No. 894,418. PATENTED JULY 28, 1908.

J. BAUM.

ELEVATOR MECHANISM.

APPLICATION FILED JAN. 11, 1908

3 SHEETS—SHEET 1.

Fig. 3.

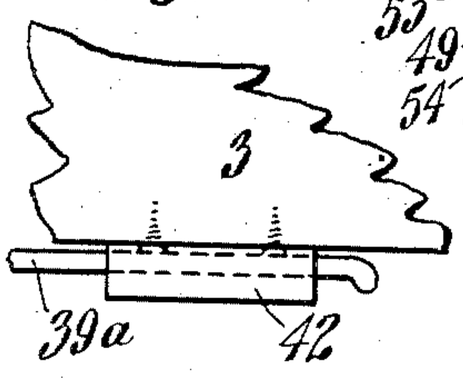


Fig. 4.

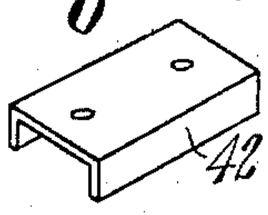
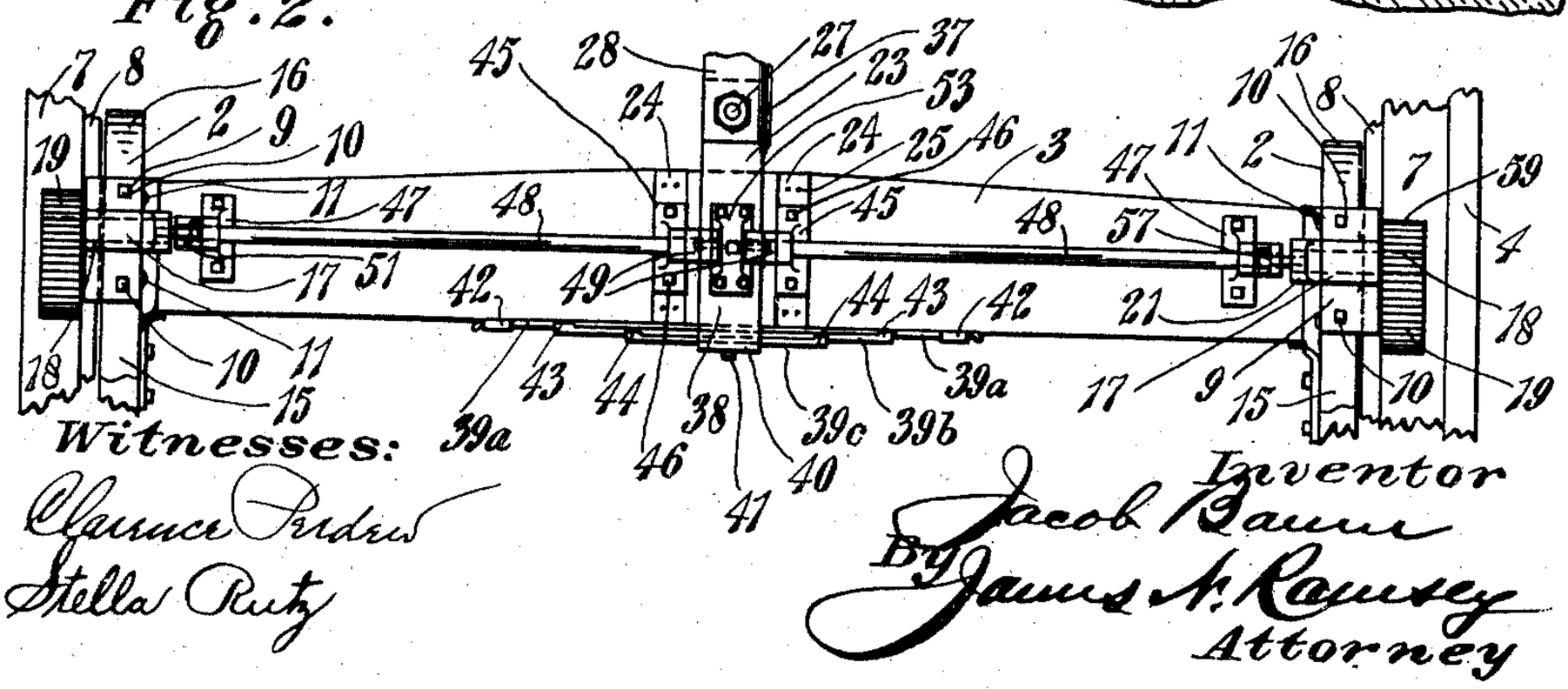


Fig. 1.

Fig. 2.



