C. H. MILLER.

MANLIFT.

APPLICATION FILED JULY 21, 1920.

1,382,211.

Patented June 21, 1921.

4 SHEETS—SHEET 1.

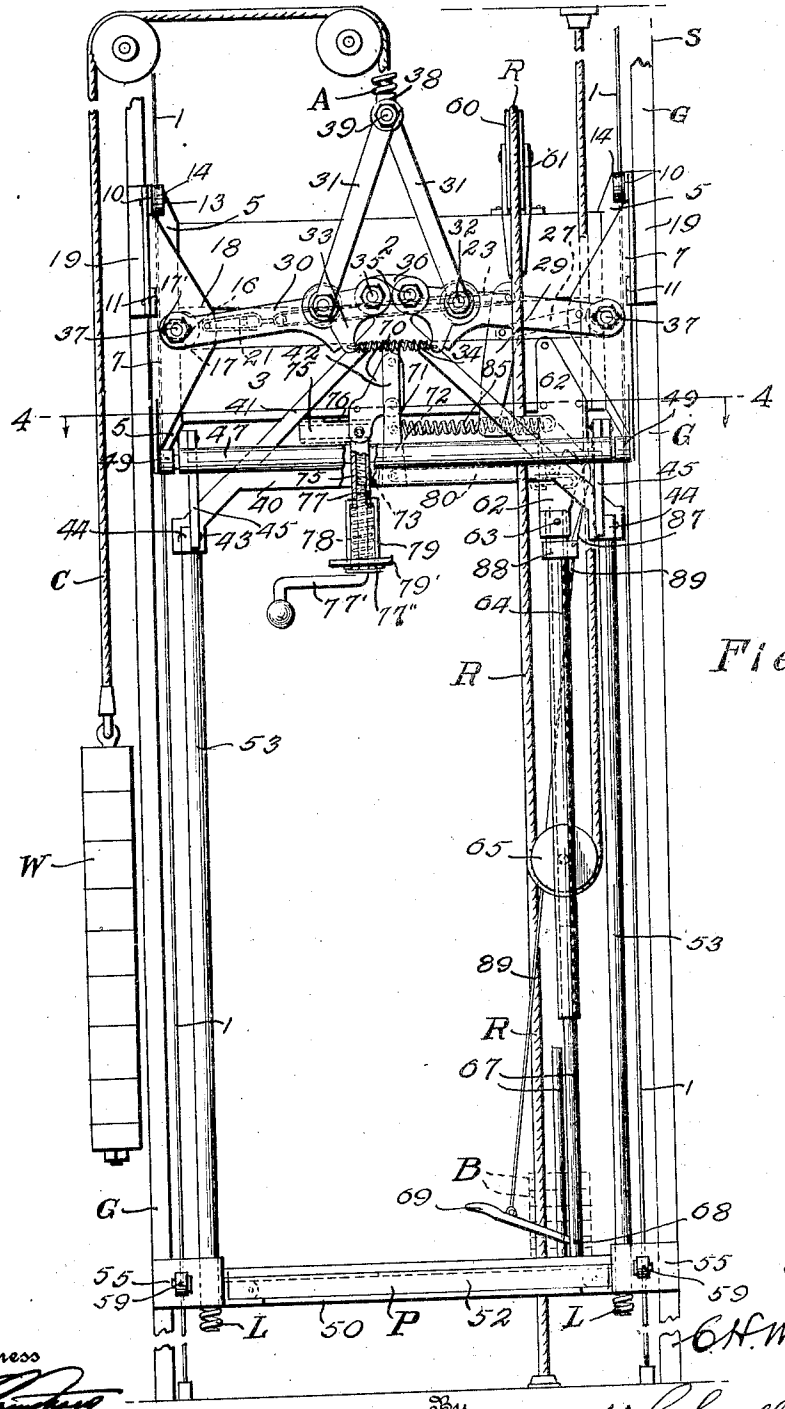


Fig. 1.

Witness

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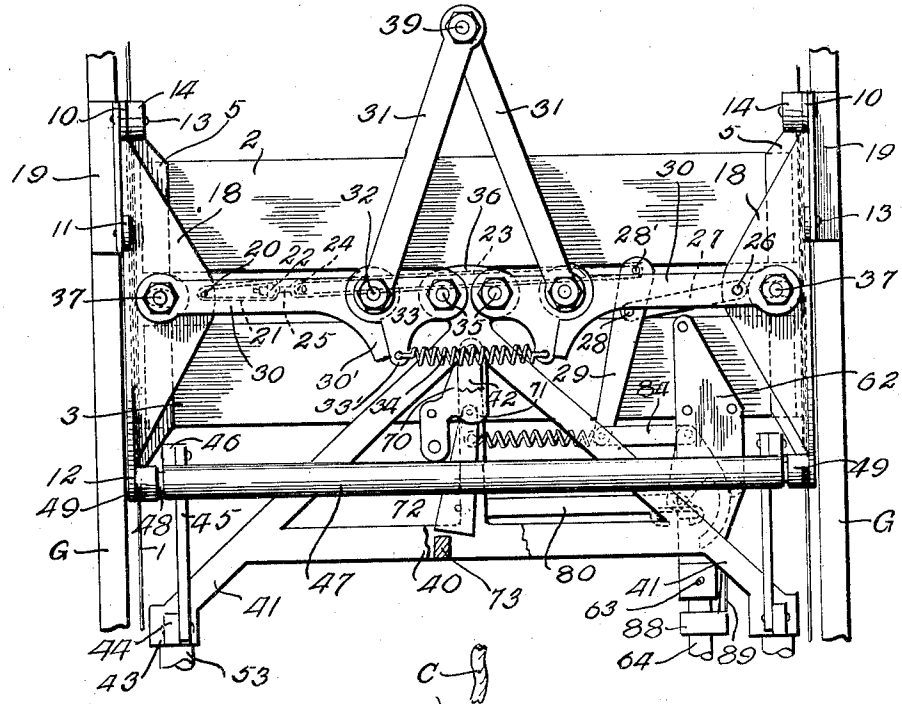


Fig. 2.

