

April 7, 1925.

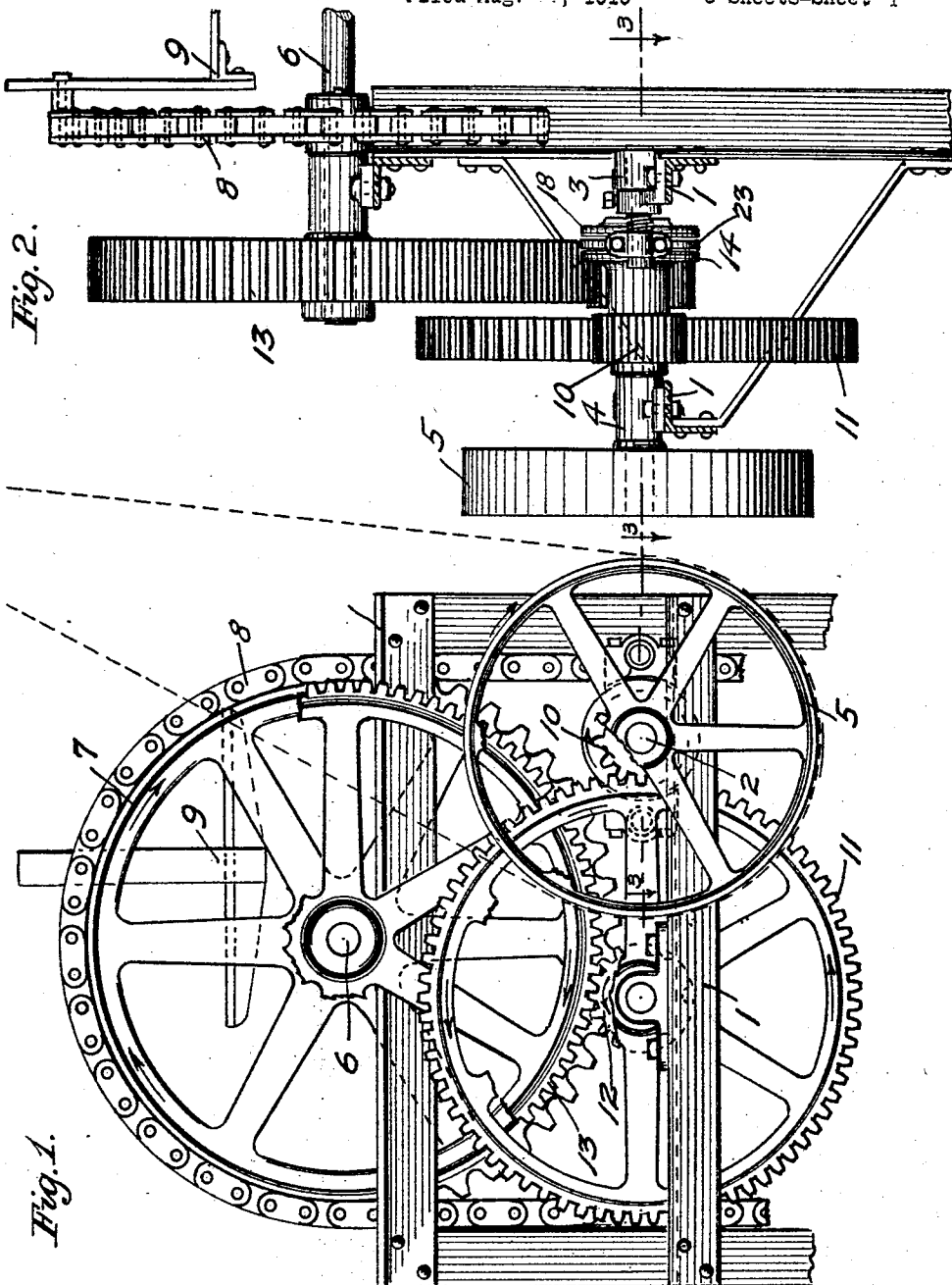
H. J. BUCK

1,532,877

AUTOMATIC BRAKE FOR STRAIGHT LIFT ELEVATORS

Filed Aug. 30, 1919

3 Sheets-Sheet 1



Witnesses
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AUTOMATIC BRAKE FOR STRAIGHT LIFT ELEVATORS

