(No Model.) 3 Sheets—Sheet 1

T. WHETTER.

SASH BALANCE.

No. 489,442. Patented Jan. 3, 1893.

Fig. 10.

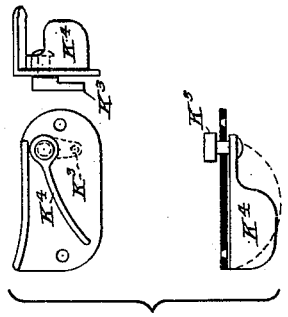


Fig. 11.

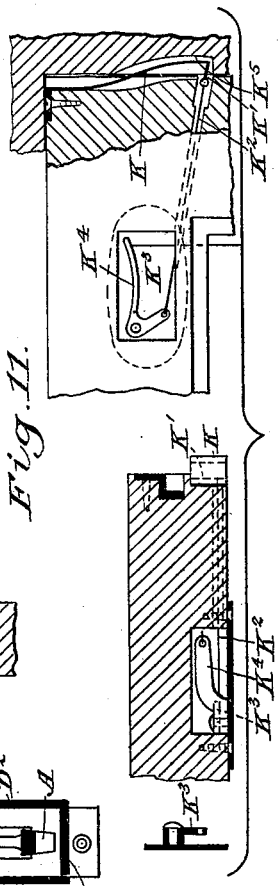


Fig. 3.

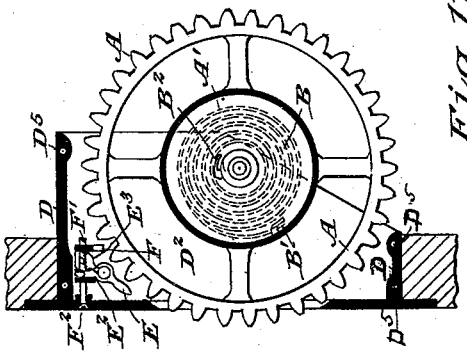


Fig. 2.

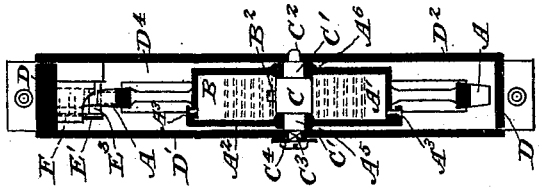
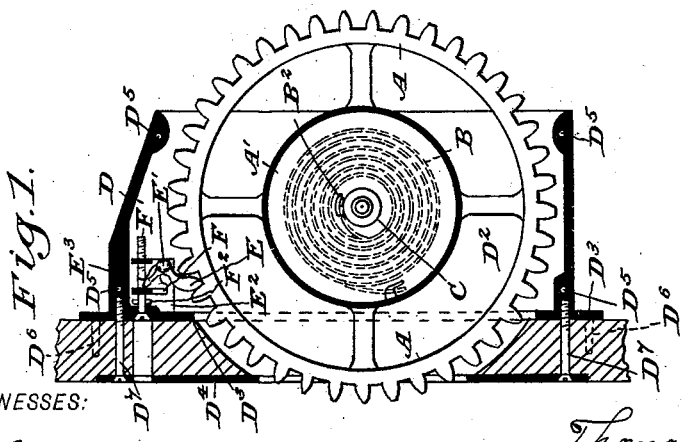


Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

T. WHETTER.

SASH BALANCE.

No. 489,442. Patented Jan. 3, 1893.

Fig. 6.

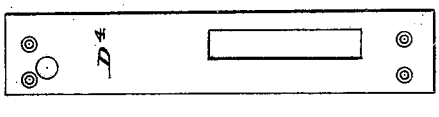


Fig. 5.

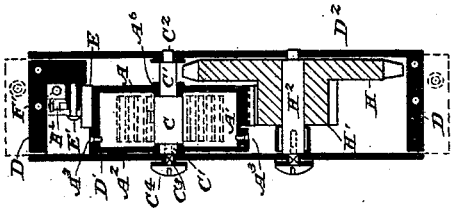


Fig. 4.

