No. 881,783. PATENTED MAR. 10, 1908.

E. M. ERB.

SASH BALANCE.

APPLICATION FILED AUG. 20, 1906.

2 SHEETS—SHEET 1.

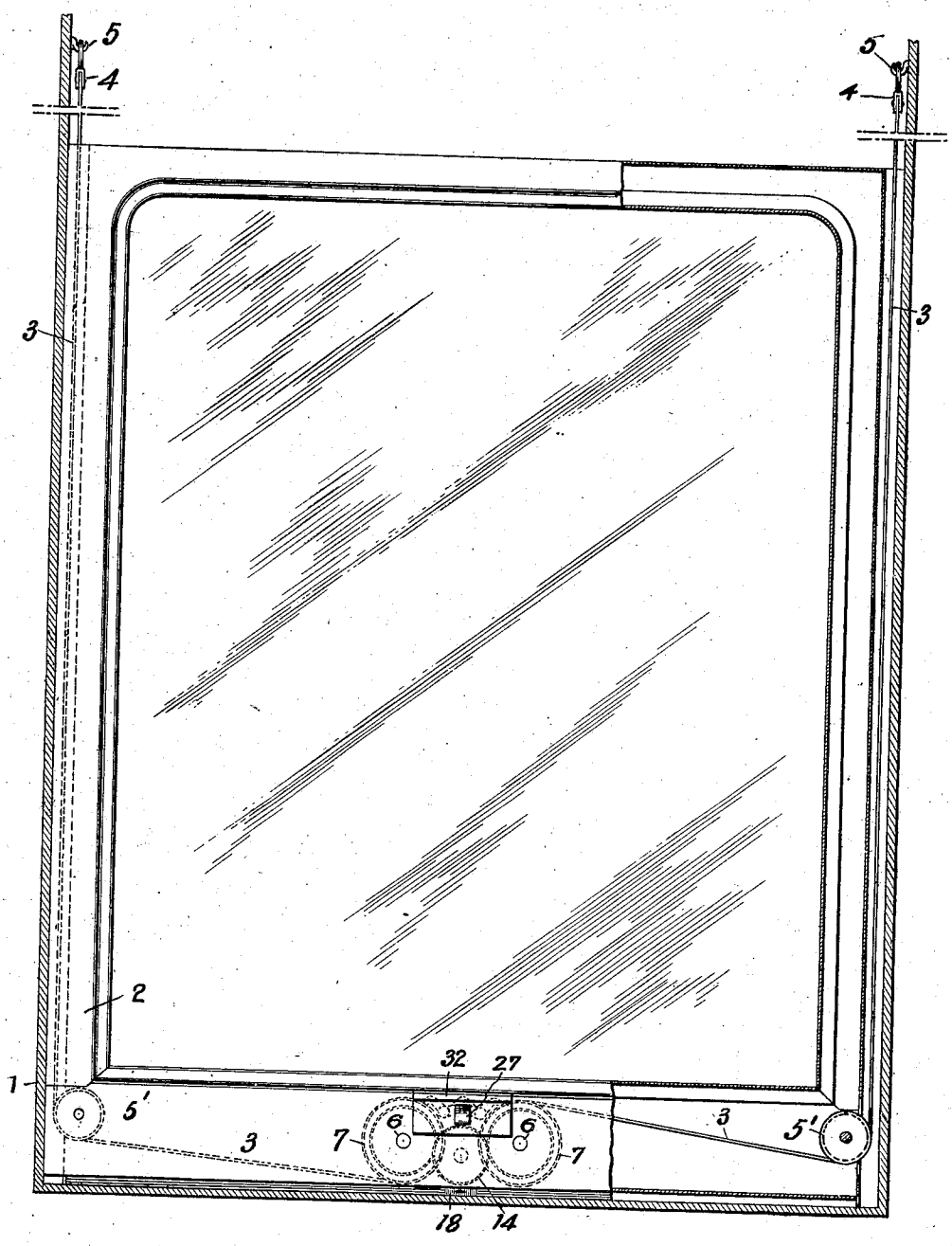


Fig. 1.

Witnesses
Frank S. Oberlin
R. F. Martin.

E. M. Erb Inventor
By his Attorneys
Warfield & Duell

THE NORRIS PETERS CO., WASHINGTON, D. C.

No. 881,783. PATENTED MAR. 10, 1908.

E. M. ERB.

SASH BALANCE.

APPLICATION FILED AUG. 20, 1906.

