 96 is connected by a spring 100 with the roof structure of the car, and this spring is normally under tension, but is prevented from moving said arm downwardly toward the car by a chain 101 whereof one end is connected with said inner arm and the other end with a collar 102 provided upon the rod 80 adjacent to the upper end thereof. It will be clear that should the supporting cables 9, 8, 9 of the car break, the springs 100 operate through the levers 96 to thrust the brake shoes 99 into engagement with the corner rails 88 so that the latter assist the brake shoes 89 of the lower car section in supporting the car.

In addition to the brake shoes 99 adjacent the corners thereof, each car is provided upon its top side with a pair of supplemental brake shoes 103, Figs. 1, 1*a* and 12, one adjacent the front of the car and the other adjacent the rear thereof. Each brake shoe 103 is pivotally supported at 104 upon a bracket 105 fixed in position upon the top of the car and is constructed with an inwardly extending arm 106 connected by a cable 107 with the disc 102 and by a pair of cables 107*a* with the two operating cables 9. Normally the cables 107 and 107*a* hold their brake shoes 103 retracted against the pull of a spring 108, Fig. 1*a*, whereof one end is connected with the arm 106 and its opposite end with the bracket 105. A stop pin 109 on bracket 105 limits the inward swing of the brake shoe under the influence of cables 107 and 107*a*.

In the event that the car supporting cables 9, 8, 9 break the springs 108 swing their shoes 103 on their pivots 104 each into engagement with the adjacent side rail 86. Each brake shoe 103 is made with rail-engaging teeth 110 which are adapted to positively interlock with a rack of teeth 110*a* provided on the adjacent rail 86 when the brake shoe is thrust into engagement with the latter by spring 108. These teeth are disposed in arcuate rows eccentrically disposed with respect to pivot 104 as shown in Fig. 1*a*, so that the greater the tendency of the weight of the car to turn the brake shoe on its pivot 104 the greater will be the gripping action of the brake shoe.

The supplemental car section 85 is likewise provided with pivoted brake shoes 103 connected by cables 107*b* with a collar 102*a* fast on rod 80. Cables 107*b* normally hold their brake shoes 103 retracted against the pull of springs, not shown, each of which is like the spring 108 of Fig. 1*a*. It will therefore be clear that when the cable 8 breaks and rod 80 is projected downwardly the cables 107*b* are slackened thus allowing the brake shoes 103 to engage the side rails 86.

Normally the cables 9, 8 and 9 support the car, while the two outer cables 9*a* are emergency cables which normally are not subjected to the weight of the car and move idly with the cables 9, 8 and 9. Near their lower ends the cables 9*a* are provided with eyes 9*b*, Fig. 15 connected by cables 9*c*, Figs. 12 and 13, with a brake operating member 9*d* herein shown as a plate normally resting by gravity upon the roof structure of the car where it is yieldingly held by springs 9*e*. The cables 9*a*, Fig. 15, have their lower ends fastened by means of bolts 9*f* to the roof structure of the car and the portion of each cable between its eye 9*b* and its bolt 9*f* is maintained in a slackened condition by the cables 9*c*. In the event that the cables 9, 8 and 9 break the car 7 will start to fall during

which movement the brakes 89 and 99 are set and at the same time this falling movement of the car transfers the weight of the latter to the cables 9*a* thereby taking up the slack at the lower ends of the latter and causing said cables 9*a* to act through the cables 9*c*, Figs. 12 and 13 to raise the member 9*d* far enough to cause the latter to act through levers 96 to unset the brakes 99. At the same time as the member 19 moves upwardly relatively to the roof structure and unsets the brakes 99, it acts through a collar 80*a* to cause an upward displacement of rod 80 relatively to the car. Thus upward relative movement of rod 80 gives slack to the cables 83, Fig. 15 which permits the supplemental car section 85 to move downwardly with relation to the body of car 7 with the result that levers 90 are operated by cables 94, Fig. 13 to also unset the brake shoes 89. The upward movement of rod 80 relatively to the car 7 also acts through the cables 107, Fig. 12, and the cables 107*b*, Fig. 14 to unset all four brake members 103.