Witnesses:

Clarence Prideaux

Stella Ruth

Inventor

Jacob Baum

By James N. Rowsey

Attorney

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ELEVATOR MECHANISM.

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3 SHEETS—SHEET 2.

Fig. 7.

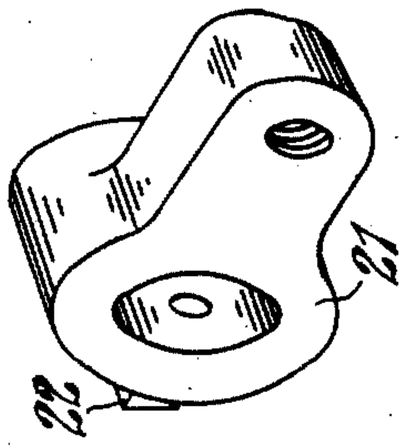


Fig. 6.

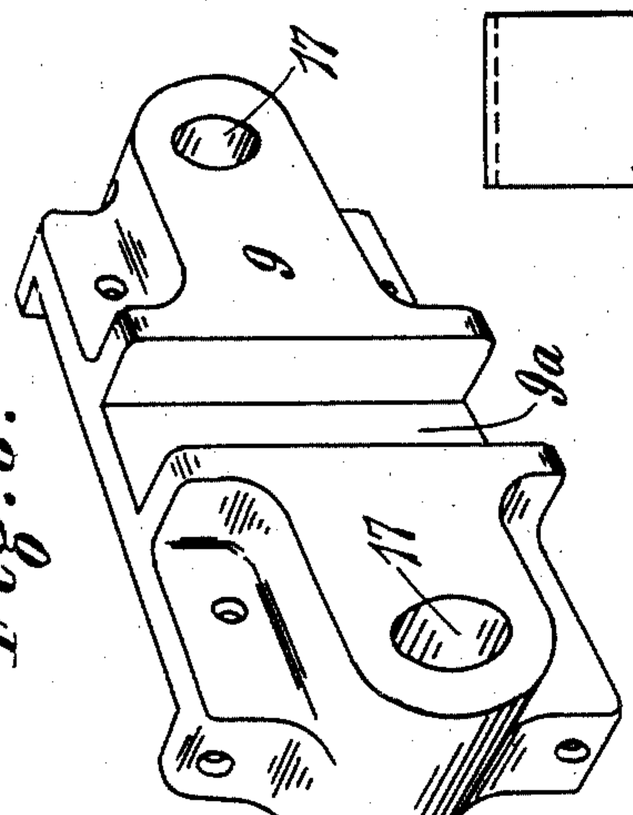
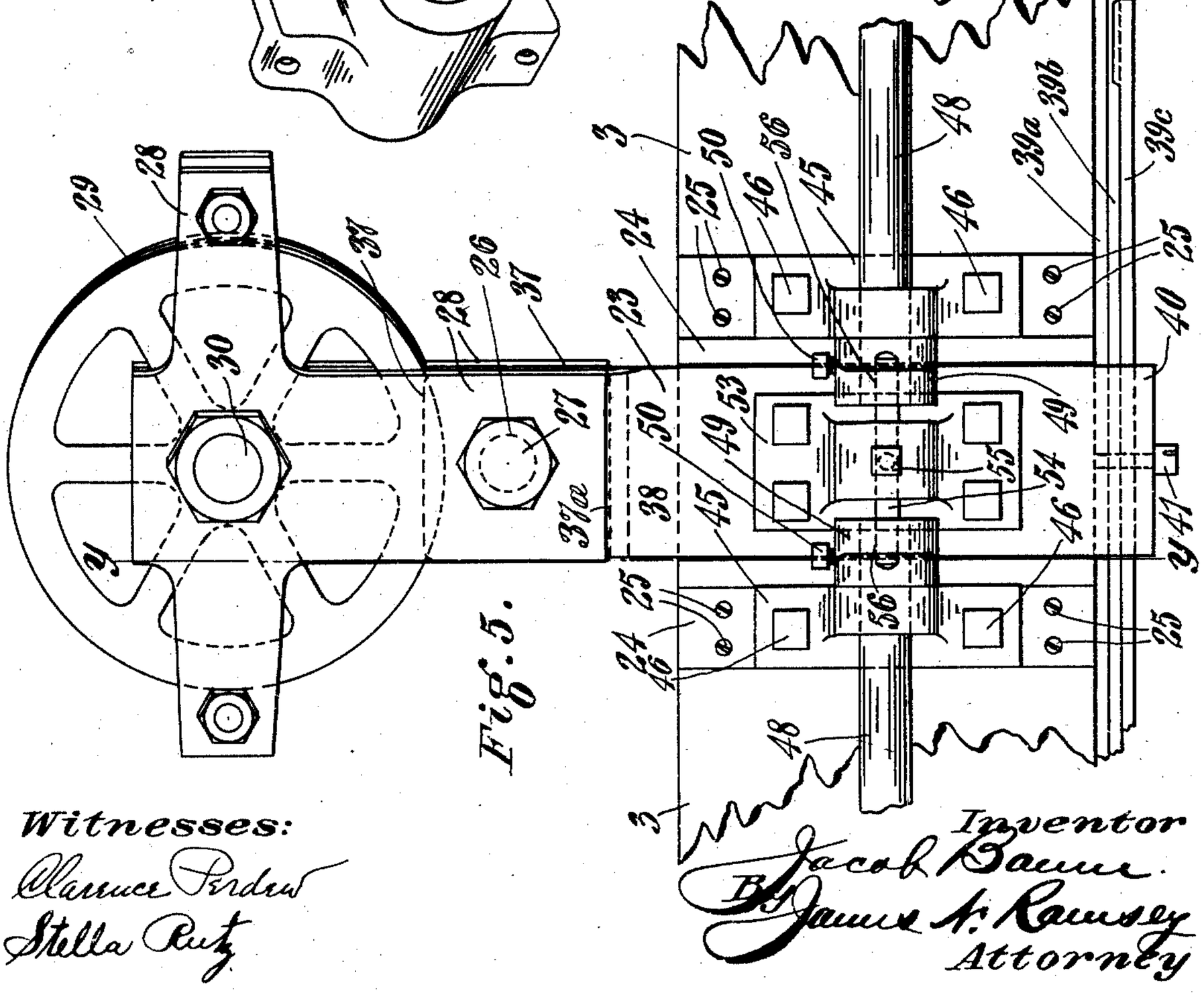