2 SHEETS—SHEET 2.

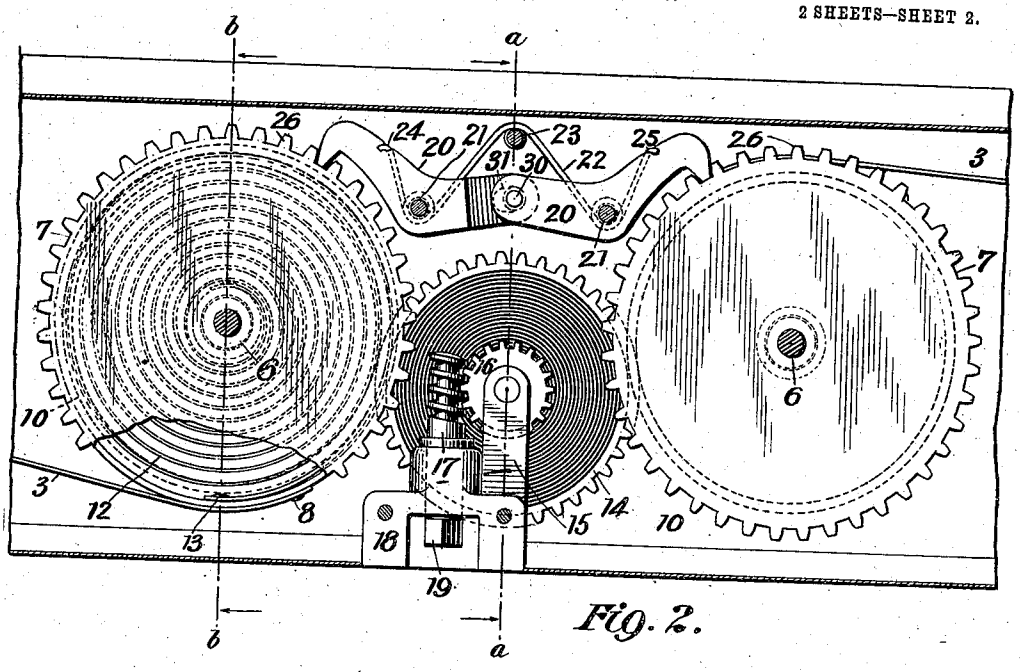


Fig. 2.

Fig. 3.

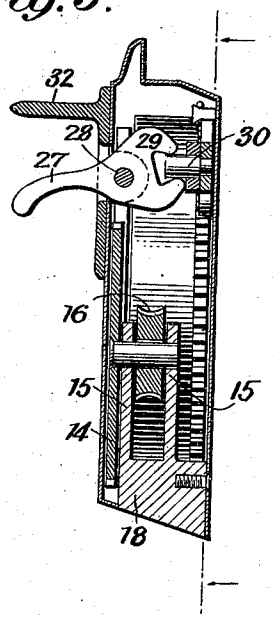
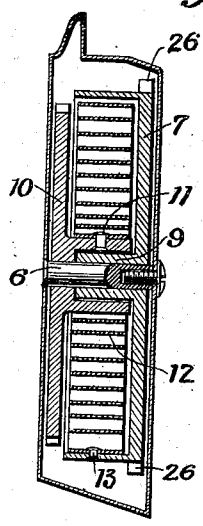


Fig. 4.



Witnesses
Frank S. Ober
P. F. Martin.

E. M. Erb Inventor
By his Attorneys
Warfield & Duell

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDMUND M. ERB, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO ROBERT M. DIXON, OF EAST ORANGE, NEW JERSEY.

SASH-BALANCE.

No. 881,783. Specification of Letters Patent. Patented March 10, 1908.

Application filed August 20, 1906. Serial No. 331,233.

To all whom it may concern:

Be it known that I, EDMUND M. ERB, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Sash-Balances, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates broadly to sash balances, but more particularly it concerns improvements in devices of the above character adapted for use in railway cars or similar structures.

One of the objects of this invention is to provide sash balancing means for sliding sashes whereby the lifting power thereof may be easily varied or adjusted to any desired degree of nicety.

Another object thereof is to provide for easy access to the sash balancing means whereby it may be more readily adjusted, repaired or replaced than has been possible with sash balances as heretofore constructed.