Thus when the cables 9, 8 and 9 break there is a limited falling movement of the car 7 which is automatically terminated by the brake devices on both the body of the car and the supplemental section 85. During the latter part of this downward movement the weight of the car is transferred to the auxiliary cables 9*a* which act through the connections described to unset the brake devices leaving the car free to be operated by means of the cables 9*a*.

The supplemental car section 85 may be provided with upwardly extending guide bars 118, Fig. 17, the upper portions of which occupy ways 119 provided upon the outside of body 7, said guide bars 118 being held within the ways 119 by plates 120 fastened to car 7. In this way the body of the car and the supplemental section are slidably connected so as to be held against lateral displacement relatively.

Any suitable means may be provided for stopping the movements of the cables 8, 9, and 9*a* when either car 7 reaches the limit of its movement in either direction. For example I may provide a drum 121, Fig. 16, fixed to the shaft 30, that is shown in Figs. 1 and 3 and to which are connected the opposite ends of a cable 122 which extends around guide sheaves 123 so that a vertical stretch 122*a* of cable 122 is supported in proximity to the car 7, said stretch or portion 122*a* being provided with collars 122*b* and 122*c*. As the car 7 nears the limit of its downward movement it acts through collar 122*b*, cable 122 and drum 121 to turn shaft 30 in a direction to shift clutch member 18, Fig. 1, into its intermediate idle position. Also as the car 7 nears the limits of its upward movement it acts through the collar 122*c*, cable 122 and drum 121 to rotate shaft 30 in a direction to shift clutch member 18 into its idle intermediate position. This stop mechanism illustrated in Fig. 16 is omitted from the other figures of the drawings for the sake of clearness.

If desired a plurality of bumper springs 110, Figs. 7 and 11, may be provided at the bottom of each shaftway or well, each of these springs being seated within a socket member 111 fixed in position upon the floor of the well. This construction permits of replacement of the springs when broken.

In Fig. 10, I have shown a horizontal cross sectional view through one of the cars of the apparatus. Each car has two opposite sides provided each with two doors 112 and 113 mounted in ways to slide horizontally relatively to a doorway 114. The door 112 is a solid panel and may be provided with a window 115, as shown in Fig. 1. The other door 113 is of lattice work, or grill work. The ways 116 and 117 within which the doors are mounted are sufficiently long to permit either or both doors to be fully removed from the doorway 114, or to permit either door to be placed within said doorway.

The advantage to this car construction is that in case of emergency the solid panel door 112 can be closed, thus excluding dangerous gases from the car when the apparatus is installed in a mine. At other times the drill door 113 may be used.

The three cables 9, 8 and 9, Figs. 12 and 15, normally support and operate the car while the two cables 9*a* are, as shown at their lower ends in Fig. 15, normally slack and are connected by cables 9*c* with the brake operating member or plate 9*d*. It will therefore be clear that the first effect of the breakage of cables 9, 8 and 9 is that the brake shoes on the roof structure of the car are set and at the same time the supplemental car section 85 is moved upwardly relatively to the car body by the cables 83 until levers 90 engage lugs 95 on the car which acts to set the brake shoes 89 of the supplemental car section. These operations are accompanied by tightening of the cables 9*a* which operate through the branch cables 9*c* to raise the plate 9*d* thereby unsetting the brakes on the car roof. Upward movement of plate 9*d* also acts through collar 80*a* to raise bar 80 relatively to the car thereby giving slack to the cables 83. At this time however the car is supported by the brakes of the supplemental car section 85 until cables 9*a* are operated to raise car 7. When this occurs the connectors 94, Fig. 13, operate through lever 90 to unset the brakes of the supplemental car section. Downward movement of the supplemental car section 85 relatively to the car 7 is limited by the connector chains 124 after which the car is free to be raised and lowered by the cables 9*a*. Normally the connector chains 124 maintain the supplemental car section 85 at a predetermined distance from the car body.