Fig. 5.



Witnesses:

Clarence Perdew

Stella Rutz

Inventor

Jacob Baum.

By James F. Ramsey

Attorney

No. 894,418. PATENTED JULY 28, 1908.

J. BAUM.

ELEVATOR MECHANISM.

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3 SHEETS—SHEET 3.

Fig. 8.

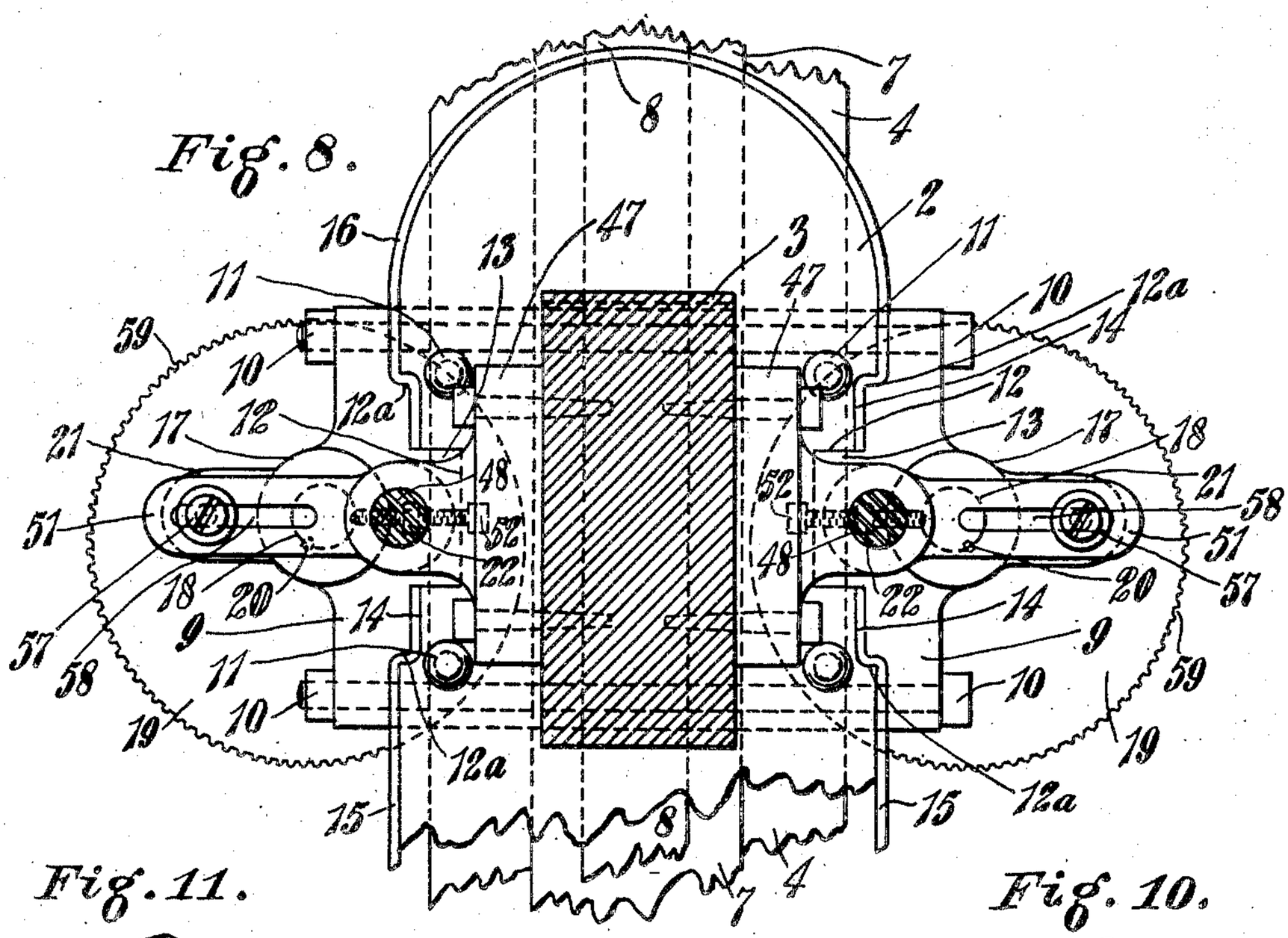


Fig. 11.

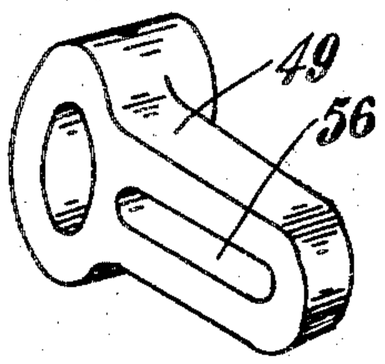


Fig. 10.

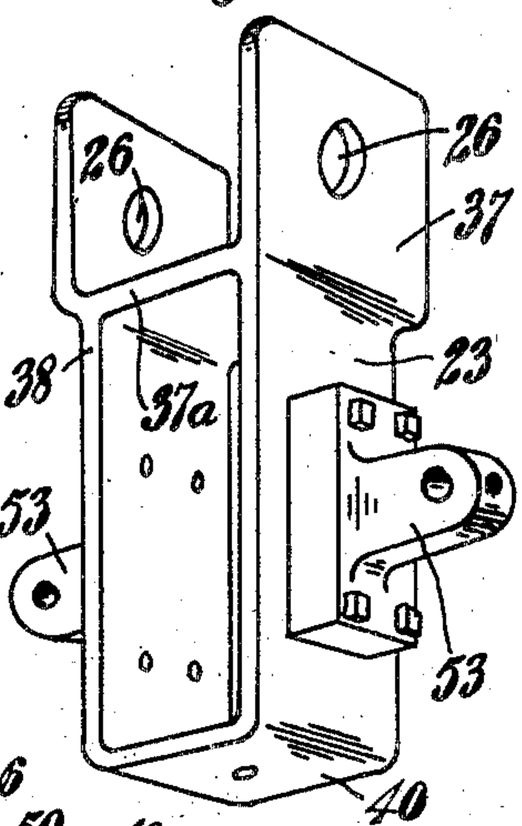


Fig. 9.

