

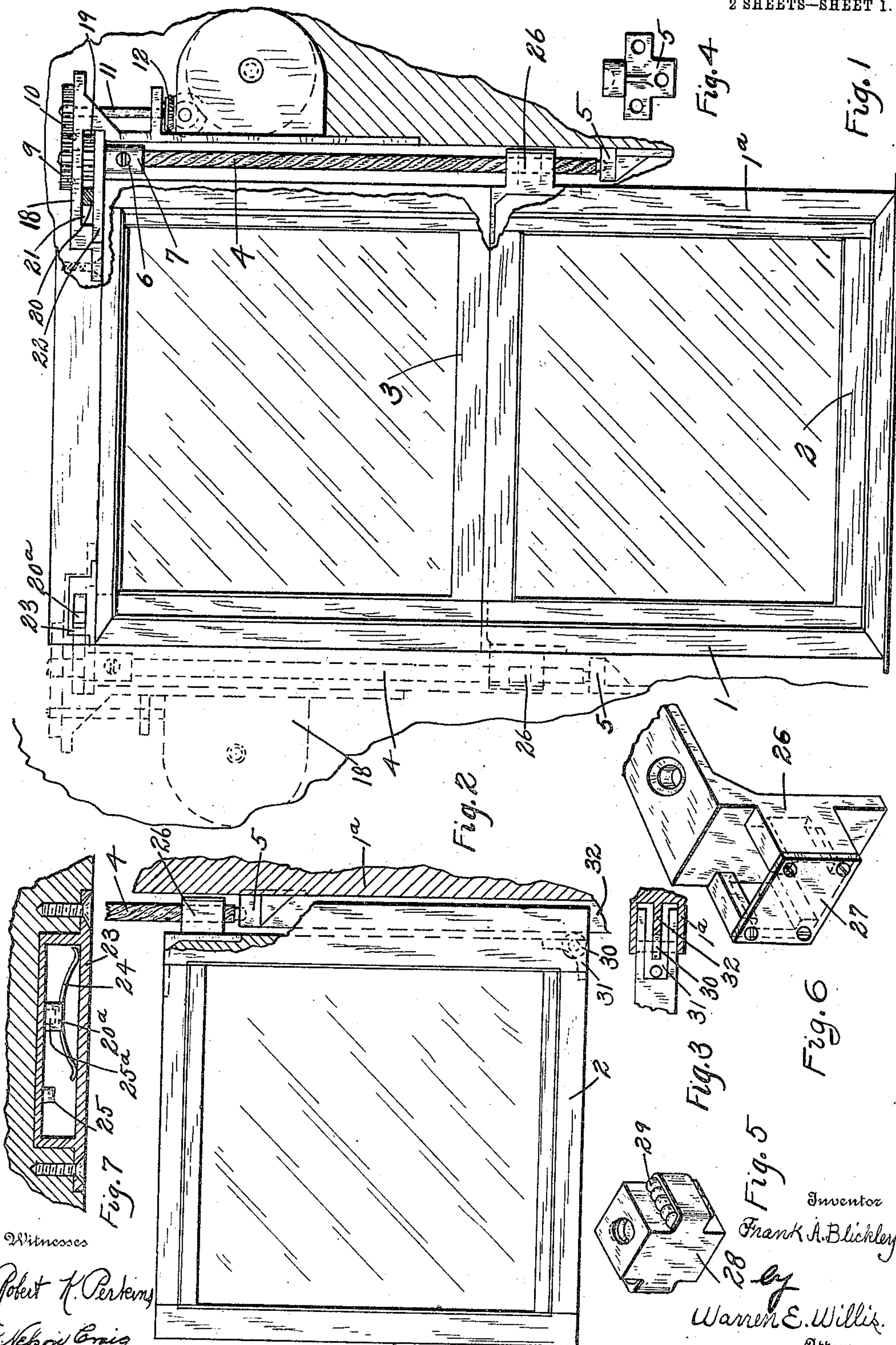
No. 822,717.

PATENTED JUNE 5, 1906.

F. A. BLICKLEY.
SASH BALANCE.

APPLICATION FILED FEB. 20, 1905.

