

(No Model.)

F. F. FIFE & W. V. BLÉHA.
SASH BALANCE.

No. 430,938.

Patented June 24, 1890.

Fig. I,

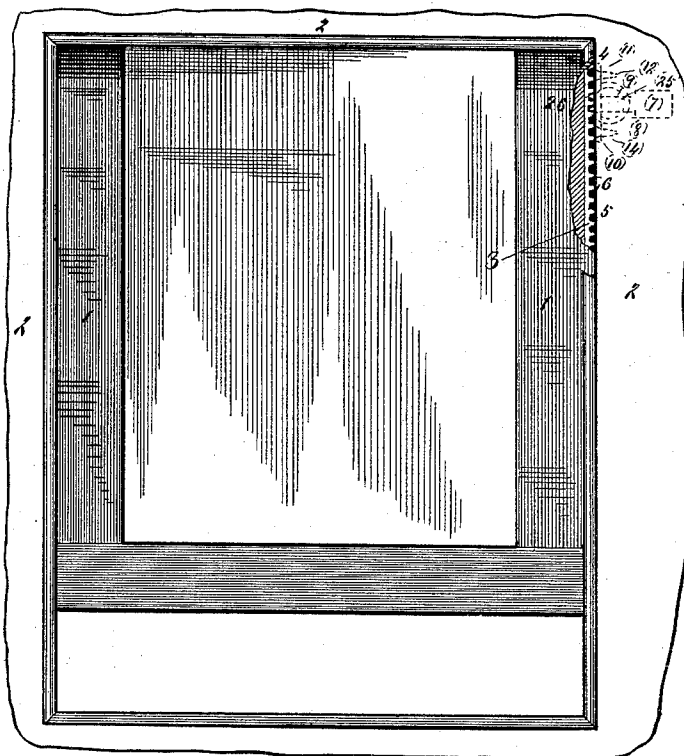


Fig. II,

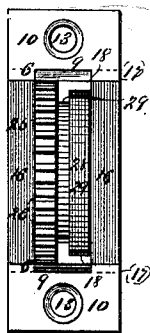


Fig. III,

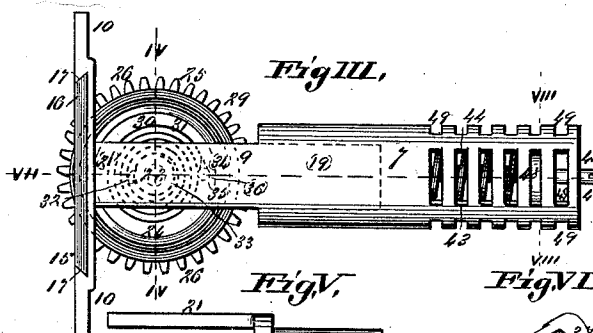


Fig. IV,

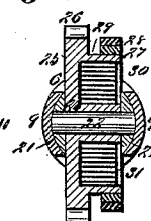


Fig. V,

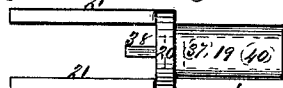
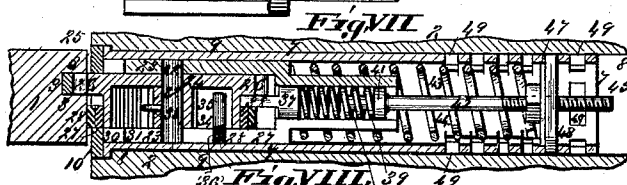


Fig. VI,



Fig. VII,



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UNITED STATES PATENT OFFICE.

FRANK. F. FIFE AND WILLIAM V. BLÉHA, OF ST. LOUIS, MISSOURI.

SASH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 430,938, dated June 24, 1890.

Application filed January 30, 1890. Serial No. 338,694. (No model.)