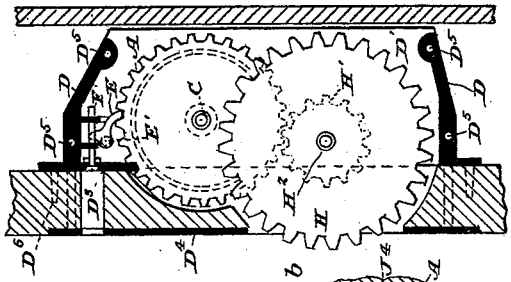


Fig. 9.

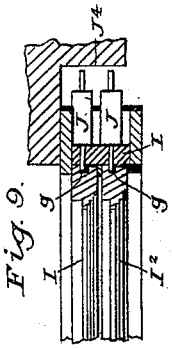


Fig. 8.

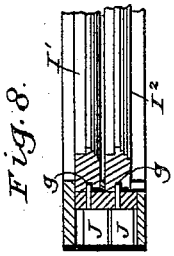
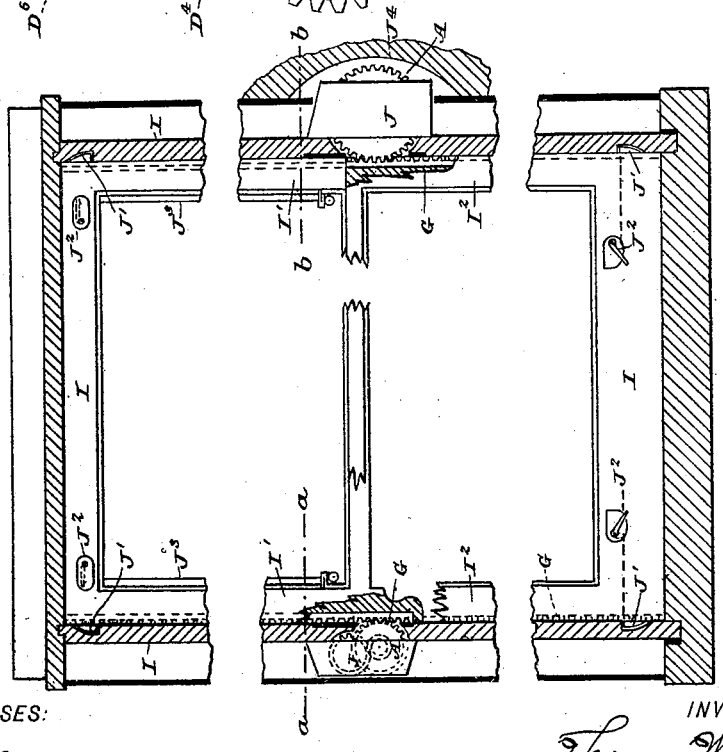


Fig. 7.



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(No Model.) 3 Sheets—Sheet 3.

T. WHETTER.

SASH BALANCE.

No. 489,442. Patented Jan. 3, 1893.

Fig. 12.

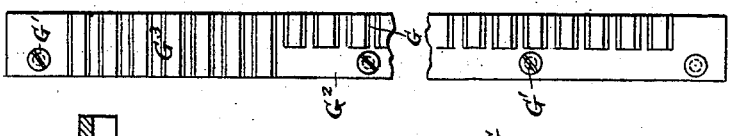


Fig. 17.

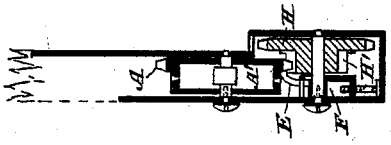


Fig. 18.

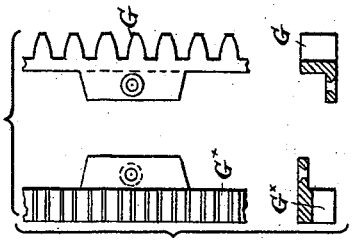


Fig. 16.