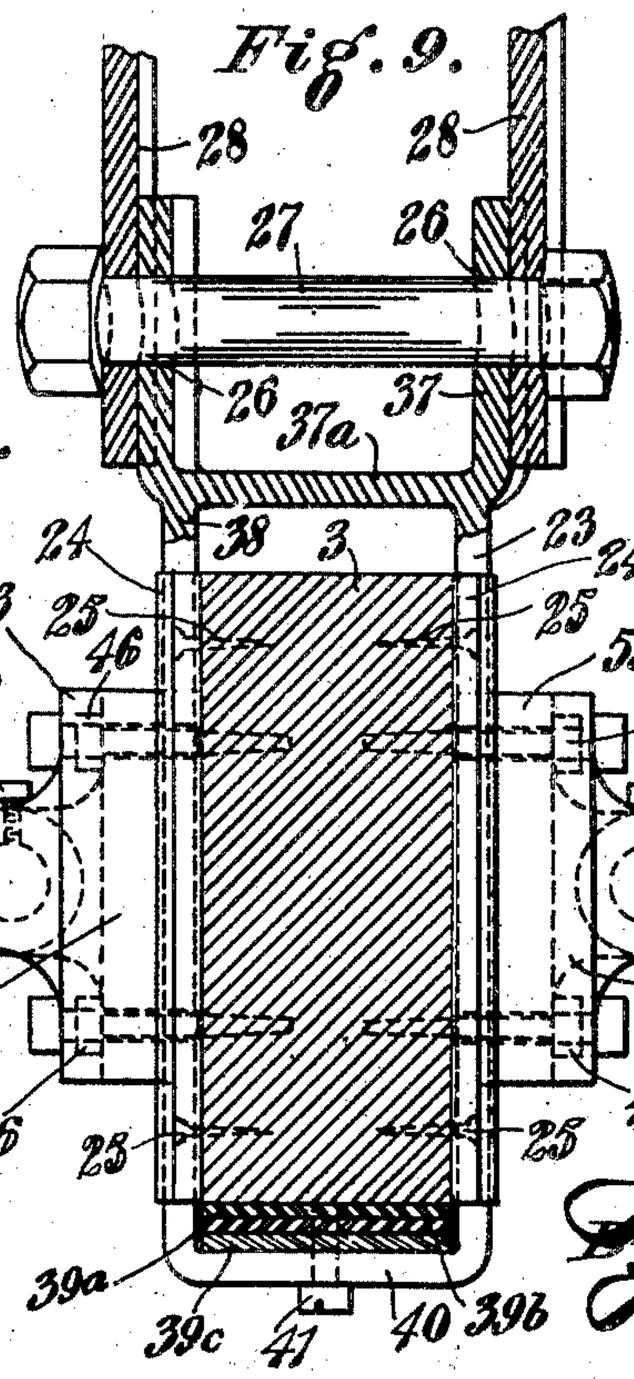
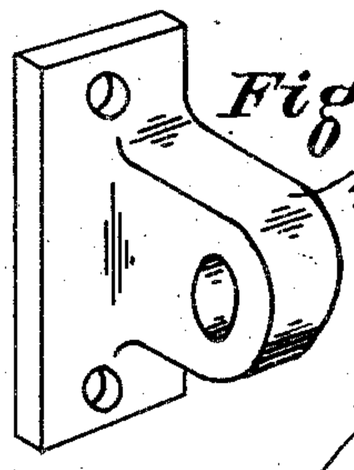


Fig. 12.



Witnesses:

Clarence Perdew

Stella Ruth

Inventor

Jacob Baum

By James F. Ramsey

Attorney

UNITED STATES PATENT OFFICE.

JACOB BAUM, OF CINCINNATI, OHIO.

ELEVATOR MECHANISM.

No. 894,418. Specification of Letters Patent. Patented July 28, 1908.

Application filed January 11, 1908. Serial No. 410,327.

To all whom it may concern:

Be it known that I, JACOB BAUM, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Elevator Mechanisms, of which the following is a specification.

My invention relates to hoisting apparatus, and the object is to provide an elevator car with supporting mechanism that is simple and effective and adapted to insure the car against falling in case of breakage of the cable.

My invention consists in the elevator mechanisms herein set forth and claimed.

In the drawings: Figure 1 is a plan view of part of an elevator car embodying my invention, this view serving, as well, to illustrate the arrangement of the overhead supporting mechanism for the cables. Fig. 2 is a side elevation of part of the upper frame work of the car and the vertical guides, this view serving to illustrate the application of the spring to actuate the supporting head downwardly, as will hereinafter be more fully described. Fig. 3 is a detail view of part of the beam illustrating the application of one of the spring holding plates, and Fig. 4 is a detail perspective view of one of the spring holding plates. Fig. 5 is a side elevation of the supporting head, eccentric and connecting mechanism, parts being broken away for lack of space. Fig. 6 is a detail perspective view of the combined guide and bearing block. Fig. 7 is a detail perspective view of the crank for the inner end of the eccentric shaft. Fig. 8 is a cross section on a line corresponding to x—x of Fig. 5. Fig. 9 is a cross section on a line corresponding to y—y of Fig. 5, excepting that the upper part of the supporting head and parts of the yoke attached thereto are shown in the section on a line extending vertically through the centers of the sheave shaft and connecting bolt. Fig. 10 is a detail perspective view of the supporting head with the pin block attached thereto. Fig. 11 is a detail perspective view of one of the slotted rings, and Fig. 12 is a detail perspective view of one of the bearing blocks for the mechanism for operatively connecting the supporting head with the eccentric.

