

No. 667,302.

Patented Feb. 5, 1901.

O. M. EDWARDS.
SPRING ROLLER.

(Application filed Dec. 15, 1899.)

(No Model.)

Fig. 1

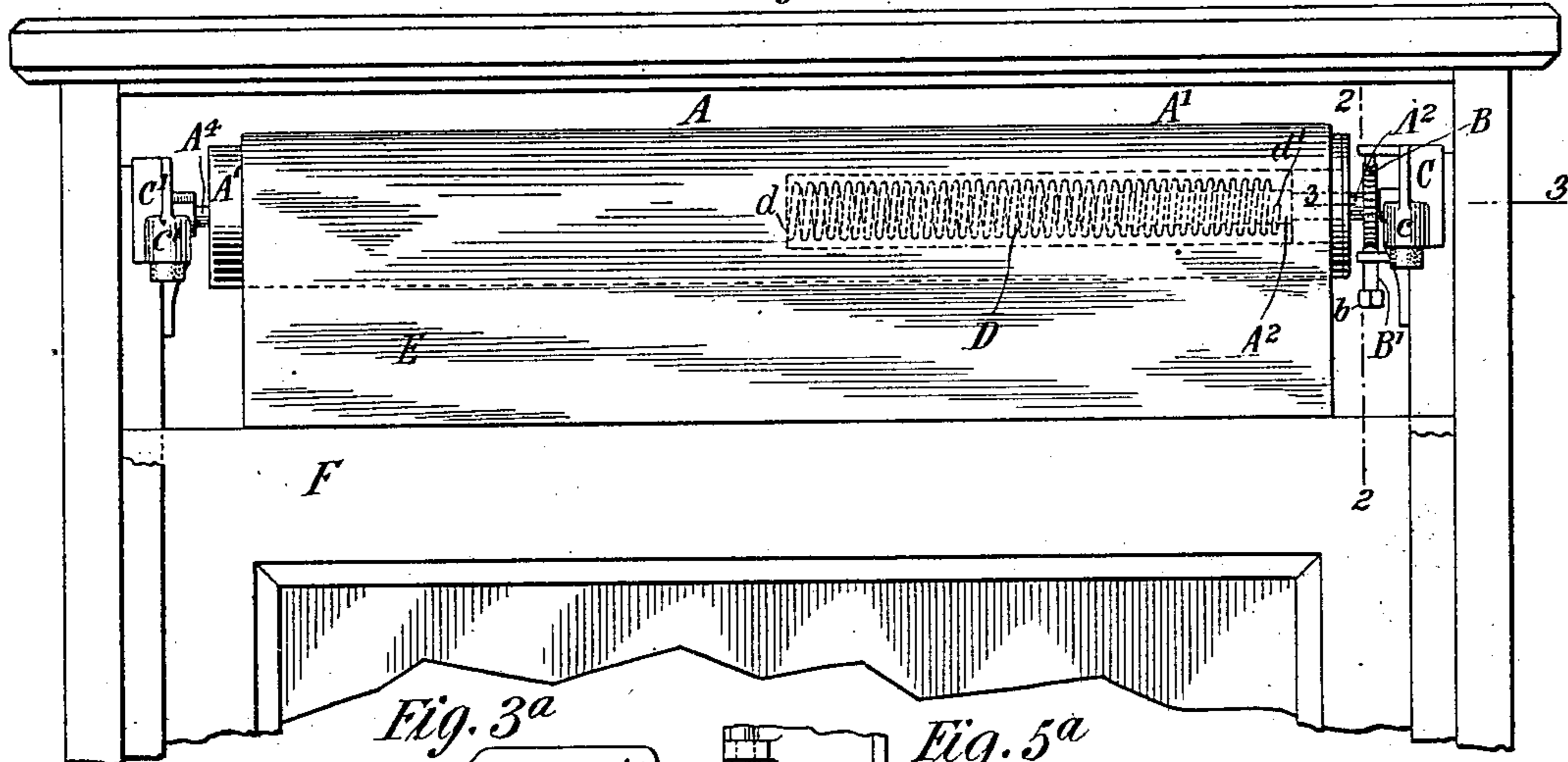


Fig. 3a

Fig. 5a

Fig. 5

Fig. 4