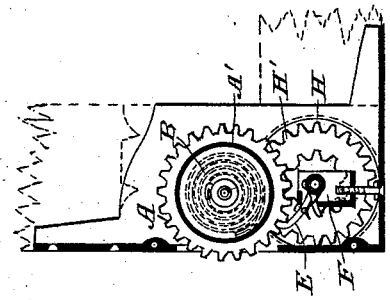


Fig. 15.

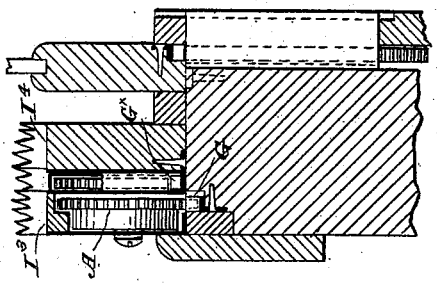


Fig. 14.

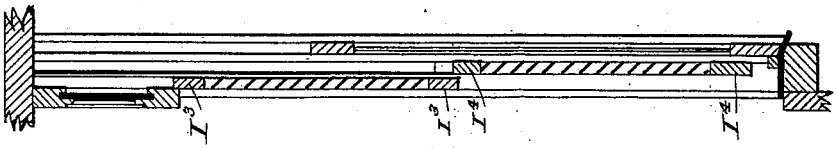
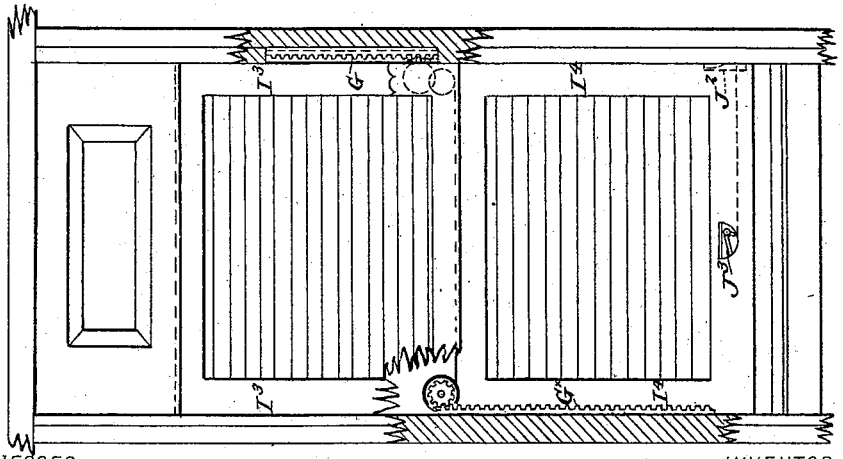


Fig. 13.



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UNITED STATES PATENT OFFICE.

THOMAS WHETTER, OF PETERSHAM, NEAR SYDNEY, NEW SOUTH WALES.

SASH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 489,442, dated January 3, 1893.

Application filed August 15, 1891. Serial No. 402,789. (No model.)

To all whom it may concern:

Be it known that I, THOMAS WHETTER, carpenter, a subject of the Queen of Great Britain, residing at Petersham, near Sydney, in the British Colony of New South Wales, have invented a new and useful improved apparatus for controlling and adjusting sliding sashes in window-screens and such like, of which the following is a specification.

This invention relates to improved apparatus contrivances or mechanisms by which sliding sashes which travel in frames may be easily and effectively controlled and adjusted to any desired position within their range of travel in such frames.

This invention has been specially devised in order that house windows may be constructed without cords and weights and in order that the windows of vehicles particularly of omnibuses and railway vehicles and rigid screens or blinds for same may be positively adjusted as may be desired and at the same time be held in the frames without rattle or disagreeable noise.