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3 Sheets-Sheet 2

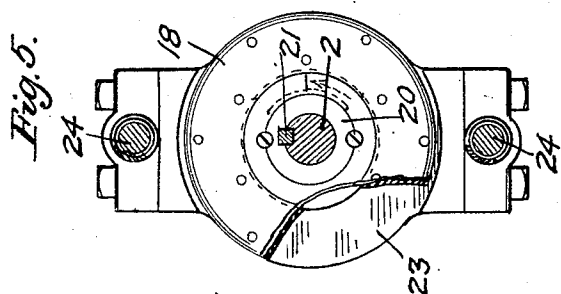
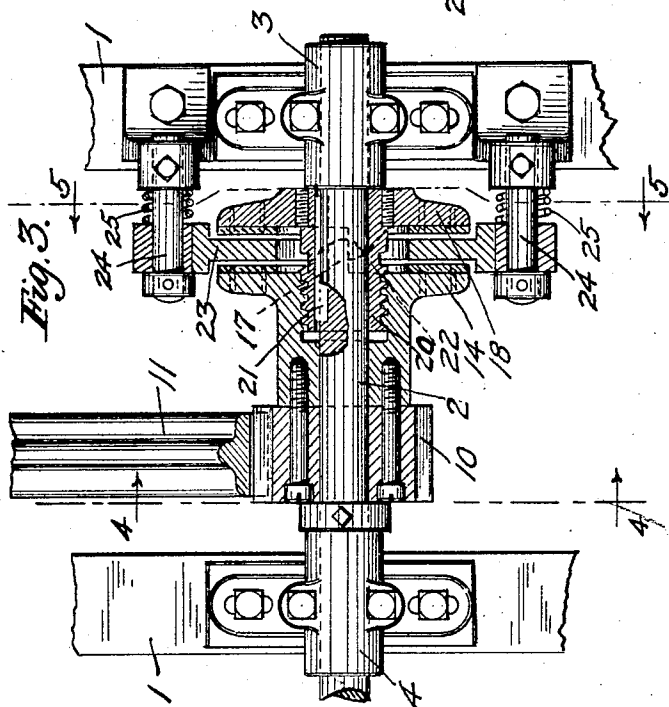
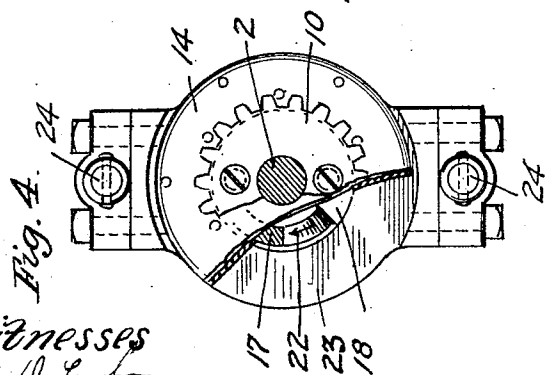
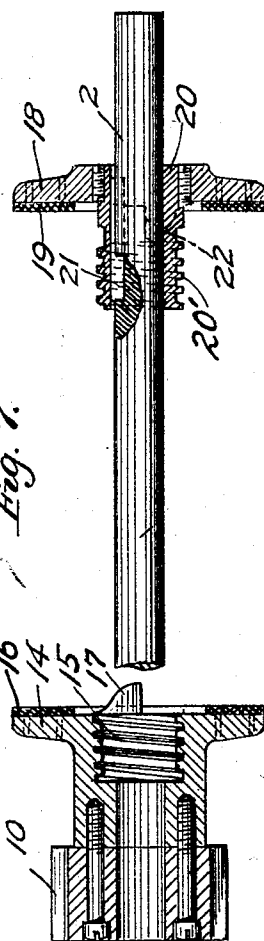
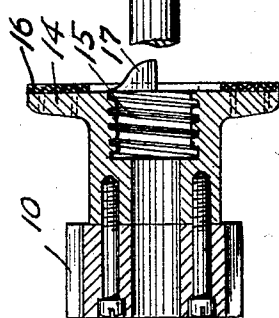


Fig. 6.