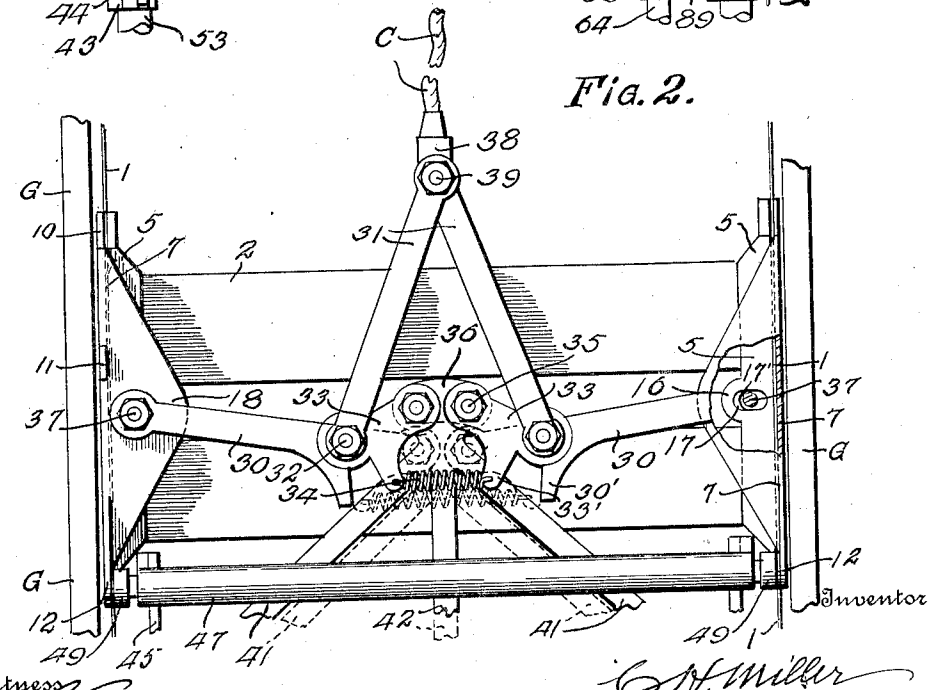


Fig. 7.

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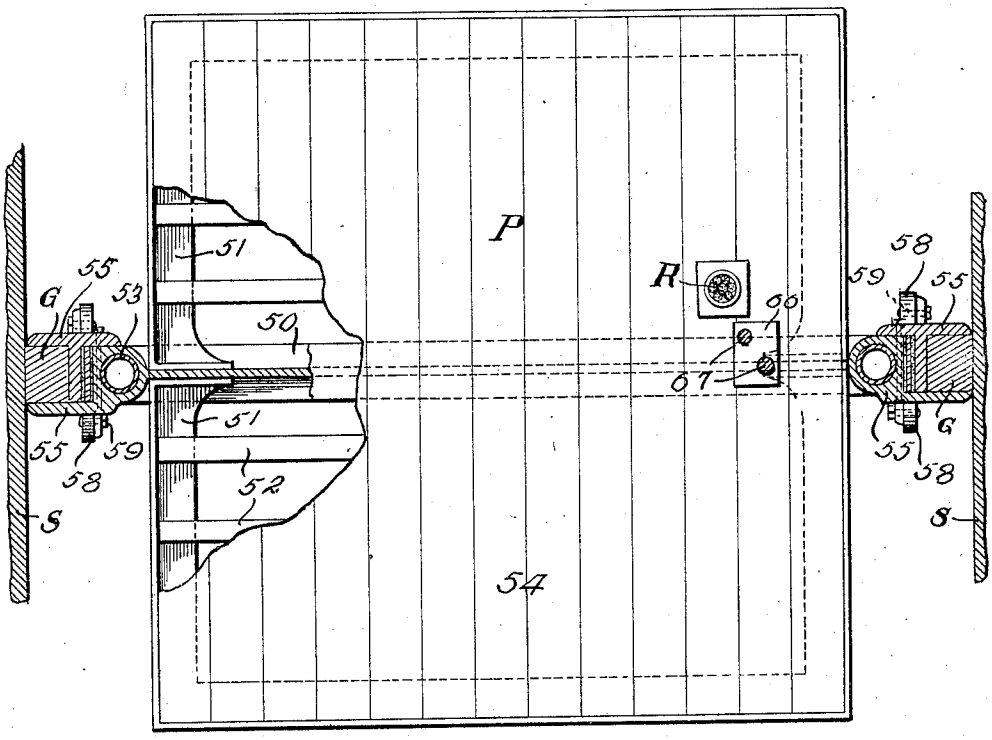


Fig. 3.