What I claim is:

1. In an elevator apparatus, in combination, a shaftway provided with oppositely disposed vertical rails at the sides thereof; a car movable up and down between said rails; brake shoes slidably mounted upon said car each in position to co-operate with one of said rails; a car supporting and operating cable independently connected at its one end with said car; means positively connecting each brake shoe with said cable through which the tension of the latter occasioned by the weight of the car serves to hold each brake shoe in a normally retracted inoperative position, said means comprising a brake shoe operating lever fulcrumed intermediate its ends upon said car and having an arm pivotally connected directly to said brake shoe and said pivotal connection being disposed below the level of said fulcrum so that when said brake shoe is set the weight of said car acts through said pivotal connection to hold said shoe against its rail, and a flexible member having one end thereof connected with the other arm of said lever and its opposite end connected with said cable above said car, and a separate brake-setting spring associated with each of said levers, each of said springs having one end thereof connected with the last-mentioned arm of its lever and its opposite end connected with said car.

2. In an elevator apparatus, in combination, a shaftway provided with oppositely disposed

vertical rails at the sides thereof; a car movable up and down between said rails; a car supporting and operating cable; a supplemental car section disposed wholly beneath said car; brake shoes movably mounted upon said supplemental car section each in a position to co-operate with one of said rails; flexible cables through which said car normally supports said supplemental car section in a predetermined position relatively thereto; means operable upon breakage of said car-supporting and operating cable for moving said supplemental section vertically relatively to said car when said car-supporting cable is relieved of the weight of said car through breakage of said cable; brake-operating levers carried by said supplemental car section, and means through which the movement of said supplemental car section relatively to said car operates said levers to set said brake shoes against their rails.

3. In an elevator apparatus, in combination, a shaftway provided with oppositely disposed vertical rails at the sides thereof; a car movable up and down between said rails; a main cable for normally supporting and operating said car; brake mechanism mounted on said car in position to cooperate with said rails; means connecting said brake mechanism with said main cable through which the tension of the latter occasioned by the weight of the car serves to hold said brake mechanism normally unset; a supplemental car section movably supported in position beneath said car; brake mechanism mounted on said supplemental car section in position to cooperate with said rails; means connecting said last mentioned brake mechanism with said car for normally holding said last mentioned brake mechanism unset; means through which said car normally supports said car section in a predetermined position relatively thereto; a plurality of normally slack auxiliary car operating cables connected with said car; means for automatically raising said supplemental car section relatively to said car and for setting the brake mechanism of said supplemental car section when said main cable breaks, and means through which said auxiliary cables act automatically to unset the brake mechanism of said car when the slack of said auxiliary cables is taken up through breakage of said main cable.

4. In an elevator apparatus, in combination, a shaftway provided with oppositely disposed vertical rails at the sides thereof; a car movable up and down between said rails; a main cable for normally supporting and operating said car; brake mechanism mounted on said car in position to cooperate with said rails; means connecting said brake mechanism with said main cable through which the tension of the latter occasioned by the weight of the car serves to hold said brake mechanism normally unset; a supplemental car section movably supported in position beneath said car; brake mechanism mounted on said supplemental car section in position to cooperate with said rails; means connecting said last mentioned brake mechanism with said car for normally holding said last mentioned brake mechanism unset; means through which said car normally supports said car section in a predetermined position relatively thereto; a plurality of normally slack auxiliary car operating cables connected with said car; means for automatically raising said supplemental car section relatively to said car and for setting the brake mechanism of said supplemental car section when said main cable breaks, and means through which said auxiliary cables act automatically to unset the brake mechanism of said car when the slack of said auxiliary cables is taken up through breakage of said main cable and means for automatically unsetting the brake mechanism of said supplemental car section when the car is subsequently moved upwardly by said auxiliary cables.

5. In an elevator apparatus, in combination, a shaftway; a car movable vertically within said shaftway; a cable connected with and supporting said car; a cable-operating shaft; reversible power transmitting mechanism for driving said shaft, said mechanism including a clutch member splined on said shaft and adjustable to cause said mechanism to drive said shaft in either direction, said clutch member being also adapted to occupy an idle neutral position; brake mechanism for said shaft including a brake-operating member; a shipper bar for said clutch member made with a cam to co-operate with said brake-operating member; means slidably supporting said shipper bar alongside of said shaft so that it is movable endwise on a rectilinear path parallel therewith, said cam being operable to set said brake mechanism when said clutch member is moved into its neutral position by said shipper bar and to unset said brake mechanism when said clutch member is moved in either direction away from its neutral position, and means through which said car acts to shift said shipper bar into its intermediate position when said car reaches the predetermined limit of its travel in either direction.

NICOLA DI BARTOLOMES.