These improved apparatus for controlling and adjusting sliding sashes in window screens and such like consist essentially in the combination and arrangement with the moving parts or sashes and the still parts or sash frames of a window &c. of a toothed wheel whose revolution is controlled by the resilient force of a spring (upon the one) and a rack in which said toothed wheel gears (upon the other) and in which said toothed wheel travels or which said wheel causes to travel in either case moving the sash within the frame. The one part of the apparatus hereinafter called the spring balance wheel then consists of a toothed wheel forming part of or attached to or geared to a drum containing a wound spring whose tension is regulated in the winding by means of a ratchet pawl which is removable when this combined spring wheel is geared in the rack on the other part of the window &c. This part of the apparatus is contained in a frame having an appropriate casing for attachment to the sash or to the frame as the case may be. The rack is attached either to the edge of the sash or to the face of the stile of the window as the case may be and in all cases the apparatus is used in duplicate. With the two parts just described there is also used in duplicate a spring holder or catch adapted to fasten the sash in its closed position and to hold the sash in any desired open position until said holder or catch is manipulated to release it. Where it is desired that two sashes of a window or of a screen should be moved in the same direction so that one will overlap the other one rack is affixed to the style of the sash frame the spring balance wheel on one of the sashes with its toothed wheel in gear with said rack while a second toothed wheel on or geared to the spindle of the first toothed wheel takes into a second rack which is affixed to the other sash such second wheel having such ratio in size with the first one as will cause the second rack to travel the increased distance necessary in the overlapping of the two. In some cases instead of the toothed wheel of the spring balance wheel gearing directly into the rack multiplying gearing is used so that a comparatively small unwinding or winding of the spring may result in a long travel of the rack on the wheel or of the wheel in the rack. But in order that this invention may be clearly understood reference will now be made to the drawings herewith in which

Figures 1 and 2 are sectional elevation and cross section of a controller as affixed to the sash frame of the ordinary or house window. Fig. 3 shows in section a modified construction of such spring balance wheel which is especially suitable for light sash. Figs. 4, 5, and 6, are sectional elevation cross section and face view respectively of a further modified construction in which the travel of the spring is multiplied by gearing. Fig. 7 is a sectional elevation of an ordinary window furnished completely according to this invention. Figs. 8 and 9 are partial sectional plans on lines *a a* and *b b* respectively in Fig. 7. Fig. 10 shows details of the spring catch or holder for bottom sash and Fig. 11 is elevation plan and section of a similar catch &c. in position on upper sash and Fig. 12 shows in elevation and section a rack for the edges of ordinary windows. Fig. 13 is front elevation and Fig. 14 vertical section of a railway carriage window having sliding screens furnished according to this invention. Fig. 15

is an enlarged horizontal section of the same through the spring balance wheel and Figs. 16 and 17 show in sectional elevation and cross section respectively said spring balance wheel on a larger scale and Fig. 18 shows in elevation and section the modifications of the racks suitable for these overlapping sashes.

A is a toothed wheel whose center forms a barrel or drum A′ inclosing a wound spring B having one end attached to hook B′ on the inside of the barrel or drum and the other end hooked or clipped to hook B^2 upon the central arbor C. The barrel A′ has a removable cover A^2 which when the spring is placed in position is fastened by screws A^3 and this cover and the other end of said barrel A′ form the bosses A^5 and A^6 of wheel A running loose upon the journals C′. This combined spring wheel is placed in a convenient casing having frame D side plates D′ and D^2 edge plate or face D^3 and false face or protector D^4. The combined spring wheel is secured in place by one end C^2 of arbor C screwed against the wind of spring B being screwed into plate D^2 and by a square hole in the plate D′ taking over the other square end C^3 of said arbor C before being fastened to frame D by screws D^5 said arbor being further secured by a washer and screw C^4 of opposite pitch or inclination to screw on end C^2 of said arbor. To prepare the spring balance wheel complete for sale and for fixing it is necessary that the spring B should be wound or partly wound and that means must be provided for retaining it in tension until it is properly fixed and its wheel A in gear with the rack that the resilient force of said spring is to act upon. The removable ratchet pawl E is fulcrumed on pin or stud E′ screwed into plate D^2 and it has a rearward extension or arm E^2 and a rear spring E^3. A carrier F has a female screw on a revoluble but otherwise stationary male screw F′ fastened in position by pin F^2. One end of this carrier F takes against the spring E^3 while the other takes against arm E^2 when the screw F′ is revolved it brings carrier F into the position shown in Fig. 1 of the drawings but such screw may be revolved so that the carrier will be moved to the position shown in Fig. 3 of the drawings and thus carry the pawl E altogether clear of the teeth of wheel A. The pawl E being in gear with wheel A the spring may be wound by drawing a rack over said wheel until the desired tension is reached such tension being tested by means of a graduated spring or by a weight attached to the rack revolving the wheel A or by other means. The pawl E now holds wheel A and the spring B until the controller is fixed in position and the rack on the other part of the window being placed in gear said pawl may be withdrawn by the turning of screw F′.