A further object of the invention is to provide sash balancing means such that the means usually employed for holding the sash stationary in its frame are entirely eliminated.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, wherein is illustrated one of the various possible embodiments of my invention—Figure 1 is a view in elevation showing a portion of a window frame having a sash mounted therein with my invention applied thereto. Fig. 2 is a view showing partly in elevation and partly in section the operative parts of the mechanism constituting my invention, the front wall of the lower portion of the sash rail being removed. Fig. 3 is a vertical sectional view taken on line *a*—*a* of Fig. 2. Fig. 4 is a similar view taken on line *b*—*b* of Fig. 2.

Similar reference characters refer to similar parts throughout the several views of the drawings.

In order to render more clear the more important objects sought to be attained by my invention, it may here be noted that the use of catches, wedges or similar contrivances hitherto employed for holding sashes in different positions in their frames are objectionable, owing to the frequency with which they become broken or disarranged and the necessity of making frequent repairs or renewals. Moreover, such devices mar the appearance of the sash.

In overcoming the above objections and realizing other important ends, I have found it desirable to provide sash balancing means upon the sashes themselves such that the operative mechanism thereof is easily accessible for repairs or replacement of the parts, and I also provide means acting directly upon the sash balancing means for holding the same stationary and thereby maintaining the sashes in stationary positions at any point in their range of movements.

It will be apparent from the following description of the structural features constituting my invention that I have attained the above and other important ends through the provision of an exceedingly simple and efficient construction.

Referring now to the drawings, wherein I have shown the preferred adaptation of my invention, designed to be used in connection with railways cars or the like, 1 denotes a portion of the frame work of the window within which the sash 2 is adapted to slide, said sash when slid upward being received within the space provided between the inner and outer walls of the car. The sash is suspended in the frame by means of thin flexible bands 3, preferably of metal, although chains or cords may be used in this connection if desired. Bands 3 are provided at their upper ends with links or hooks 4 adapted to be detachably secured to the frame by being positioned over the hooks or other supporting devices shown at 5, which extend upwardly from the side stile of the frame.

It will be understood, of course, that suitable front and rear stops are provided for guiding the sash in its sliding movement.

The lower rail of sash 2 is hollow, as shown, and extending transversely of said rail and secured in the walls thereof are arbors 6. Journaled upon each of said arbors is a hollow drum 7, said drums having smooth, circular peripheries, about which ride the suspending bands or tapes 3, which pass down-

wardly through recesses provided in the side stiles of the sash and over idler pulleys 5′ journaled near either side thereof, the lower ends of said bands or tapes 3 being suitably secured to drums 7 as at 8.

Journaled upon arbors 6 and inwardly extending sleeves 9 of drums 7 are gear wheels 10. These wheels have secured thereto by means of rivets 11 the inner ends of coil springs 12, said springs being coiled within drums 7 and having their outer ends secured to said drums as at 13.

In order to vary the tensions of springs 12, which as will be seen can be accomplished by the rotation of gear wheels 10, a pinion 14 is journaled upon arms 15 extending upwardly from the base of the sash and within the same. This pinion meshes with both of gear wheels 10, and is adapted to be rotated through the instrumentality of a worm gear 16, adapted to be rotated by a worm 17 suitably journaled in a bracket 18 extending upwardly from the bottom wall of the sash rail. Worm wheel 17 is provided with a square or similarly shaped head 19, enabling it to be rotated by means of a wrench or other suitable turning device.

It will be understood that the rotation of gear wheels 10 by means of pinion 14 by the worm mechanism as above described will operate to increase or diminish the tension of springs 12, in accordance with the amount of force required to balance the sash in the frame, and at this point it may be noted that I preferably overbalance the sash, so that when the same is released by the holding devices presently to be described the same will tend to move in an upward direction.

It will be understood, of course, that the flexible bands or tapes are wound in opposite directions about drums 7, this feature being clearly shown in Fig. 2.

In order to provide for holding the sash in any desired position in its range of sliding movement, I have provided means for directly engaging the balancing mechanism, thus eliminating the use of the usual devices which extend between the sash and the frame, such mechanism, as is clearly shown in the drawings, being constituted by a pair of dogs 20 journaled upon pins 21 projecting from the inner wall of the sash rail. These dogs are pressed in the direction of spring drums 7 by means of a single spring 22 which passes about a pin 23 and exerts pressure at either end, as at 24 and 25, upon said dogs, and the ends of dogs 20 engage with a circular row of teeth 26 extending from the peripheries of drums 7. It will be obvious that when dogs 20 engage with teeth 26 of the spring drums 7 said drums are held against rotation, and the sash is thereby maintained in a closed or in any desired position in its frame.