To all whom it may concern:

Be it known that we, FRANK. F. FIFE and WILLIAM V. BLÉHA, both of the city of St. Louis, in the State of Missouri, have invented
5 a certain new and useful Improvement in Combined Sash-Balance Elevators and Stops, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.
10

This invention relates to devices for a spring-balance gear that counteracts the gravity of the sash, in combination with a friction-stop that arrests its movement at any
15 required point; and the invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a detail elevation of a window-casing, which incloses a sash that is controlled by our invention. Fig. II is an enlarged front view of the combined gear and tension-spring-actuated wheel. Fig. III is an enlarged side view of the same and shows the rotating and pressure springs by which
25 it is actuated and the cylinder in which it is incased. Fig. IV is a vertical section taken on line IV IV, Fig. III, and shows the combined gear and friction wheel, the coil-spring that actuates the same, with the rubber inner fold and leather outer fold of the friction-surface of said wheel. Fig. V is a longitudinal detail of the bifurcated spring and journal-bearing cylinder, and also shows projecting therefrom the tongue of the friction-block
35 that by the influence of its pressure-spring exerts a balance or stop friction on the gear and friction wheel. Fig. VI is a perspective view of the friction-block. Fig. VII is a horizontal section taken on line VII VII, Fig. III, and shows a detail of a window sash and casing to which our device is attached, and the various spring-propelled balance and stop elements of the invention; and Fig. VIII is a vertical section taken on line VIII VIII, Fig.
45 III, and shows the cylinder with its key-slots and the bifurcated key seated therein, which key is transferable from one key-slot to another to adjust the pressure of the spiral springs.

50 Referring to the drawings, 1 represents a window-sash and 2 a casing, to which, respectively, our device is attached.

3 represents a straight metal cog-rack, which is inlaid in the vertical side of the sash, and, preferably, is in duplicate on both
55 sides of the same, to which it may be secured by screws 4 at each end or by any other suitable means. The rack is sufficiently inlaid in its recessed bed 5 to house the cogs 6, so that their points do not project beyond the
60 flush line of the surface edge of the sash.

7 represents hollow cylinders which house the pressure-springs and the combined gear and friction-wheels, which cylinders are inclosed in the boxings 8 in the window-cas-
65 ings in corresponding positions adjacent to the racks that are boxed in the sash, preferably on each side thereof. The said cylinders are provided with bifurcated forward extensions. 9, on the forward ends of which extensions
70 are brazed or otherwise secured the attachment-plates 10. The said attachment-plates with said cylinder and its housed devices (hereinafter described) are inlaid at 11 and secured to the window-casing by the screws
75 12, which pass through perforations 13 in said plates and engage in their screw-seats 14 in said casing.

The attachment-plate is provided with a large rectangular slot 15 in its center, through
80 which is passed the geared friction-wheel and other devices to be housed in the cylinder.

16 represents a dovetail sliding plate which runs in its dovetail groove seat 17 in the attachment-plate, and which sliding plate has
85 a rectangular slot 18 in its center. The said plate, while it holds captive the aforesaid housed devices within the cylinder, at the same time allows the projection of the cog-gear and friction-surface of the spring-actuated balance and stop wheel for its functional operation as a sash gravity balance and stop. The plate when seated in position constitutes a buffer-stop to the spring-projected journal-bearing arms 21 to limit their projection
95 of the wheel, and also before the insertion of the cylinder within the casing it keeps the devices housed therein. The said dovetail slide is removed when said devices are in the process of insertion therein or of re-
100 moval from the cylinder.

19 represents the inner hollow spring-propelled cylinders that telescope within the outer cylinders 7, and are provided at their

forward ends with peripherally-enlarged flange-collars 20 integral therewith, from which collars extend longitudinally of the cylinders the bifurcated journal-bearing arms 21, which are flat on the inside, but are convex on the outside, being curved to the arc of a circle that corresponds with those of the flange-collars, from which they extend and with which they are integral. Thus the convex outer surfaces of said journal-bearing arms register with the concave inner surfaces of the cylinders 7 and of their bifurcated arms 9, within which they telescope.