Fig. 3

Fig. 2

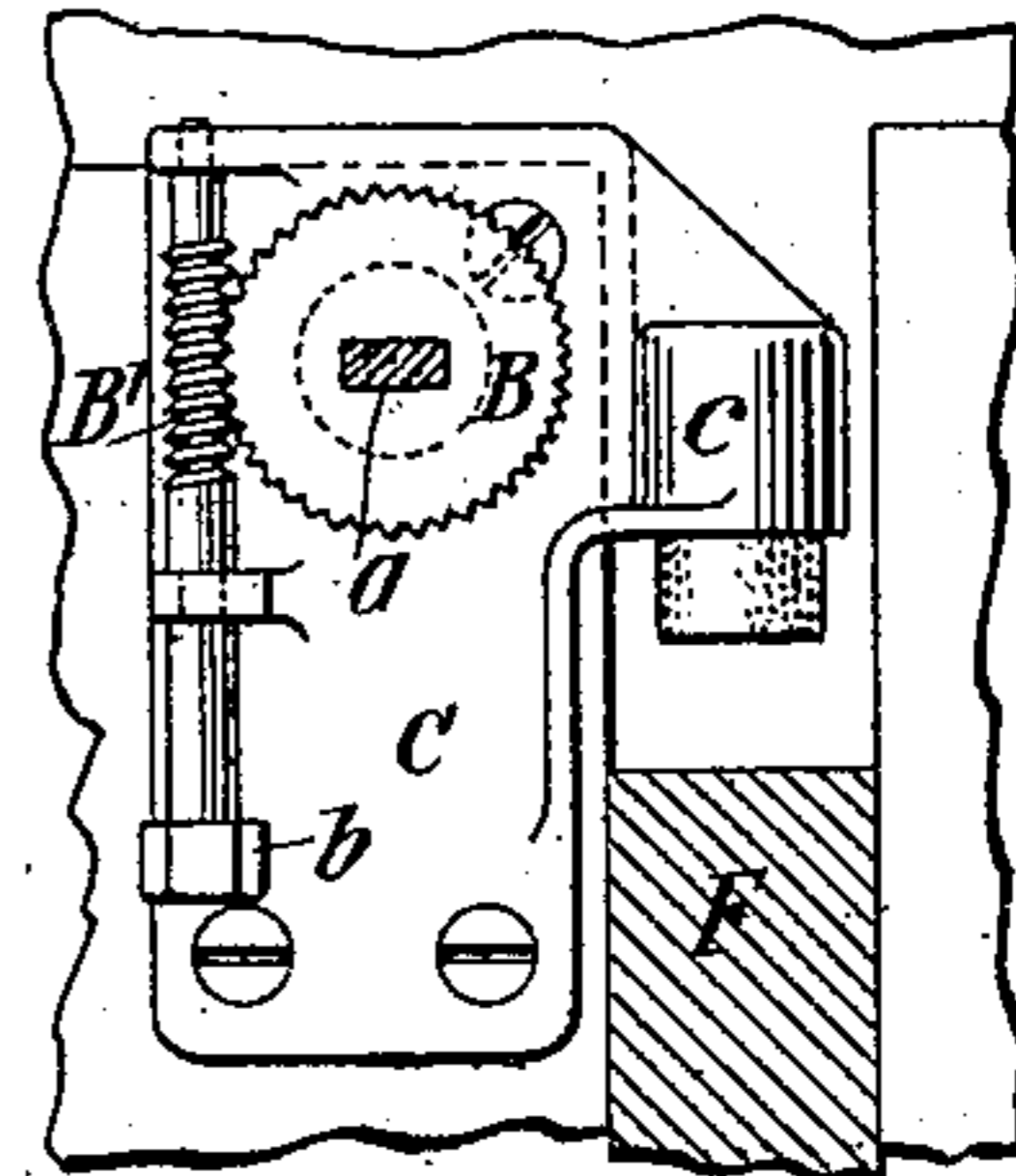
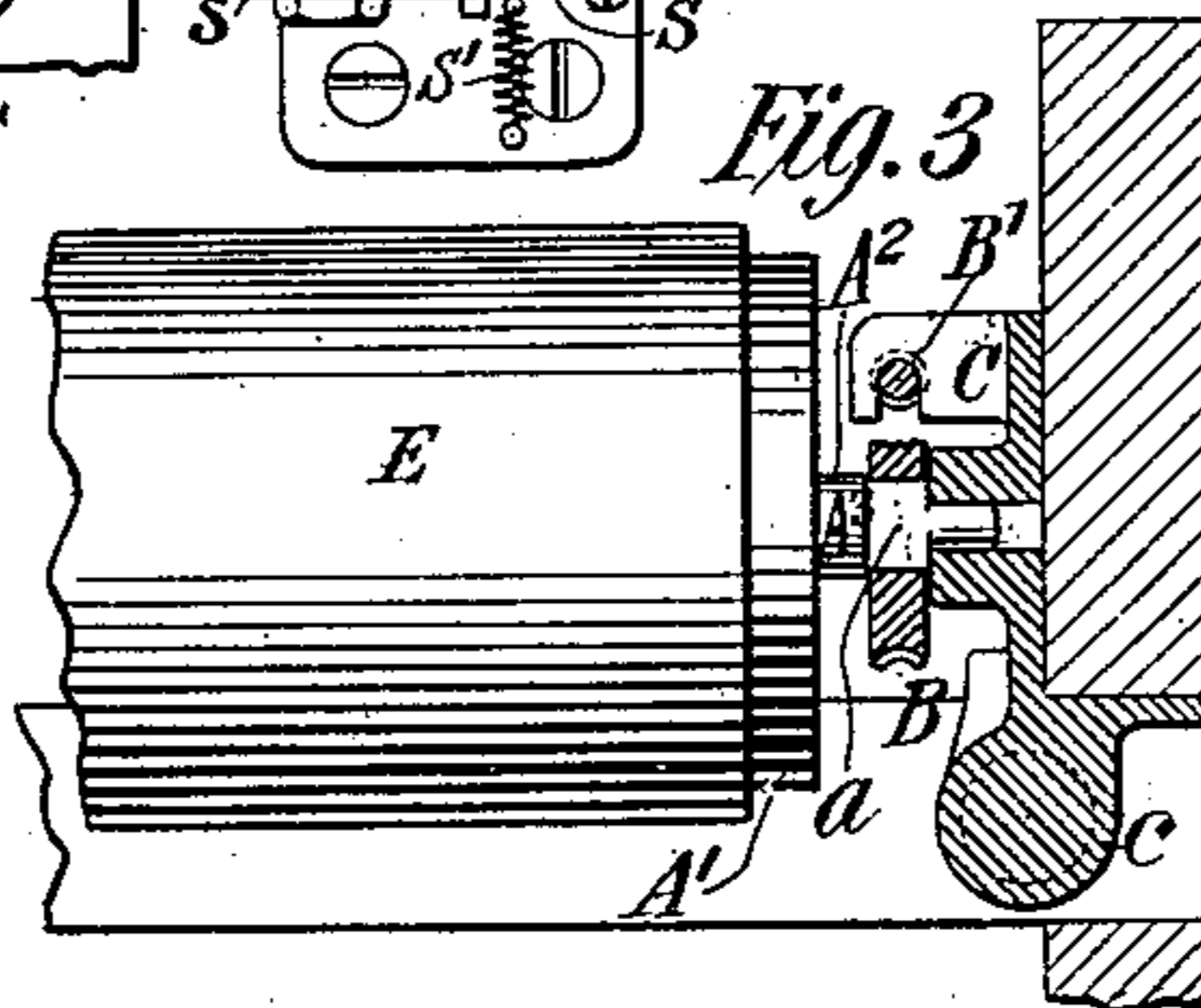