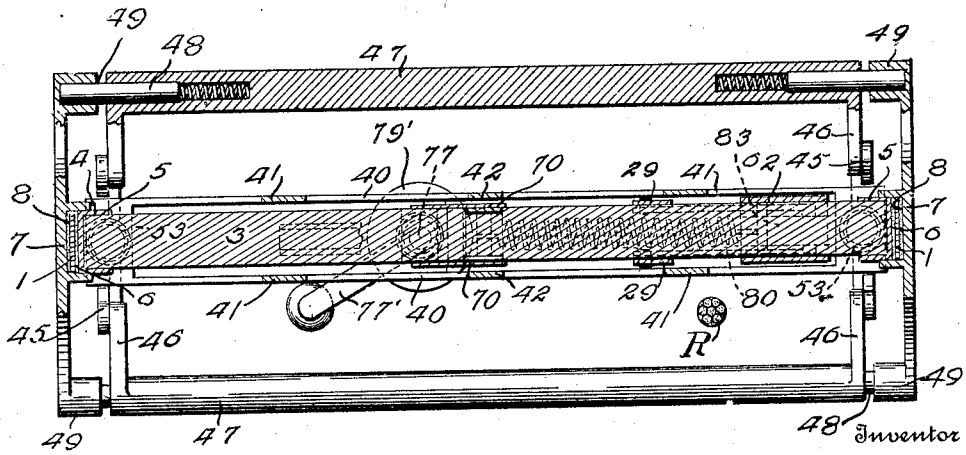


Fig. 4.

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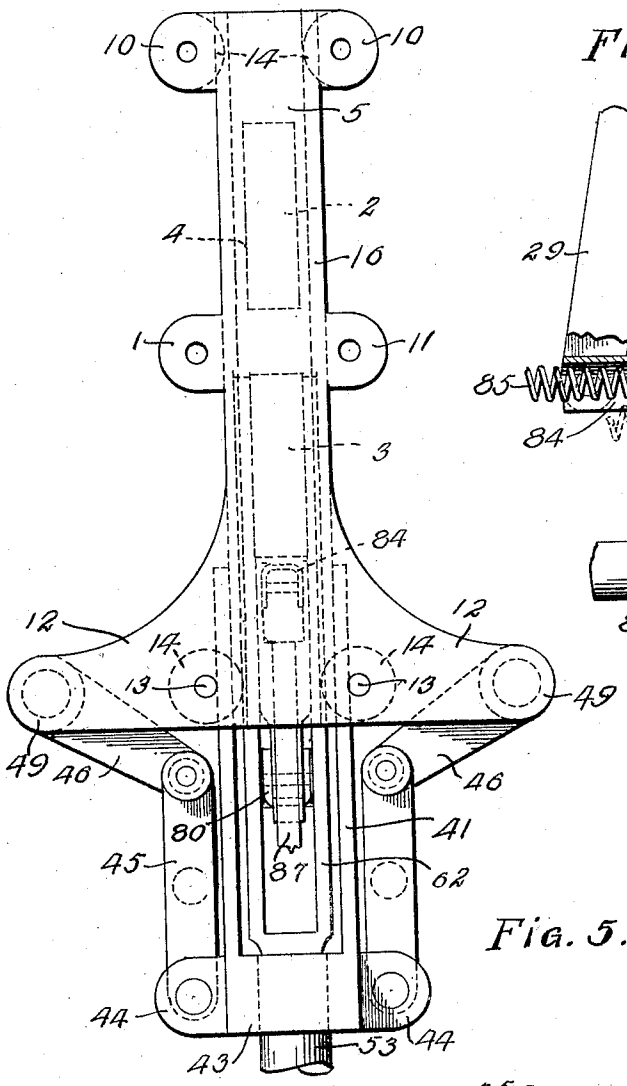


Fig. 5.

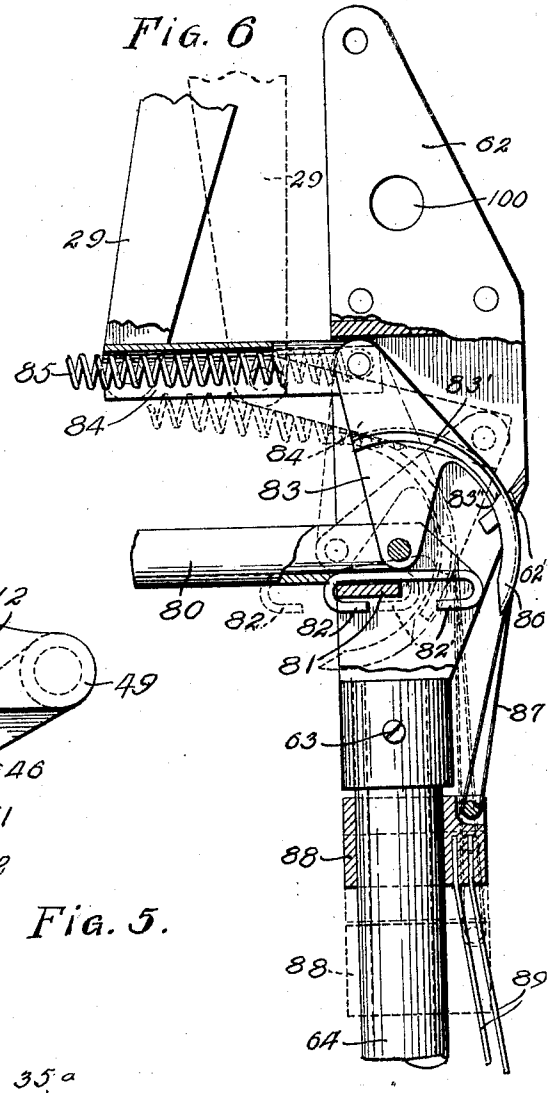


Fig. 6.

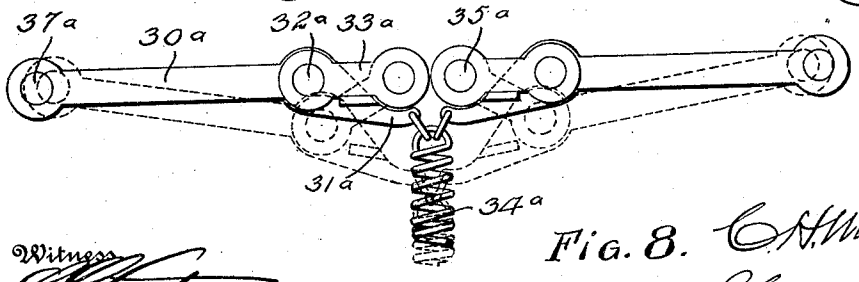


Fig. 8.