My invention is illustrated as applied to an ordinary freight elevator car, of which part of the floor is shown at 1 in Fig. 1 of the drawings, this car being provided with upright posts 2, the upper parts of which are connected by a transverse beam 3, as is usual in the construction of such elevator cars. The stringer 4 is secured to the wall 5 of the elevator shaft in a vertical position by suitable means, such as the bolts 6. A rail 7 is secured to this stringer in the middle thereof, and upon this rail 7 a guide rail 8 is secured, both the rail 7 and the guide rail 8, as well as the stringer 4, running the full length of the travel of the elevator car. The combined guide and bearing block 9 is secured on the post 2 of the car by means of bolts 10 passing through the post from edge to edge, and by means of bolts 11 passing through the post from side to side at right angles to the bolts 10. In addition to these two sets of bolts, the post 2 is provided with recesses 12 in its edges, into which take the lugs 13 of the guide and bearing block. Other recesses 14 are provided in the edges of the post 2 adjacent to the recesses 12, and the ends of the braces 15, as well as the ends of the strap 16, are suitably bent to take into these recesses 14, while the guide and bearing block 9 is provided with additional shoulders or offsets 12^a adapted to bear against the braces 15 and strap 16. This arrangement of recesses and lugs and shoulders constitute the preferred construction, and is adapted, in connection with the arrangement of the double set of bolts, to attach the combination guide and bearing block securely to the post so as to efficiently resist the strain imposed in the operation of the eccentrics, as will hereinafter be described. The braces 15 are additionally secured to the post 2 and to other parts of the car, the details of which are not illustrated in the drawings since they form no part of my invention. The straps 16 are adapted to reinforce and protect the upper end of the post 2. In the middle of the combination guide and bearing block 9, outside the post 2, is provided the vertical guide way 9^a, adapted to receive the guide rail 8, and at the sides of the post, the guide and bearing block 9 is provided with the horizontal bearings 17, in which are journaled the eccentric shafts 18. On the outer ends of the eccentric shafts 18 the eccentrics 19 are mounted and rigidly secured by means of the keys 20. On the inner ends of the eccentric shafts are the cranks 21 rigidly secured to the shafts by means of set screws 22.

As illustrated in Fig. 2, a set of the above described mechanisms is provided on each one of the posts 2 of the elevator car, and a

rail and a guide rail 7 and 8, respectively, are provided at each side of the elevator shaft.

It should be understood that while I have herein shown and described the guide rail 8 mounted on the rail 7, the guide way 9[a] of the guide block 9 being adapted to coöperate with the guide rail 8, and the rail being adapted to be engaged by the eccentrics in their operation to prevent the falling of the car, the rail 7 might be continued past the inner sides of the eccentrics 19 so as to enter the guide way of the guide block, and even the stringer 4 might be dispensed with by bolting the rail 7 directly to the wall of the elevator shaft, in which case the rail 7 would be made to serve the purpose of the stringer, rail and guide rail herein shown and described. However, I prefer to provide the guide rail 8 in addition to the rail 7, and of smaller cross section than the rail 7, since such a guide rail is of sufficient size to serve for guiding the car in its vertical movement, while it is desirable to provide the somewhat heavier rail 7 for the engagement of the eccentrics 19, since, in the operation of the eccentrics, this rail 7 would be required to support the entire weight of the car and contents. It is also desirable to provide the stringer 4 of greater width than the rail 7 to form secure means for attaching to the wall 5 of the elevator shaft.

Midway of the beam 3, the supporting head 23 embraces the beam 3 and is maintained in position for sliding vertically by means of guide plates 24 suitably attached to the beam 3, such as by screws 25. This supporting head 23 is provided with openings 26 in its upper part, through which the connecting bolt 27 may pass, for pivotally securing to this supporting head 23 the yoke 28, which is composed of two side members between which are journaled the sheaves 29 on the bolt 30. These sheaves 29 are adapted to receive the cables 31, the free ends of which are secured to heads 32 suspended on the pin 33 which is supported at the top of the elevator shaft on beams 34. These cables 31 pass under the sheaves 29, then pass upward over sheaves 35 journaled in suitable bearings on the beams 34, then passing over the sheaves 36 journaled in bearings likewise mounted on the beams 34 at the side of the elevator shaft, from which sheaves the cables 31 pass downward to suitable mechanism for raising and lowering the elevator car, not herein shown, since it does not constitute part of my invention.