The spring balance wheel is fixed to the sash frame by being let into a cavity made for the purpose in the wall face of the sash frame or stile and is secured by screws D^6 through flanges of frame D the protector plate D^4 being at the same time secured to the face of said frame or stile (with a hole through the stile for the insertion of a driver or key for head of screw F) by screw D^7 with the teeth of wheel A protruding through the slot in such plate. The rack G (Fig. 12) is fastened to the sash by means of screws G′ through flange G^2 (which may be of full length of rack or be short pieces at intervals in such length) and teeth G^3 are provided of the full width of the edge of the sash to enable the sash to be placed in the frame past the protruding teeth of wheel A in said frame.

The modified construction of spring balance wheel shown in Fig. 3 dispenses with the protector plate D^4 which in this case is the front edge of the frame D through which the teeth of wheel A project but in all other respects the construction is identical with that described. In the modified construction of controller shown in Figs. 4, 5, and 6, the parts are identical save the wheel A instead of protruding from the casing and gearing into the rack is geared with a pinion H′ forming part of a toothed wheel H on an arbor H^2 fastened to plates D′ and D^2 and which latter wheel projects so that its teeth will gear with the rack in the place of the teeth of wheel A. All other parts are the same but this construction enables a spring with a less travel and a smaller compass to be used where the range of travel of the sash in the frame is considerable. In Fig. 7 the sash frame is marked I the upper sash I′ the lower sash I^2 the spring balance wheel J the rack G the catch or holder J′ and the releaser J^2 the upper of which latter have a cord or wire J^3 for convenience in use. In this Fig. 7 the spring balance wheel shown on the left hand side of the drawings is similar to that illustrated in Figs. 4, 5, and 6, while that on the right hand side is a single gear one making it necessary to construct a break-away or recess J^4 in the wall. But in all cases it must be remembered the spring balance wheel is used in pairs of identical construction. The catch and holder and releaser are constructed of a spring piece K screwed to the stile of the sash with its catch end K′ looking downward or upward as the case may be and attached to a rod or wire K^2 leading to a lever end K^3 on a thumb piece lever K^4 the depression of which will pull rod K^2 and close end K′ into its cavity making the edge of sash flush and free in its frame to be moved up or down. The resiliency of spring K will normally when window is closed place catch K′ in a cavity K^5 in the frame and thus lock the sash and when the window is open is sufficient to give a good grip from the sash on the frame. The tension of the spring B having been regulated (by the movement with a rack of wheel A) so that the force of the springs of the duplicate spring balance wheel will counterbalance the weight of the sash plus such force as may be necessary to move the sash say two-thirds of its travel it being remembered

that the farther the window is run up by the force of the spring the more manual pressure will be required to lower it and conversely.