2 SHEETS—SHEET 1.



Witnesses

Robert K. Perkins
N. Nelson Craig

Inventor

Frank A. Blickley

by
Warren E. Willis.
Attorney

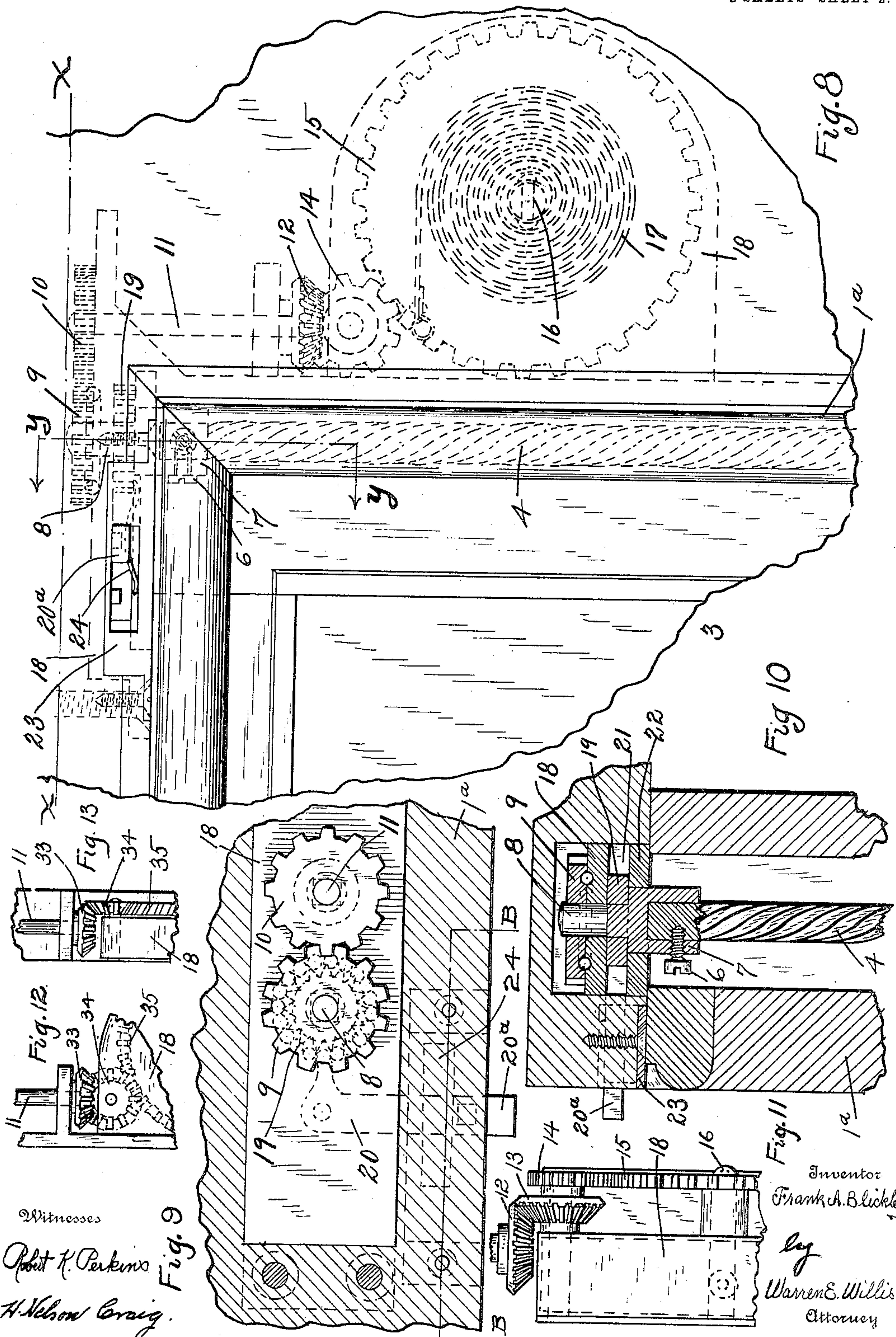
No. 822,717.

PATENTED JUNE 5, 1906.

F. A. BLICKLEY.
SASH BALANCE.

APPLICATION FILED FEB. 20, 1905.

2 SHEETS—SHEET 2.



Witnesses
Robert K. Perkins
H. Nelson Craig.

Inventor
Frank A. Blickley
by
Warren E. Willis
Attorney

UNITED STATES PATENT OFFICE.

FRANK A. BLICKLEY, OF PHILADELPHIA, PENNSYLVANIA.

SASH-BALANCE.

No. 822,717.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed February 20, 1905. Serial No. 246,457.

To all whom it may concern:

Be it known that I, FRANK A. BLICKLEY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Sash-Balances, of which the following is a specification.