22 represent axles which are loosely journaled in their perforated bearings 23 in said bifurcated arms 21, and on said axles are fast seated the perforate peripherally-enlarged or diametrically-extended hubs 24 of the combined gear and friction balance top wheels 25. The said hubs 24, which are preferably of cast metal, have integral unspoked boxed extensions from their central journal-bearings to the cog-gears 26 around their peripheries on the one side, and which peripheral cogs are preferably cast integral therewith, and on the other side said boxed hubs extend to the combination elastic friction-tires that are mounted around them. The said friction-tires are constituted of elastic rubber bed-hands 27, that are fast seated on the hubs on the contrary side to that of the cog-gears and peripherally surmounting leather friction-tires 28, that are fast mounted on said elastic rubber beds. Now it will be seen that, as shown in Figs. II, III, IV, and VII, the cogs extend about their own length beyond the friction-tires, for they have to work in geared connection with the cog-racks 3, which are housed in their recessed beds 5 within the sash, while the friction-tires work on the surface edges of said sash. An intervening frictional surface 29 is left open clear to the periphery of the hub between the cog-bed extension and the friction-tire, for a purpose hereinafter described.

30 represents spring-boxes that are recessed within one side of the hubs 24, in which boxes are housed the coil-springs 31. The inner terminal loops 32 of said springs are securely attached to the axles 22 by the keys 33, that engage in said loops and said axles, and the outer terminal loops 34 are secured to one of the bifurcated journal-bearing arms 21, that carry the wheels 25, by the screw-key 35, which engages in said outer loop and is secured in its screw-seat 36 in said journal-bearing arm.

Now it will be understood that as the coil-spring is placed in the spring-box within the wheel in the required operative direction for the cog-rack on the sash, as said sash is lowered, acting on the cog-gear of the wheel to wind up said spring, and as it does so the spring approximately counterbalances the gravity of the sash, so that the usual counterpoise-weights are dispensed with, as also are the frequent consequent annoyances of broken cords and lodged weights. When the sash is

fully lowered, the coil-spring in consequence is fully wound. The active strength of the spring nearly counterbalances the dead-weight or gravity of the sash, so that but a slight action of the hand in either direction will overcome the counterpoise and either raise or lower the window; but as this invention is a combined spring-actuated sash-balance and friction-stop, the coadjutant and adjustable spring-pressure devices, &c., that actuate said friction-stop enter in combination as concomitants of the invention, for the gravity of the sash is unavoidably increased and decreased, respectively, in wet weather on the one hand and dry on the other. Therefore it is required that there should, besides the spring-actuated sash-balance cog-gear, be combined the friction-stop shown and described on the other side of the wheel. This friction-tire 28, as has been described, is itself a combination-pad, having a leather friction-surface lying around an elastic rubber bed that combines the wearing qualities of the leather with the elastic pressure of the rubber.

We will now describe the adjustable spring-pressure devices that elastically force the combined gear and friction wheel to its work.

37 represents pressure-blocks that work within the inner hollow cylinders 19, and whose forward friction-tongues 38 have concave ends that fit to the convex peripheral surfaces of the balance-stop wheels 25 between the cog-gear 26 and the friction-pads.

39 represents the minor spiral-springs that are housed and work in the spring-chambers 40 within the inner cylinder 19, to exert their spring-pressure on the pressure-blocks 37. The said springs are held and forced to their work by the disk-heads 41 of the screw-bolts 42, the disk-heads working within said spring-chambers.

43 represents the major spiral springs that are seated in the spring-chambers 44 within the outer cylinders. The said major spiral springs press against the flange-collars 20 of the inner cylinders 19. The rear screw-threaded ends 45 of the bolts 42 have screw-nuts 46 adjustably seated thereon in the required position for the washers 47, that are in back contact with said nuts, to sufficiently stiffen the pressure of said major and minor spiral springs. The said washer is held to its work by the adjustable bifurcated key 48, whose forks straddle the bolt 42 and whose ends are adjustably seated, respectively, in such of the elongated slots 49 in said cylinder 7 as will accord with the right position of said washer that it locks and the spring-pressure that it is desired should be exerted therefrom.