The spring balance wheel is fixed as before described and as shown in Figs. 7, 8, and 9, and the sash I with the catch or holder and release in place put in position with racks G in gear with wheels A. Now when it is desired to raise or lower the sash the thumb lever K^4 is depressed and this releasing catch K′ the sash will move by spring B revolving wheel A until the limit is reached or until thumb lever K^4 is released when catch K′ will take against the stile of the frame and hold the sash. The racks G (Fig. 12) for ordinary windows are fitted into a groove or channel *g* (Figs. 8 and 9) in the sash and are secured by screws G′ (Fig. 12) through flange G^2 which is flush with the points of the teeth and let in flush to the edge of the sash stile.

Referring to Figs. 13 to 18 which illustrate that modification of this invention which is used where two sashes are moved the one to overlap the other as in the movement of the screens or rigid blinds of railway carriage windows. The toothed wheel A having a barrel or drum A′ containing a wound spring B (as before described) gears into the rack G fixed to the sash frame and at the same time gears with pinion H′ forming part of toothed wheel H which gears in rack $G^\times$ on lower screen I^4. One of these sashes is provided with a catch or holder J^2 and a releaser J^3 as before described. The spring balance wheel has a similar pawl E and carrier F with details as hereinbefore described and the tension of the spring B is adjusted in a similar manner. It is secured by screws through one of its covering plates to the edge of the top or outer screen I^3 and this is put in position with the teeth of wheel A gearing in rack G on the frame after the other screen I^4 is in place with its rack $G^\times$ gearing with teeth of wheel H. The screens are raised by releasing the catch when the spring B according to its tension will revolve both wheels A and H the latter at the speed due to the relative sizes of said wheel A and pinion H′ that is say at twice the speed. The wheel A with its screen I^3 travels on the rack G and the wheel H will lift the other screen I^4 at twice the rate of travel of screen I^3 by means of rack $G^\times$ attached thereto and in the same space of time lift said screen I^4 twice as high as screen I^3 and thus open both screens fully by overlapping them.

Many further modifications of this invention might be devised to suit the exigencies of sashes and sash frames already constructed without departing from the nature of my invention. One of such modifications specially suitable for railway carriage windows which have independent sashes which lower into a cavity in the casing and are lifted and rested upon the sill of the window may be shortly described as follows;—The rack is attached to the sash frame and at its upper part is made of such a width of face that the sash may have edgewise movement upon it without disengaging the teeth of the wheel of the spring balance wheel therefrom. The spring balance wheel is one containing the multiplying pinion and wheel as shown in Figs. 4, 5, and 6, but the frame and casing would be somewhat like that shown in Figs. 16 and 17 with the wheels A and H in reversed positions that is with wheel A and spring B contained in the projection of the casing which takes into the inside of the sash the whole being fixed clear of the stops of the sash frame. By this arrangement if the casing be extended a little along the bottom rail a larger wheel and consequently a longer spring may be used and at the same time space be left in the corner for the adjustment of the removable pawl. The catch and releaser would be placed at the upper corner of the sash.

It is to be understood that I do not confine myself to any particular method or means or details of construction by which this invention may be carried into effect so long as the nature of such invention be retained but,

Having now particularly described and explained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:—

1. In apparatus of the class set forth, the combination with wheel A and spring B, of a pawl with stud E′, rearward extension E^2 and rear spring E^3, a carrier, and a fixed screw, all arranged in a suitable frame and casing.

2. In apparatus of the class set forth the combination and arrangement with sliding sashes adapted to overlap and with the frames thereof of a rack on the sash frame a spring balance wheel on one sash and a rack upon the other sash such spring balance wheel having pinion engaging toothed wheel both geared to revolve at the required relative speeds and one of which is adapted to move on the rack while the other causes the other rack and its attached sash to move in the same direction substantially as herein described and explained.

3. In apparatus of the class set forth, the combination with wheel A, a spring, pawl and screw, of a carrier connecting said pawl and screw of a toothed pinion a toothed wheel, and a fixed and movable rack gearing with the said pinion and wheel, substantially as set forth.

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Witnesses:
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FRED WALSH.