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UNITED STATES PATENT OFFICE.

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MANLIFT.

1,382,211. Specification of Letters Patent. Patented June 21, 1921.

Application filed July 21, 1920. Serial No. 397,830.

To all whom it may concern:

Be it known that I, CHARLES H. MILLER, a citizen of the United States, residing in Liberty township, in the county of Jefferson and State of Iowa, have invented certain new and useful Improvements in Manlifts, of which the following is a specification.

This invention relates to elevators such as are actuated by the operator or passenger, and more especially to the brakes therefor; and the object of the same is to produce an improved manlift for dwellings, factories, grain elevators, store houses, and other places where there is frequent call for one person to ascend or descend and it is preferred not to use the stairs.

The primary feature of improvement consists in adapting the structure for the use of passengers who may be overweight, underweight, or of average weight; effectively preventing its use by children; providing always against accident to the passenger or damage of the structure in the event that the cable should break; and yet supplying means by which an imprisoned passenger can easily escape.

There are also secondary features of improvement, as will appear in the following specification and claims. Reference is made to the accompanying drawings, wherein—

Figure 1 is an elevation of this manlift with the car at rest within the shaft and unoccupied, the toggle being broken upward at its center and both brakes applied. Certain parts are broken away or in section to show details, and the safety screw is in place ready for use, while its tube is shown in dotted lines as turned upward out of the way.

Fig. 2 is a similar view of the upper part or head of the device with the toggle straightened out and the rocker moved to swing the finger over the block, although the foot brake is not yet released.

Fig. 3 is a plan view of the platform with several of the floor boards removed or broken away, and a horizontal section through the guides in the elevator shaft, showing the parts traveling thereon.

Fig. 4 is a horizontal section on the line 4—4 of Fig. 1, with one bail in section.

Fig. 5 is a detail elevation of one shoe casting, showing the connection of certain parts therewith.

Fig. 6 is a detail of the rocker and the parts connected therewith, and the casting containing it.

Fig. 7 is diagrammatic to show in full lines how the links of the toggle break downward when the cable parts, and in dotted lines how the center of the toggle next drops farther downward to apply the brakes and prevent accident.

Fig. 8 is an elevation of a modified form of toggle.

The elevator shaft is herein typified by upright planks S having maple guides G between which the car travels, although the shaft may be inclosed except for openings at the landings. From a counterbalancing weight W a cable C leads over pulleys and through the ascent bumper A to the top of the car; and at its bottom the latter has a platform P with landing bumper springs L. The counterbalance is by preference of a little less weight than the car plus the weight of the average passenger, and provision is made to add balancing or overbalancing weights B to the car to alter this condition as desired and as circumstances demand. The car is made up of the carriage (which might be called the "cage" if inclosed), the head carrying the brakes and linkage, and the yokes connecting the carriage and head to permit slight relative movement for purposes which will appear. The cable is connected with the head, and the latter—through the yokes—supports the carriage. A rope R (preferably of cotton) is fixed at top and bottom of the shaft and leads through the car, and the passenger propels himself and the car upward or downward by pulling downward on a proper stretch of this rope. He has only to overcome the difference in weight between himself and the car on one hand, and the counterbalance weight on the other when moving in one direction, or he may apply a gentle brake when moving in the other direction; and this direction varies according as the weights B are added or removed or the passenger is heavy or light within limits. The action required on the part of a child or extremely light passenger, or on the part of an extremely heavy person, two persons, or one with some other load, will appear hereinafter.

Standing just inside the guides G and

stretched tightly from top to bottom of the shaft are two steel straps 1 about an eighth of an inch in thickness and two inches wide, or they may be heavier if they serve also as the guides and those lettered G are omitted. The head has two cross bars or beams 2 and 3, spaced slightly and with their ends secured rigidly within sockets 4 within inner brakes or jaws 5 lined at 6 on their outer faces next the straps; and coacting with these jaws are outer brakes or shoes 7 lined on their inner faces at 8 next the straps—the lining being that which is ordinarily used in automobile brakes and replaceable when worn. Each jaw has a pair of parallel wings 16 provided with slots 17. The corresponding shoe has larger and wider wings 18 passing the edges of the strap and outside the wings 16, where they are provided with slots 17'. The shoe preferably has pairs of ears 10, 11, and 12 through which pass pins or bolts 13 carrying anti-friction rollers 14 on the inside faces of the ears extending inwardly through openings in the wings sufficiently to avoid sliding contact of the wings with the edges of the strap 1. On said pins or bolts outside the ears are adjustably supported angle iron strips forming outstanding lips 19 which are used only when the guides G are employed.

The foot-controlled brake mechanism includes means for drawing the shoes into gripping contact with the straps by spring pressure, and a pedal on the platform connected with such means whereby it may be overcome by the passenger at will. A pin 20 connects one pair of wings 18 and passes through the outer end of a short loop 21 of steel ribbon whose inner end carries a block 22. A second longer ribbon loop 23 stands in line with the first and carries a block 24 at its inner end, and a bolt 25 adjustably connects the blocks. A pin 26 connects the other pair of wings 18, and a third ribbon loop 27 leads from this pin inward. The inner end of this loop and that of the longer loop 23 are pivoted at 28 and 28' to a pendant brake lever 29 made up of twin members passing astride the lower beam 3, and the lower end of the lever is swung normally inward by a spring described below so as to apply the brakes.