50 represents a groove in the rear end of the screw-bolt 42, which provides the means, with the aid of a screw-driver, for increasing or reducing the pressure on the minor spring 29, and *via* said spring on the block 37, whose friction-pressure is thus adjusted on the pe-

ripheral surface 29 of the drum of the combined gear and friction wheel 25.

In conclusion, it will be seen by the above-described devices, whose operation has been largely pointed out above in connection with the description, that the elevation and lowering of the sash are definitely controlled with a near approximation to the balance of its gravity by the action of the coil-spring on the cog-gear connection of the balance-wheel with the rack on the sash. At the same time, in combination therewith, the action of the combination elastic friction-pad tire, also peripherally mounted on said wheel, and the pressure-block 37, with frictional action on said wheel itself under the operation of the adjustable-system of pressure-springs, combines with the above-stated balance action a stop action also at any required position of the sash.

We claim as our invention—

1. The combination of the rack 3, the combined cog and friction balance-wheel 25, and the coil-spring 31, housed in said wheel that actuates the same, substantially as and for the purpose set forth.

2. The combination of the rack 3, the cog-wheel that gears into said rack, the rubber tire fast mounted on said wheel on the reverse side to its cog-gear, the leather friction-tire fast mounted on said rubber tire, and the coil-spring mounted within said wheel, substantially as and for the purpose set forth.

3. The combination of the rack 3, the hollow cylinder 7, the bifurcated extension-arms of said cylinder, the inner cylinder 19, provided with the flange-collar 20, the journal-bearing arms 21, that project from said cylinder, the combined cog-gear and friction balance-wheel whose axle-shaft is mounted in the journal-bearings of said arms 21, the said wheel being provided with the spring-box 30, the coil-actuating spring housed within said box in said wheel, and the major pressure spiral spring 43, that pushes on said collar 20 of the inner cylinder to hold the cog-gear of the balance-wheel in gear with the rack 3 and the friction-tire of said wheel in contact with the sash, substantially as and for the purpose set forth.

4. The combination of the rack 3, the combined gear and friction wheel 25, whose cogs gear into said rack and whose elastically rubber-bedded leather friction-tire engages with the sash, and said wheel provided with a peripheral friction surface 29 between said cogs and said friction-tire, and also provided with a spring-box 30, the coil-spring that actuates said wheel, said spring being housed in said box, the pressure-block 37, provided with the friction-tongue 38, that has a friction-pressure on said peripheral surface 29 of said wheel, and the minor spiral spring 39, that actuates said pressure-block, substantially as and for the purpose set forth.

5. The combination of the cog-gear rack, the combined cog-gear and elastic bedded friction balance and stop wheel 25, the coil balance-spring 31, the hollow cylinders 7, that housesaid wheel and its actuating devices, the said cylinder being provided with elongated key-hole slots, the inner hollow cylinder 19, provided with the journal-bearing arms 21, the pressure-block 37, the major and minor spiral springs 39 and 43, the spring-carrier screw-bolt 42, and the bifurcated key 48, seated in the slots 49 in the cylinder 7, substantially as and for the purpose set forth.

6. The combination of the cog-gear rack, the combined cog-gear and elastically-bedded friction-tired wheel, the coil and pressure springs that actuate said wheel, the housing and journal bearing hollow cylinders 7 and 19, that house and carry said wheel, the centrally-slotted attachment-plate 10, with its screw-fastenings, by which said cylinder 7 is secured in its housing, said plate provided with the dovetail grooves 17, and the centrally-slotted dovetail sliding plate 16, said plate arranged so that while it allows sufficient projection of the cog-gear and friction-tire of the wheel at the same time keeps it and its actuating devices captive within its housing, substantially as and for the purpose set forth.

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In presence of—

BENJN. A. KNIGHT,
THOS. KNIGHT.