This invention relates to devices for holding weights in equilibrium, and is particularly adapted to be used in connection with window-sash in place of the counterweights commonly employed.

Its objects are, first, to provide a substitute for such weights that shall occupy relatively less space; second, to provide a counterbalance which shall be readily adjustable to balance sash of varying weights; third, to provide a balance that is less expensive than the better grade of sash-balances and which dispenses with pulleys, cords, and weights. Its objects are accomplished by the device hereinafter fully described and shown in the accompanying drawings, in which—

Figure 1 is an elevation of a window-frame balanced with my invention, having the casing partially broken away. Fig. 2 is a similar view of a lower sash, but showing only one device attached. Fig. 3 is a fragmentary view on the bottom of Fig. 2. Fig. 4 is a front elevation of the lower bearings for the shaft. Fig. 5 is a perspective view of the traversing end, showing the balls in place. Fig. 6 is a perspective view of the end bracket. Fig. 7 is a transverse section on line B B of Fig. 9. Fig. 8 is an enlarged front elevation of the window-casing corner, showing a portion of the mechanism. Fig. 9 is a sectional view taken on line *xx* of Fig. 8. Fig. 10 is a sectional view taken on line *yy* of Fig. 8. Fig. 11 is a fragmentary view showing bevel-gearing. Fig. 12 is a partial front elevation, showing an alternative form of construction of gearing. Fig. 13 is a side view of the same.

Similar characters refer to similar parts throughout the several views.

1 and 1^a represent the casing of the window, while 2 represents the lower sash, and 3 the corresponding upper sash. The vertical rod 4, having a helical thread thereon, has a bearing in the bracket 5 at its lower end, while its upper end is fitted to the socket 7 and adjustably held therein by the screw 6. The socket 7 has an extension 8 passing through the upper part of the mechanism and on it is rigidly centered the spur-gear 9,

adapted to mesh with a similar spur-gear 10, the same being centered on the short vertical shaft 11, which, after passing through suitable bearings, has at its extreme lower end the bevel-gear 12, adapted to mesh with its mate 13. The said bevel-gear 13 is integral with the spur-pinion 14, meshing with the spur-gear 15, the latter being rigidly centered on the pivot 16, which is freely revolvable within suitable bearings formed in the case 18. The spirally-coiled flat spring 17 has its inner end attached to the pivot 16, while its outer end is secured to the interior of the case 18 in such a manner as to exert its tension upon the helically-threaded rod 4 through the gear-train just described. Between the upper part of the case 18 and the lower side of the spur-gear 9 is interposed a ball or roller bearing surrounding the socket extension 8 and adapted to allow the gear 9 to turn freely. Also on the socket extension 8 is attached the ratchet-wheel 19, while the pawl 20 is adapted to engage with it, the purpose of the said pawl being to lock the window-sash in any position and also for the purpose of holding the spring from uncoiling while giving it additional tension. The said pawl 20 works in the opening 21, formed by the upper portion of the bracket 18 and plate 22, located at the top of the window-casing.

Directly in front of the opening 21 is the bracket 23, which contains the elliptical spring 24, secured to the outer end of the pawl 20, which has a further extension 20^a, reaching out from the upper casing and adapted to be grasped by hand or operated by any convenient means. Immediately above the elliptical spring 24 and central therewith is an opening in the pawl-shank 20, which is adapted to receive the projections or lugs 25 and 25^a, which are a part of the bracket 23. If the window be raised, it will evidently cause the helically-threaded rod 4 to revolve and by its connections through the socket 7, stem 8, gears 9 and 10, shaft 11, bevel-gears 12 and 13, and pinion 14 impart rotary motion to the spur-gear 15. As the post 16 is rigidly affixed in the spur-gear 15 it must also revolve and carry with it the inner end of the coil-spring 17, uncoiling the same. If at this time the pawl 20 be brought into engagement with the ratchet-wheel 19, which is affixed on the stem 8, the gear-train is locked or prevented from acting, and while the train is so locked the screw 6 may be loosened, allowing the helically-threaded rod

to revolve freely as the window is lowered, its upper end turning within the sleeve 7. Then when the window is at some point near the top the screw 6 may be tightened, where-
 5 upon lowering the window winds up the spring, the pawl 20 having been removed from engagement with the ratchet-wheel 19. The nut-bracket 26 is attached, by means of wood-screws, to the side of the sash 2 and 3.
 10 The said bracket 26 has the cap 27 riveted or otherwise secured to it. Within the bracket 26 is positioned a nut 28, adapted to transverse the threaded rod 4. The said nut 28 is held in such manner by the bracket 26 that
 15 it is obliged to move longitudinally of the helically-threaded rod 4 as the window is raised or lowered. The nut 28 has a limited amount of side motion within the bracket 26, allowing it to freely move on the threaded
 20 rod 4, irrespective of inaccuracies in the window and window-frame construction and for wear of the parts. In order to provide for free action of the nut 28 within its bracket, it is formed with recessed raceways above
 25 and below its point of contact with the bracket, in which are placed the balls 29.