The automatic brake mechanism is controlled by linkage composed of duplicate toggles spaced so that they stand and work outside the beams 2 and 3 and the foot brake mechanism already described, although they apply the same brake shoes 7. It will not be necessary to describe both toggles, except where they are connected, but each link of each toggle is in two parts (in length about three to one) connected by a knuckle joint as will be seen. Through the slots 17 and 17' extend bolts 37 on which are pivoted the outer ends of the outer parts 30, each having a depending knuckle 30' at its inner end. To this part at 32 is pivoted the inner part 33 having a depending knuckle 33' at its outer end adapted to contact with the knuckle 30' when these two parts aline and therefore constitute one link. The inner end of this two-part link is pivoted at 35 to a crown 36 which constitutes the intermediate pivot of the toggle, and the latter is supported by the two arms of a fork 31 mounted at their lower ends on the pivots 32 and converging upward to a block 38 which has pivots 39 for the forks (one on each side) and which is carried at the end of the cable C. A stout contractile emergency spring 34 connects the inner knuckles 33' and, when the cable C parts and the weight of the car is no longer sustained by the fork 31, this spring knuckles the parts of both toggle links on their joints 32 and instantly applies the brakes. When all parts of the toggle stand horizontal, its bolts 37 are at the outer ends of the slots 17 and the inner ends of the slots 17' and the foot brake may be operated at will; when the toggles are deflected out of a straight line, they draw the bolts inward and apply the brakes—the pivots 28 and 28' moving in their respective loops to permit—and therefore one brake mechanism does not interfere with the action of the other and either or both may be operated to apply the shoes and check the movement of the car.

Yokes of substantially A-shape are supported at their angles by the crown 36 and include bars 41 diverging downward therefrom on opposite sides of the lower beam, horizontal truss bars 40 connecting them in pairs near their lower ends, and upright strut bars 42 connecting the centers of the horizontal bars with the angles at the top. The lower ends of the respective yokes are connected to each other by blocks 43 underlying the beam 3, and also carry lateral ears 44. To the latter are pivoted upright links 45 which are pivoted at their upper ends to the inner ends of crank arms 46 projecting rigidly inward from tubular shafts 47 which I call "bails." and bolts 48 are mounted in the ends of these bails and may be projected normally outward by springs into sockets 49 in the lower ears 12 of the shoes. This structure constitutes a hinge connection between the shoes and yokes, keeping the carriage and head in vertical alinement and running free on the steel straps while yet permitting a certain vertical movement between them, and the bails serve as overhead handles in a manner yet to be explained.

The car platform P is made up of an I beam 50, right-angular brackets 51 bolted to its web and outstanding therefrom, joists 52 connecting the outer arms of the

brackets, and a flooring 54 overlying the joists; and from the I-beam near its ends rise uprights or pipes 53 which are connected with the blocks 43 at the ends of the yokes above described. Each extremity of the I-beam carries a casting having outstanding lips 55 traveling against the sides of the guide G, with space for the steel strap, and rollers 58 pivoted at 59 on the castings run on the edges of said strap.

The hand rope R in its passage through the carriage is by preference given a compound or S-bend so that there shall always be a stretch on which the operator may draw downward to ascend or descend, as it is easier to do so, than to draw upward. To give it this bend two pulleys are employed, and these are carried by the head rather than by the carriage for a reason which will appear. As shown herein, an upper pulley 60 is journaled in the forked upper end of a bracket 61 mounted on the upper beam 2. The lower beam 3 carries a second bracket or casting 62 made tubular at its lower end, and in this end by a set screw 63 or otherwise is adjustably mounted a pipe or hanger 64 having a slot in which is journaled a lower pulley 65, preferably set in a plane at right angles to the upper pulley. The rope R passing down is preferably led first under the lower pulley, then carried up and led over the upper pulley, and finally again down and through the platform; hence whichever way the carriage is to be moved, the operator has a stretch of rope on which he can draw downward. The pipe and lower pulley are adjusted from time to time to take up slack in the rope.

From a floor plate 66 fast on the platform rise two rods 67 over one of which the lower end of the pipe 64 may be telescopically mounted, whereby this rod will steady the lower end of the pipe when the passenger is pulling on the rope; the other rod might serve as a support for the weights B if they are rings. As shown herein a lever 69 is pivoted at 68 to the rods and forms the pedal for the foot brake near the flooring on the platform.

The lower beam 3 carries at about its center a bracket 70, and between depending ears thereon at 71 is pivoted a finger 72 whose lower end is movable between the truss bars 40 of the yokes. Fastened rigidly between these bars at a point just out of alinement with the pivot of the finger is a block 73, and the parts are of such size and disposition that the free end of the finger may not swing over the block while the toggle is broken upward; but when it does, upward movement of the block and yokes is impossible, and the brakes may not be applied by the toggle.

Between other depending ears on said bracket at 74 is pivoted the upper end of an internally threaded tube 75, a leaf spring 76 in the bracket bearing on said upper end to hold the tube either horizontal and along the lower edge of the beam 3 out of the way when it is not to be used, or vertical and depending between the truss bars 40 of the yokes when it is to be used. In the event that the manlift is overloaded and it is desired to oppose the tendency of the load to break the toggles downward, a screw 77 is inserted into the lower end of the threaded tube and run upward therein by turning its crank handle 77′, a shoulder and washer 77″ at the base of the screw thereby putting tension on a powerful spring 78 which surrounds the tube 75. The upper end of this spring contacts with the upper end of a sleeve 79 which is closed except for an opening sliding upon the tube 75 and the sleeve has a flange 79′ which underlies the yoke bars 40. Therefore the passenger by turning the screw can apply any amount of spring tension desired or necessary to offset the overload. When not in use, this emergency screw can be withdrawn from the tube and laid aside within the carriage, or run into a hole provided for it in one of the castings or brackets, as 100, but it should be ever within reach of an adult standing on the platform.