In order to retract dogs 20 from engagement with the teeth 26 of drums 7, a finger lever 27 is pivoted upon a pin 28 carried interiorly of the bottom rail of the sash, said lever extending inwardly from said rail to enable it to be grasped by the hand of the operator. The opposite end of lever 27 is bifurcated, as shown at 29, and extending between said bifurcated portions is a pin 30 carried upon the inner end of one of dogs 20, the inner end of the remaining dog being provided with an enlarged opening 31 to provide for a relative movement between the dogs when they are swung on their pivots by means of finger lever 27 to disengage them from the teeth of drums 7. A rest 32 extends inwardly from the inner wall of the bottom sash rail to enable to operator better to grasp finger lever 27 when it is desired to retract dogs 20 from the spring drums, which effects a release of the balancing means and allows a sliding movement of the sash.

Having thus described the structural features comprising this embodiment of my invention, the operation thereof may now be understood. Springs 12 within drums 7 being tensioned to a degree sufficient to overbalance the weight of the sash, it will be understood that a retraction of the dogs 20 by means of finger lever 27 will release the balancing means and enable the sash to move upward under the influence of said springs, or to be pushed downwardly to a closed position, as desired.

It will be noted that, inasmuch as each of the suspending means is independent of the other, a breakage of one will in no wise interfere with the operation of the other, which can be quickly adjusted to any desired tension and thus operate singly until such breakage has been repaired. In the event of the breakage or other disarrangement of the sash balance the whole device may be removed from the frame with the sash by merely unhooking the upper ends of the suspending bands or straps from the devices to which they are attached. It will accordingly be apparent that I have provided a construction which possesses not only great simplicity and compactness, but is also readily accessible for purposes of adjustment or repair, which as above explained may be readily effected by simply removing the sash from the frame. Through the provision of the dogs which directly engage with the balancing means, the use of catches, wedges or similar devices is entirely done away with, and the appearance of the sash thereby improved.

As many changes could be made in the above construction and many apparently widely different embodiments of my invention could be made without departing from the scope thereof, I intend that all matter contained in the above description or shown

in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I desire it also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In window construction, in combination, a sliding sash, suspending means therefor, a plurality of drums about which are wound said suspending means, arbors for rotatively supporting said drums, a member engaging each of said drums to hold the same against movement, and means for withdrawing said members from engagement with said drums whereby they are free to move to carry the sash in an upward direction.

2. In window construction, in combination, a sliding sash, suspending means therefor, a plurality of drums about which are wound said suspending means, arbors for rotatively supporting said drums, a member engaging each of said drums to hold the same against movement, a spring for maintaining said members in engagement with said drums, and common means for withdrawing said members from engagement therewith whereby said drums are free to rotate under the influence of their springs to carry the sash in an upward direction.

3. In window construction, in combination, a sliding sash, suspending means therefor, a plurality of drums about which are wound said suspending means, a plurality of members journaled upon arbors supported in said sash, each of which supports one of said drums, a spring connecting each of said members with the drum mounted thereon, a common means for rotating said members to adjust the tension of said springs, a plurality of spring-pressed members each of which engages one of said drums and holds the same against movement, and a finger lever common to both of said spring-pressed members adapted to retract the same and permit said drums to rotate under the influence of their springs.

4. In window construction, in combination, a sliding sash, suspending means therefor, a plurality of drums about which are wound said suspending means, a plurality of gear wheels journaled upon arbors supported in said sash, each of which rotatively supports one of said drums, a spring connecting each gear wheel with its drum, a pinion meshing with each of said gear wheels, and worm mechanism for rotating said pinion whereby said springs, through said gear wheels, may be given any desired degree of tension.

5. In window construction, in combination, a sliding sash, suspending means therefor, a plurality of drums carried by said sash about which are wound said suspending means, a plurality of arbors each of which carries rotatively one of said drums, a gear wheel journaled upon each of said arbors, a spring connecting each gear wheel with one of said drums, a pinion journaled upon said sash and meshing with each of said gear wheels, worm mechanism adapted to rotate said pinion whereby said gear wheels are rotated and the springs connected therewith given any desired degree of tension, a plurality of members each of which engages teeth provided upon one of said drums and holds said drums against movements, a spring common to both of said members for holding the same in engagement with said drums, and a finger lever for retracting said spring-pressed members whereby they are disengaged from said drums and said drums are permitted to rotate freely under the influence of the springs connected therewith.

In testimony whereof I affix my signature, in the presence of two witnesses.

EDMUND M. ERB.

Witnesses:
C. H. WILSON,
R. F. MARTIN.