As is usual in the construction of elevators, the beams 34 are placed across the elevator shaft at an angle to the walls thereof, so that the cables 31 will pass downward adjacent to the walls of the elevator shaft without interfering with the stringer 4 and rail 7 and guide rail 8. As a consequence of this construction, the sheaves are also placed at an angle to the walls of the elevator shaft and to the beam 3 of the elevator car. In order to compensate for the angle, I construct the supporting head 23 with its upper part 37 at an angle to its lower part 38, as is best illustrated in Fig. 10 of the drawings. This allows the sheaves 29 to assume positions parallel to the sheaves 35 and sheaves 36 at the top of the elevator shaft, and avoids twisting of the cables during their operation, thus lessening the wear on the cables as well as the friction in the operation of the elevator. The supporting head 23 is preferably provided with a transverse rib 37[a] above the beam 3 and of a sufficient distance therefrom to allow the proper vertical motion of the supporting head 23 with respect to the beam 3. A series of flat springs 39[a], 39[b], and 39[c] are interposed below the beam 3 between it and the lower transverse part 40 of the supporting head 23, these springs being so formed as to tend to force the supporting head 23 downward with respect to the beam 3, but this tendency being counteracted by the tension of the cables 31 when the car is suspended by them and the supporting head 23. Preferably, a screw 41 takes through the transverse part 40 of the supporting head 23 and through the flat springs to hold them from lengthwise displacement, and spring holding plates 42 are secured to the under edge of the beam 3 and embrace the parts of the flat spring 39[a] adjacent to its ends, thus preventing the lateral displacement of the spring. Springs 39[b] and 39[c] are provided with lugs 43 and 44 which prevent the lateral displacement of these springs by engaging with the springs 39[a] and 39[b], respectively.

A bearing block 45 is mounted on each one of the guide plates 24 and securely fastened by means of screws 46 taking into the beam 3, while a similar bearing block 47 is secured on each side of the beam 3 in a similar manner near each of the combination guide and bearing blocks. Crank shafts 48 are journaled in the bearing blocks 45 and 47, and have slotted cranks 49 rigidly secured on them adjacent to the bearing blocks 45 by means of set screws 50, while adjacent to the cranks 21, slotted cranks 51 are rigidly secured on the crank shaft 48 by means of set screws 52. A pin block 53 is rigidly mounted on the supporting head 23 at each side, and each of these pin blocks 53 has a pin 54 rigidly secured in it by means of a set screw 55 and extending laterally therefrom into the slots 56 in the slotted cranks 49. Pivot screws 57 pass through the slots 58 in the slotted cranks 51 and are screwed into the cranks 21 on the eccentric shafts 18. Thus the pin blocks 53, crank shafts 48, slotted cranks 49 and 51 and the pin 54 and pivot screw 57 constitute means for operatively connecting the supporting head 23 to the eccentrics 19 by means

of their shafts 18 and cranks 22, and the various parts are so proportioned with respect to each other that the eccentrics 19 are held away from the rails 7 when the supporting head 23 is held upward by the tension of the cables, against the force of the flat springs above described. However, should the cables break, the supporting head 23 would be moved downward by its own weight as well as by the force of the flat springs. This would rotate the slotted cranks 49 downward, and this motion being transmitted by the crank shafts 48, the slotted cranks 51 would also be rotated downward, carrying the cranks 21 downward and rotating the eccentric shafts 18 so that the eccentrics 19 are drawn inward against the rails 7, and engaging therewith, prevent the further falling of the elevator car.

As will be noted, when the eccentrics 19 have once engaged with the rails 7, all further downward pressure will have a tendency to force the eccentrics farther inward and to cause them to grip the rails 7 more tightly. It should also be noted that the normal disengaged position of each eccentric is such that if released, it will move toward the rail 7 by its own weight, while the motion of all of the cranks in the connecting mechanism, as well as that of the supporting head and the sheaves thereon, will be downward when the support of the cable is removed, so that the use of the flat springs is not absolutely necessary. However, I prefer to use the springs in connection with the gravity action above referred to, since the rapidity of operation of the device, in case of the breakage of the cable, is increased. Also, in order to increase the efficiency of the operation of the eccentrics, I prefer to nurl their peripheries 59 so that the efficiency of their frictional contact with the rail 7 will be increased. However, the nurling of the peripheries of the eccentrics 19 is not essential, since experience has shown that the eccentrics with plain peripheries will quickly and effectually engage with the rails 7, which are preferably made of wood, while the eccentrics are of metal.

As will be understood, when the eccentrics 19 engage with the rails 7 as above described, a strain will be imposed on the eccentric shafts outwardly from the posts 2, tending to shear the shafts and to rupture the bearing block 9 through the journal bearings which it forms for said eccentric shafts. To provide for this, the bearing block 9, in addition to being of heavy construction, is shaped as illustrated in the drawings, so as to most effectually resist the strains as above described, while, being bolted to the post 2 in connection with the braces 15 and strap 16, it is effectually reinforced by these parts.

By providing the slotted cranks to make up the connecting mechanism, any twisting strain which comes on the eccentric shafts 18 will not be transmitted to the shafts 48 and the slotted cranks, so that these shafts and slotted cranks may be of comparatively light construction. Likewise, slotted cranks 49 being provided for connection with the pin block on the supporting head, any twisting strains which may be imposed on this supporting head will not be transmitted to the connecting mechanism. The guide plates for the supporting head constitute a desirable feature in that they maintain the head in a practically uniform position, the accomplishment of which object is further facilitated by the pivotal connection of the yoke 28 to the head 23 by means of the pin 27. These features, together with the angularly disposed upper parts of the supporting head allowing the sheaves to be mounted at an angle and relieve the twisting strains on the cables as hereinbefore described, constitute an elevator mechanism of simple construction, dispensing with considerable friction and consequent wear in operation, as well as providing an effective device for preventing the fall of the car when the support of the cables is removed by breakage of the cables on any of the supporting parts.