Pivoted to the free end of the finger 72 is one end of a channeled link 80 which leads thence over a bridge 81 within the casting 62 and has hooks or stops 82 82′ to limit its movement thereover, and the other end of the link is pivoted to the lower end of a rocker 83 which has ribs 83′ for guiding it in its movements within the casting. The upper end of the rocker is pivotally connected by a link 84 of inverted U-shape with the lower ends of the twin foot brake levers 29, and also by a contractile spring 85 with the finger 72. The rocker has a rigid tongue 86 continuing the curvature of the ribs but narrower so as to leave shoulders 83″ at their rear ends which are adapted to coact with stops or shoulders 62″ within the casting, and attached to said tongue is a steel tape 87 leading thence down to a collar 88 slidably mounted on the hanger 64, while links or tapes 89 lead from said collar downward to the pedal or stirrup. Thus pressure on the latter by a passenger will first move the lower end of the rocker and the link 80 inward and set the finger over the block, and then, when the outer stop 82′ strikes the bridge 81, will move the upper end of the rocker outward (the shoulders 83″ now clearing the stops 62″) and draw on the link 84, overcome the spring 85, and release the foot brake.

With the above construction, let us assume that the counterweight will balance the weight of the car and a passenger weighing

125 pounds—that being the mean average between 100 and 150. A passenger weighing less than 100 pounds we will call underweight, and one over 150 pounds overweight. Weights B may be provided on the landing at the main floor, or made accessible for children and underweight adults who can be trusted to use the device. Normally and at rest the manlift stands with the parts as seen in Fig. 1, the brakes being applied both by the action of the spring 85 on the brake lever 29, and by the fact that the counterweight drawing upward on the toggle link pivots 32 (while their outer ends are clamped to the straps 1 and their inner ends support the empty carriage) breaks the toggle upward at its center. Tendency to "creep" upward in case the building is vibrated by machinery is successfully resisted, and the car remains at rest. A prospective passenger approaches, to go either up or down, and his operation of the device will depend upon whether he is of average weight, underweight, or overweight.

If within the average, conditions are normal; if he is a little light, he may carry a load or may add one or two weights B. When he steps on the platform, the toggle straightens out as the carriage descends a little with respect to the head, but the brakes are yet applied by the spring 85 and the car does not move. He puts his foot on the stirrup and bears downward, with the result first that the lower end of the rocker moves inward and swings the finger over the block, and next that the upper end of the rocker moves outward and the foot brake is eased off to an extent depending on the pressure he applies. If the passenger is above the mean average and, with the carriage, overbalances the counterweight, he may now descend at a speed regulated by his control of the brake; but to ascend, he must pull on the rope R "hand over hand" while still holding the foot brake released. If he is below the mean average, he may ascend in the same way or descend by using the rope. Arrived at the desired floor, he releases the stirrup and the foot brake is immediately applied automatically and the car comes to rest, the finger also swinging away from above the block; he steps off at the landing, and the toggle breaks upward so that the parts resume the position shown in Fig. 1.

If the prospective passenger is underweight beyond possibility of correction by adding weights B as suggested, or if the owner does not consider it wise to provide such weights, it may be assumed that such would-be passenger is a child. As such he cannot throw off the foot brake, because the finger may not be moved over the block and the lower end of the rocker toward the center to permit the shoulders 83″ to pass the stops 62″ until the toggle is straightened; and he is not tall enough to reach the bails, with results yet to be explained—therefore the abnormally underweight person cannot operate the manlift.

If the prospective passenger is overweight, when he steps on the platform the toggle not only straightens out but continues onward and breaks downward at the center. He operates the stirrup as above described to set the finger and release the foot brake, and if he is but little overweight his pressure on the stirrup may relieve the carriage of sufficient load to permit the toggle to straighten out and the car to move; if not, he may have to use the rope. But if he is so heavy that this expedient does not permit the car to move, he still has the choice of three methods of descent, viz: If the distance down is great, he may use the emergency screw to relieve the center of the toggle of its excess relative weight, sufficient to permit the brakes to slip, and control his speed by the foot brake. Or, he may pull down hand over hand on the middle stretch of the rope R, thus sufficiently relieving the brakes to permit them to slip and follow his pull downward. Or, he may support part of his weight by the bails, and use the foot brake in the usual manner. The extra heavy man wishing to ascend may, of course, use the rope R hand over hand if he have the strength, and as soon as he thus relieves the platform of sufficient weight the toggle will straighten out and permit the car to ascend when the foot brake is thrown off. But I might suggest that an ascent is usually made from the main or ground floor, and where the manlift is to be used by an extra overweight passenger (or some lighter person carrying a load, or perhaps two passengers) provision must be made accordingly. This can most readily be done by increasing the counterweight, and adding weights B to the platform to remain there for the average and underweight person, so that the overweight passenger to ascend from the main floor has but to first remove a few weights B. On the return trip he descends with the same ease with which he made the ascent, since removal of weights B from the platform put him in the "average" class; and, before leaving the manlift at the main floor, he should restore the weights B removed and thus leave the device in condition for use by others as described above.

If the cable C should break or burn off or the weight W become detached, whether the lift is idle or loaded, moving or at rest, the emergency spring 34 immediately knuckles the links of the toggles downward at their pivots 32 and automatically applies the brakes; the shoes cease to descend but the crown continues to do so, and the weight of the car (with its load if it have one) quickly knuckles the toggle downward at its center

so that the car comes to rest and accident is avoided. If there be a passenger aboard, he now uses the emergency screw 77 and applies the tension of its spring gradually to ease the load off the center of the toggle, and then manipulates the foot brake to control his descent to safety.