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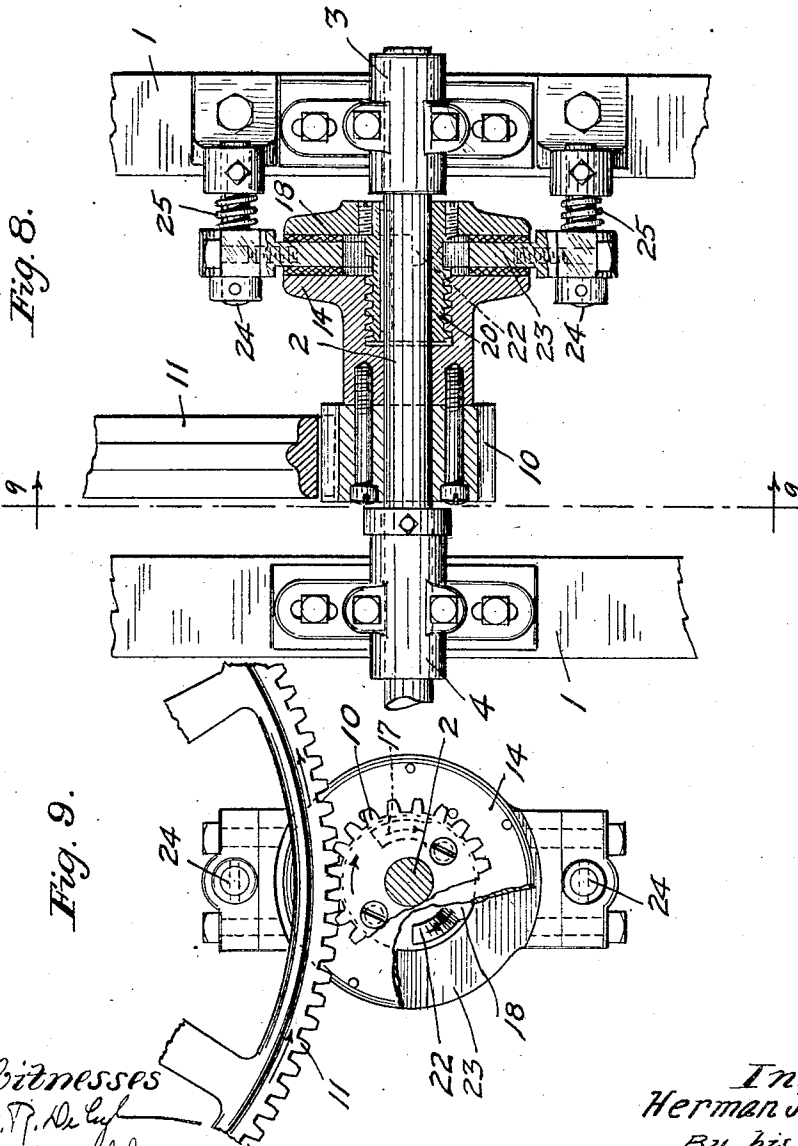
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AUTOMATIC BRAKE FOR STRAIGHT LIFT ELEVATORS

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3 Sheets-Sheet 3



Witnesses
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UNITED STATES PATENT OFFICE.

HERMAN JOSEPH BUCK, OF ELLWOOD CITY, PENNSYLVANIA, ASSIGNOR TO MATHEWS CONVEYER COMPANY, OF ELLWOOD CITY, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

AUTOMATIC BRAKE FOR STRAIGHT-LIFT ELEVATORS.

Application filed August 30, 1919. Serial No. 320,858.

To all whom it may concern:

Be it known that I, HERMAN J. BUCK, a citizen of the United States, residing at Ellwood City, county of Lawrence, and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Brakes for Straight-Lift Elevators, of which the following is a specification.

This invention relates to improvements in automatic brakes designed especially for use in connection with automatically operated straight lift elevators of the general type disclosed in Letters Patent of the United States issued to me May 6th, 1919, No. 1,302,631.