The parts and the combination and arrangement of the parts as herein illustrated and described, while constituting part of my invention and being calculated to provide for the most efficient operation, will be understood as subject to such modifications as may be found expedient in the application of my invention under various conditions, so far as such modifications do not depart from the scope and spirit of my invention.

In view of this, and having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In elevator mechanism, the combination with an elevator car comprising posts and a beam connecting the posts, of stationary guides, bearings on the posts, eccentric shafts journaled in the bearings, eccentrics mounted on the eccentric shafts adjacent to the guides, a slidable supporting head for the elevator car, crank shafts extending between the supporting head and the eccentric shafts, cranks on the eccentric shafts, slotted cranks on the crank shafts, means for connecting the slotted cranks with the cranks on the eccentric shafts, and means for operatively connecting the crank shafts with the supporting head, whereby the movement of the eccentrics on the eccentric shafts is controlled, substantially as and for the purposes specified.

2. In elevator mechanism, the combination with an elevator car comprising posts and a beam connecting the posts, of stationary guides, bearings on the posts, eccentric shafts journaled in the bearings, eccentrics mounted on the eccentric shafts adjacent to

the guides, a slidable supporting head for the elevator car, crank shafts extending between the supporting head and the eccentric shafts, cranks on the eccentric shafts, slotted cranks on the crank shafts adjacent to the cranks on the eccentric shafts, and other slotted cranks on the crank shafts adjacent to the slidable supporting head, means for connecting the cranks on the eccentric shafts with the adjacent slotted cranks on the crank shafts, and means for operative connection of the other slotted cranks on the crank shafts to the slidable supporting head, substantially as and for the purposes specified.

3. In elevator mechanism, the combination with an elevator car comprising posts and a beam connecting the posts, of stationary guides, combination guide and bearing blocks mounted on the posts adapted to engage with the guides and to form bearings for eccentric shafts, eccentric shafts journaled in the bearings thus formed, eccentrics rigidly mounted on the eccentric shafts adjacent to the guides, a supporting head embracing the beam and slidable with respect thereto, crank shafts extending longitudinally of the beam, cranks on the eccentric shafts, slotted cranks on the crank shafts, means for connecting the slotted cranks with the cranks on the eccentric shafts, additional slotted cranks on the crank shafts, and means for connecting said additional slotted cranks with the supporting head whereby the movement of the eccentrics on the eccentric shafts is controlled, substantially as and for the purposes specified.

4. In elevator mechanism, the combination with an elevator car comprising posts and a beam connecting the posts, of stationary guides, a supporting head, eccentric shafts, eccentrics mounted on the eccentric shafts, means for operatively connecting the eccentrics to the supporting head, combination guide and bearing blocks mounted on the posts, having recesses within which the stationary guides may engage and forming bearings for the eccentric shafts, bolts passing at right angles to the eccentric shafts and other bolts passing parallel to the eccentric shafts through the bearing blocks and posts to secure the bearing blocks to the posts, substantially as and for the purposes specified.

5. In elevator mechanism, the combination with a car, comprising upright posts, and a beam connecting the posts, of stationary guides adjacent to the posts, a supporting head embracing the beam and slidable with respect thereto, eccentric shafts, eccentrics rigidly mounted on the eccentric shafts and adapted to engage with the stationary guides, combination guide and bearing blocks mounted on the posts, having recesses within which the guides are adapted to engage and forming bearings for the eccentric shafts, cranks mounted on the eccentric shafts, bearing blocks mounted on the beam, crank shafts journaled in the bearing blocks and extending longitudinally of the beam between the supporting head and the cranks rigidly mounted on the eccentric shafts, slotted cranks rigidly mounted on the crank shafts adjacent to the cranks on the eccentric shafts, additional slotted cranks rigidly mounted on the crank shafts adjacent to the supporting head, pin blocks rigidly mounted on the supporting head, pins rigidly secured in the pin blocks transversely thereof and engaging with said additional slotted cranks on the crank shafts, and means for connecting the cranks on the eccentric shafts to the adjacent slotted cranks on the crank shafts, whereby the eccentrics may be held out of engagement with the guides or allowed to engage therewith, substantially as and for the purposes specified.

JACOB BAUM.

Witnesses:
JAMES N. RAMSEY,
CLARENCE PERDEW