In Fig. 8 is shown a modified form of the toggle whereof each link is made up of an outer part 30^a and an inner part 33^a pivotally connected at 32^a, and the knuckle takes the shape of a finger 31^a on the outer part underlying the inner when the parts are alined. 35^a are the inner pivots connecting with the crown as above, 37^a are the bolts in the lapping slots, and a single spring 34^a leads downward from the fingers. The action of this toggle is the same as that of the other.

What is claimed as new is:

1. In a manlift, the combination with a car including a head and a carriage traveling on the shaft guides; of a weight substantially counterbalancing the car and a passenger, brake mechanism in the head coacting with said guides, connections between it and the weight for applying the brakes when the carriage has no passenger, and connections between said mechanism and the carriage whereby the weight of the passenger releases the brakes.

2. Claim 1 plus: passenger actuated means for moving the car.

3. Claim 1 plus: passenger operated means for controlling the brakes after they have been released by said mechanism.

4. Claim 1 plus: passenger actuated means for moving the car, and passenger operated means for controlling the brakes after they have been released by said mechanism.

5. Claim 1 plus: means whereby the passenger may manually move the car in one direction and control its movement in the other direction.

6. Claim 1 plus: a second mechanism in the head automatically applying the brakes independently of the first, and passenger operated means for easing off said second mechanism at will.

7. In a manlift, the combination with a car including a head and a carriage traveling on the shaft guides, a weight substantially counterbalancing the car and the average passenger, and a cable leading from the weight; of brake shoes in the head coacting with said guides, a toggle connecting them, said cable being branched and attached to the links of the toggle for breaking it upward and applying the shoes when the car has no passenger, and connections between the center of the toggle and the carriage whereby the weight of the passenger will straighten out the toggle and release the brakes.

8. Claim 7 plus: means whereby the underweight passenger may increase his effective weight.

9. Claim 7 plus: means whereby the overweight passenger may sustain part of his weight direct from the head.

10. Claim 7 plus: an operating rope fixed in the shaft and leading through the car.

11. Claim 7 plus: a spring-actuated lever in the head for applying the brakes independently of the toggle, and means on the carriage connected with said lever whereby the passenger may ease off this brake at will.

12. Claim 7 plus: means whereby the toggle breaks downward and applies said shoes when the cable parts.

13. In a manlift, the combination with a car including a head and a carriage, upright straps in the shaft, jaws on the head traveling along said straps, and shoes on the head facing the respective jaws; of a toggle connecting said shoes, a counterweight, a cable leading therefrom and branched and attached to the links of the toggle, and a yoke whose arms support said carriage and whose center is connected with the intermediate pivot of the toggle.

14. In a manlift, the combination with a car including a head and a carriage, upright straps in the shaft, and fixed and movable elements on the head traveling astride the respective straps; of a toggle whereof each link is in two parts connected by a knuckle joint, the outer ends of the outer parts being pivoted to said movable elements, a cable branched from said knuckle joints and leading to a counterweight, a spring tending to break said joints downward, and means for supporting the carriage from the central pivot of the toggle.

15. In a manlift, the combination with spaced upright straps in the shaft, jaws traveling along their inner faces, beams rigidly connecting the jaws, and shoes traveling along the outer faces of the straps opposite the respective jaws and having wings provided with slots; of bolts through the slots, a toggle whose links are mounted at their outer ends on said bolts, a counterweight, a cable leading therefrom and branched and attached to the links between their ends, means for supporting a carriage from the inner ends of said links whereby the weight of a passenger straightens out said toggle, a brake lever, connections between it and said wings, and means whereby the passenger may control the action of this lever.

16. In a manlift, the combination with spaced upright straps in the shaft, jaws traveling along their inner faces and having wings provided with slots, beams rigidly connecting the jaws, and shoes traveling along the outer faces of the straps and having wings provided with slots lapping

those mentioned; of bolts through the lapping slots, a toggle whose links are mounted at their outer ends on said bolts, a counterweight, a cable leading therefrom and branched and attached to the links between their ends, means for supporting a carriage from the inner ends of said links whereby the weight of a passenger straightens out the toggle, a brake lever, connections between it and said shoe wings, a spring swinging the lever to apply the brakes irrespective of said toggle, a pedal on the carriage, and connections between it and the lever whereby the passenger may overcome the spring and ease off the brakes at will.

17. In a manlift, the combination with spaced upright straps in the shaft, jaws traveling along their inner faces and rigidly connected with each other, brake shoes traveling along the outer faces of the straps opposite the jaws, toggle mechanism connecting the shoes, a counterweight, a cable leading therefrom to the mechanism, means normally breaking the toggle upward and applying the brakes, a carriage supported by said mechanism, and means whereby the weight of a passenger on the carriage straightens out such toggle and releases the brakes; of spring-actuated means for applying the shoes when released by said mechanism, and means controlled by the passenger for overcoming the spring and easing off the brakes at will.

18. In a manlift, the combination with a head, brake shoes therein for application to guides in the shaft, a toggle connecting the shoes and releasing the brakes only when its links are alined, a cable leading from the toggle, and a weight attached to the cable and substantially counterbalancing the car and a passenger; of an A-shaped yoke supported at its angle by the intermediate pivot of the toggle and having a lateral truss bar, supports depending from its divergent bars, and a carriage connected with said supports and sustained by the head through said yoke and toggle.

19. Claim 18 plus: passenger operated means for preventing the toggle from breaking upward.

20. Claim 18 plus: a block on said truss bar, a finger pivoted to the head, and passenger operated means for swinging the finger over the block to prevent the toggle from breaking upward.