While I prefer to make use of a nut held in the manner as above described, I do not wish to confine myself to this exact form of con-
 30 struction, the form of the nut not being material so long as the helically-threaded rod is caused to be rotated by the action of the nut. If the rod 4 be caused to revolve, it is evident that motion will be transmitted through the
 35 socket 7 and the train of gears 9 and 10, the shaft 11, the miter-gears 12 and 13 to the pinion 14, to the gear 15, causing the central post 16 to revolve, acting with or against the tension of the coiled flat spring 17. Obviously
 40 the tension in the said spring 17 may be so adjusted originally as to cause the sash to remain at whatever height may be desired. In place of the miter-gears 12 and 13, pinion 14, and spur-gear 15 I may make use of the con-
 45 structions as shown in Figs. 12 and 13, which consist of a skew-bevel gear 33, centered on the shaft 11, meshing with the corresponding skew-bevel gear 34, which in turn meshes with the large skew-bevel gear 35, attached
 50 to the center post 16.

From the foregoing description it will be clearly evident that this invention is equally applicable to vertically-sliding screens, blinds, or doors, as well as windows, and will act
 55 equally well if the mechanism be reversed and attached at the bottom of the casing in place of at the top, as shown.

Having thus described my invention, what I claim, and desire to secure by Letters Pat-
 60 ent, is—

1. In a sash-balance, the combination with a sash, of a coiled spring, a helically-threaded shaft operatively connected therewith,

means for adjusting the tension of the said spring, a bracket attached to the said sash 65 having a ball-raceway therein, a nut adapted to transverse the said shaft, loosely contained in the said bracket and a plurality of balls within the said bracket-raceway, above and below the said nut, all substantially as shown 70 and described.

2. A sash-balance, comprising a rotatable socket-piece, a coiled spring connected there-
 to, a ratchet-wheel on the said socket-piece, a pawl adapted to engage the said ratchet hav- 75 ing an extended shank, means for securing the shank either in or out of engagement with the ratchet-wheel, a rotatable screw-threaded rod adjustably engaging the said socket-piece, a foot-bearing for the end of the 80 said threaded rod and means for connecting or disconnecting the pawl from the ratchet, all substantially as shown and described.

3. In a sash-balance, the combination with a window-sash, a nut affixed thereto and a 85 revoluble helical shaft, of a socket-piece, a ratchet-wheel thereon, a pawl engaging the ratchet-wheel, a spur-gear centered on the socket-piece, a second spur-gear meshing with the first, a bevel-gear, a shaft connect- 90 ing the second spur-gear and the bevel-gear, a spring-case, a spring therein, a stud affixed to the spring, a large spur-gear attached to the said stud, a spur-gear meshing with the large spur-gear integral with the second 95 bevel-gear, a bearing for the said helical shaft attached to the window-casing, all as and for the purposes as set forth.

4. In a sash-balance, the combination with a window-sash, a nut movably affixed there- 100 to and a revoluble helical shaft, of a socket-piece, a ratchet-wheel thereon, a pawl engaging the ratchet-wheel, means for operating the said pawl, a spur-gear centered on the socket-piece, having a ball-bearing between 105 its side and the part adjacent, a second spur-gear meshing with the first, a bevel-gear, a shaft connecting the second spur-gear and the bevel-gear, a spring-case, a stud revoluble within the case, a spring contained therein 110 having its inner end attached to the said stud, a large spur-gear centered on and secured to the said stud, a spur-gear meshing with the large spur-gear and integral with the second bevel-gear and a bearing for the 115 said helical shaft attached to the window-casing, all as and for the purposes as set forth.

In testimony whereof I have signed my name to this specification in the presence of 120 two subscribing witnesses.

FRANK A. BLICKLEY.

Witnesses:

LOUIS VON GRAEVE,
 ROBERT K. PERKINS.