In elevators of this type articles or packages are usually automatically delivered to the carriages or platforms on the up-side of the elevator, and automatically discharged therefrom on the down-side of the elevator. It is a frequent occurrence that more carriages on the down-side than on the up-side will be loaded. The preponderance of load conveyed by the descending carriages will tend to accelerate the speed of the elevator. This is particularly true where the elevator is driven by a motor which has a tendency to increase its speed when the load acts with it, i. e., when the motor does not function as a generator as is the case with certain types of motors. In the employment of this improved brake, friction is only applied when it is necessary to counteract the increased speed due to unequal load distribution, or to stop the elevator immediately upon the cessation of the power actuation. This invention provides an improved automatic brake to arrest movement of the elevator not only when the power is intentionally shut off, but also when there is an accidental interruption in the power transmission.

It is the object of my present invention to provide automatic means for controlling, under such conditions, the speed of the elevator, although the mechanism may be applied to other types of elevators without departing from my invention.

The invention consists generally in the constructions and combinations hereinafter described and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification:

Figure 1 is a side elevation of the upper part of an elevator having my invention applied thereto,

Figure 2 is an end elevation of the same,

Figure 3 is a horizontal section on line 3—3 of Figure 2,

Figure 4 is a sectional elevation, partly broken away, on line 4—4 of Figure 3, looking in the direction of the arrows.

Figure 5 is a similar view, on line 5—5 of Figure 3, looking in the direction of the arrows.

Figure 6 is a detail section of one of the brake members,

Figure 7 is an elevation of the driving shaft upon which the brake members are located, partly broken away, and showing one brake member in section on the shaft,

Fig. 8 is a view similar to Fig. 3 showing the brake disks in engagement with the stationary brake plate,

Fig. 9 is a vertical section on line 9—9 of Fig. 8 looking in the direction of the arrow with a portion of the pinion and one of the brake members partly broken away.

In the drawings, 1 represents a portion of the frame of an elevator of the general type illustrated in my Patent No. 1,302,631, hereinbefore referred to. 2 represents the driving shaft mounted in bearings 3 and 4, upon the frame 1 and having a suitable driving pulley 5 to which a driving belt may be applied, one location of said belt being indicated by dotted lines in Figure 1. 6 represents the upper shaft of the elevator provided with sprocket wheels, one of which is shown at 7, over which the chains of the elevator pass. A portion of one of the chains 8 is shown in Figures 1 and 2 and an elevator carriage or platform 9, partly broken away, is also shown in Figures 1 and 2. The elevator carriages are secured to and supported by the elevator chains 8.

The elevator shaft 6 is driven from the shaft 2, through a pinion 10, gear 11, pinion 12, and a gear 13 mounted on said shaft 6.

The pinion 10 is mounted loosely on the shaft 2. This pinion is secured to a brake disc member 14 (see Figure 6) having an internal screw thread 15, a friction surface 16, and a projecting lug 17.

An oppositely acting brake disc member 18 (see Figure 7) provided with a friction surface 19, is secured upon a sleeve 20 that

is mounted upon the shaft 2. This sleeve is provided with external screw threads 20' fitting the internal threads 15 in the member 14. A spline 21 connects the sleeve 20 and the shaft 2 and causes the sleeve and brake member to rotate with the shaft. The brake member 18 is provided with a lug 22 arranged to coact with the lug 17 on the brake member 14.

A stationary brake plate 23 is arranged between the two brake disc members 14 and 18, being provided with an opening through which the shaft 2 and the sleeve 20 extend, and through which opening the lugs 17 and 22 on the brake disc members contact with each other. The brake plate 23 is mounted upon suitable studs 24, secured to the elevator frame, and springs 25 on said studs normally hold said plate out of contact with the member 18.

The arrangement of the parts as assembled is shown in Figure 3. The disc member 14 is screwed onto the sleeve 20. The brake disc members normally are both out of contact with the brake plate 23.

The screw-threads 15 in the brake member 14, and the corresponding threads 20' on the sleeve 20 extend in a direction corresponding to the direction of movement of the shaft 2. For instance in Figure 1 the belt pulley 5 and shaft 2 are indicated by the arrow as turning from left to right, and the threads 15 and 20' must in this instance be right hand threads, as shown in Figures 3, 6 and 7 of the drawings.