21. Claim 18 plus: members on said head and truss bar, a rocker movably mounted on the head and connected with one of said members, a second brake mechanism connected with said rocker, and passenger actuated means for moving the rocker to first aline said members and prevent the toggle from breaking upward and then to control said second brake mechanism at will.

22. Claim 18 plus: means operable by the passenger for forcing said truss bar toward the head to straighten the toggle and release the brakes after such toggle has broken.

23. Claim 18 plus: a threaded tube pendant from the head, a screw therefor having a handle at its lower end, and an emergency spring put under tension by setting the screw in the tube and exerting upward pressure on said truss bar, for the purpose set forth.

24. Claim 18 plus: passenger operated means for preventing the toggle from breaking in one direction to apply the brakes, and means for causing it to break in the other direction when the cable parts and automatically apply the brakes irrespective on the setting of said passenger operated means.

25. Claim 18 plus: each toggle link being in two parts connected by a knuckle joint capable of breaking downward only and the cable being branched and connected with such joints, a spring for breaking such joints when the cable parts, and passenger operated means for preventing the rise of the intermediate pivot of the toggle.

26. Claim 18 plus: a beam in the head, a bracket depending from the beam, a finger pivoted to the bracket and hanging alongside said truss bar, a block on the latter over which the lower end of the finger may pass when the toggle is straight, a spring drawing the finger away from the block, a link pivoted to the finger, a pedal on said carriage, and connections between the pedal and link whereby the passenger may project the link and swing the finger over the block, as described.

27. In a manlift, a head including shoes traveling on guides in the shaft and provided with ears, shafts journaled in opposite ears and each having a pair of crank arms, links pivoted to and pendant from the four crank arms, and blocks pivoted between the lower ends of the links adjacent each guide; combined with supports depending from the blocks, a platform carried by the supports and having lips also traveling on said guides, and means rising from said blocks for sustaining them from the head and permitting relative vertical movements of the head and platform.

28. Claim 27 plus: straps fixed in the shaft, anti-friction devices therefor in said shoes and lips, brake mechanism in the head, and means on the platform for controlling its application to said straps.

29. Claim 27 plus: a rod rising from the platform, a pipe depending from the head and slidably engaging said rod, pulleys carried by the pipe and by the head, and an operating rope fixed at its ends in the shaft and leading through the manlift wherein it makes an S-bend over said pulleys.

30. In a manlift, the combination with a car comprising a head and a carriage movably connected and traveling on guides in the shaft, brake mechanism in the head for application to said guides by the rise or descent of the carriage with respect to the head, a cable leading from a weight substantially counterbalancing the car and a passenger, and connections between said cable and mechanism for releasing the brakes; of a second brake mechanism in the head, a spring for applying it, and means for overcoming said spring including a flexible element leading down to the carriage whereby the passenger may put tension on said element and also sustain part of his weight from the head.

31. Claim 30 plus: an operating rope fixed in the shaft and leading through the manlift, and pulleys carried by the head for giving the rope an S-bend within the carriage whereby the passenger may manipulate a selected stretch thereof to move the car and also correspondingly alter his weight on the carriage.

32. Claim 30 plus: bails on the head within reach of an adult passenger standing on the platform whereby he may sustain part of his weight from the head.

33. Claim 30 plus: extra weights at certain shaft landings which the passenger may place on the carriage to increase his effective weight.

34. Claim 30 plus: emergency screw mechanism within the car within reach of an adult passenger whereby he may raise the carriage and himself with respect to the head.

35. The combination with a casting having an opening with spaced stops at one end thereof, a bridge across said opening, a link leading into the other end thereof over said bridge and having spaced stops astride such bridge to limit the movements of the link, and a second link above the first; of a rocker within the opening pivoted to both links and having a rib struck on an arc around the lower pivot and continued in a narrower tongue in the same arc passing between said stops, the shoulder between the tongue and rib striking said stops when the lower link is in one position and sliding off them to move it to the other position, and the rocker then turning on its lower pivot to move the upper link, and mechanism for swinging the rocker.

36. Claim 35 plus: instrumentalities connected with the respective links to be actuated separately, and means for manual actuation of the swinging mechanism to the desired extent.

37. Claim 35 plus: said swinging mechanism comprising a flexible element extending over and attached to the tongue and a pedal for applying tension to said element.

38. Claim 35 plus: a hanger depending from said casting, and a collar slidable thereon, said swinging mechanism including a tape extending over and attached to the tongue and leading downward to such collar, a second tape leading from the collar downward, and means for manually applying tension to such second tape.

39. In an elevator, the combination with a head traveling on the shaft guides, and supports depending therefrom; of a platform comprising an I-beam connected with said supports, castings at the ends thereof having lips traveling on said guides, brackets bolted to the web of the beam and outstanding from its opposite sides, joists connecting the outer arms of the brackets, and a flooring overlying the joists.

40. In a manlift, the combination with a car including a head and a carriage traveling on the shaft guides, a weight substantially counterbalancing the car and the average passenger, and a cable leading from the weight; of brakes in the head coacting with said guides, mechanism connecting the brakes and cable, connections between said mechanism and carriage whereby the brakes are automatically released by the weight of the average passenger and automatically applied under all other conditions, and means whereby the underweight or overweight passenger may bring his effective weight to average.

41. In a manlift, the combination with a car including a head and a carriage traveling on the shaft guides, a weight substantially counterbalancing the car and the average passenger, and a cable leading from the weight; of brake shoes in the head coacting with said guides, link mechanism connecting the shoes, said cable being attached to the links, connections between the links and carriage whereby the brakes are automatically released by the weight of the average passenger and automatically applied when the carriage has no load or has an underweight or overweight passenger, and means whereby the first may increase and the second may decrease his effective weight to average, and release said brakes.

In testimony whereof I hereto affix my signature.

CHARLES H. MILLER.