In operation, assuming the parts to be stationary and the brake plate 23 to be clamped between the members 14 and 18, upon application of power to the pulley 5 to turn said pulley and the shaft 2 in the direction indicated by the arrow on Figure 1, the member 18, being splined to the shaft 2 will turn with said shaft, and as the pinion 10 and brake member 14 are held stationary, by engagement with the elevator gearing, the sleeve 20 will move away from the plate 23, its threads 20' screwing out of the threads 15 in the member 14 a sufficient distance to cause the brake members to release plate 23. The brake member 14 and the pinion 10 will remain stationary during this movement of the brake member 18 until the said member 18 has made a partial revolution with the shaft 2 and the lug 22, on said brake member, has, in the revolution of said member, been brought in contact with the lug 17 on the brake member 14. The brake member 14 and pinion 10 will thereafter continue to rotate with the shaft 2 and the train of elevator gearing will be driven from said shaft 2, through the brake member 18, lug 22, lug 17, brake member 14 and pinion 10, and this will continue so long as the elevator operates in a normal manner. Should the down side of the elevator be

loaded in excess of the upside so as to cause the speed of the gearing to be accelerated, or "race," turning faster than the speed imparted to it by the shaft 2, the pinion 10 and member 14 will be caused to turn faster than the member 18, and the threads 15 will be screwed onto the threads 20', thereby causing the brake members to move towards each other and clamp the stationary plate 23.

The more the speed of the elevator is increased the greater the gripping or braking action of the parts will be. As soon as the speed of the elevator is checked the movement of the parts will be reversed and normal conditions will be restored. The brake member 18 will move faster than the brake member 14 causing the lug 22 to overtake and come in contact with the lug 17. This faster movement of the brake member 18 will, through the screw thread connection between said member and the member 14, cause the brake members 14 and 18 to separate, and the train of gears beginning with pinion 10 will be rotated from the shaft 2 at normal speed. The brake mechanism will be brought into action as often, and only as often as the elevator runs or moves faster than the speed normally imparted to it from its driving mechanism. Whenever the elevator does exceed its normal speed the brake device will immediately be brought into action and will check such speed permitting the elevator to run at all times only at substantially normal speed. Similarly, when the power is cut off or the belt runs off the driving pulley, this novel automatic brake will immediately function to stop the elevator.

I do not limit myself to the details of construction as the same may be varied in many particulars without departing from my invention.

I claim as my invention:

1. The combination, with a driving shaft, of a pinion loosely mounted thereon, gearing connected with and driven by said pinion, means connecting said shaft with said pinion for driving said pinion from said shaft, said means being arranged to permit the pinion to exceed the speed imparted to it by said shaft, a brake mechanism connected with said pinion, and means bringing said brake mechanism into operation when the speed of the pinion exceeds the speed normally imparted to it by said driving shaft, and to stop said pinion when the application of power to said driving shaft is interrupted or discontinued.

2. The combination, in an elevator driving mechanism, of a driving shaft, a pinion loosely mounted thereon, a brake member connected with said pinion, a brake member splined upon said shaft, said brake members being provided with means causing one member to be driven from the other, a sta-

tionary brake-plate arranged between said brake-members, and means causing said brake members to grip said plate when the speed of said pinion exceeds the normal speed imparted to it by said shaft, and to stop said pinion when the application of power to said driving shaft is interrupted or discontinued. 15

3. In an elevator driving mechanism the combination, with a driving shaft, of a pinion mounted loosely thereon, a stationary brake plate, oppositely acting brake members arranged upon opposite sides of said plate, means causing said pinion to be 10

driven from said shaft, and means causing said brake members to grip said plate when the pinion turns at a speed greater than that normally imparted to it by said shaft, and to stop said pinion when the application of power to said driving shaft is interrupted or discontinued. 20

In witness whereof I have hereunto set my hand this 23rd day of August, 1919.

HERMAN JOSEPH BUCK.

Witnesses:

CLARA HENNON,
REGINALD R. MILLER.