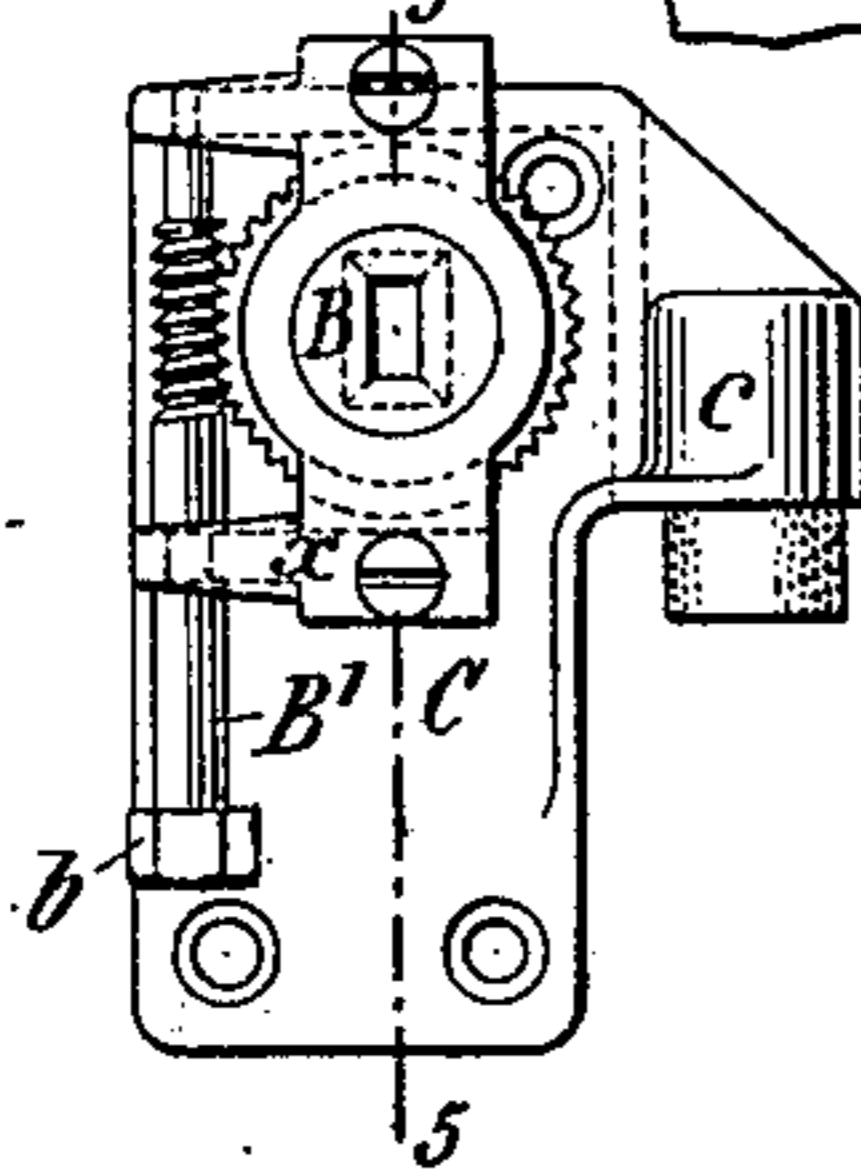
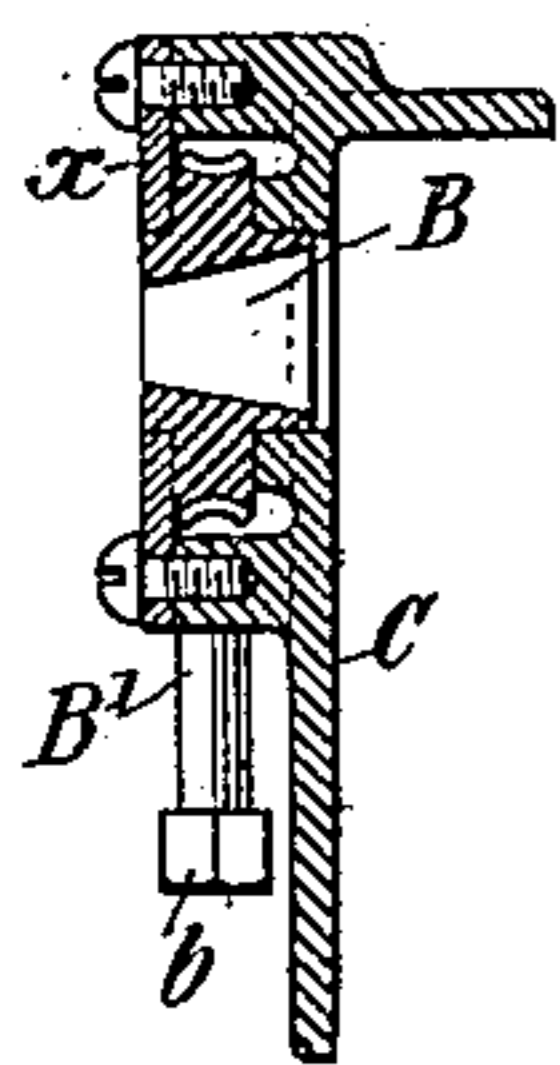


Fig. 6

Fig. 7

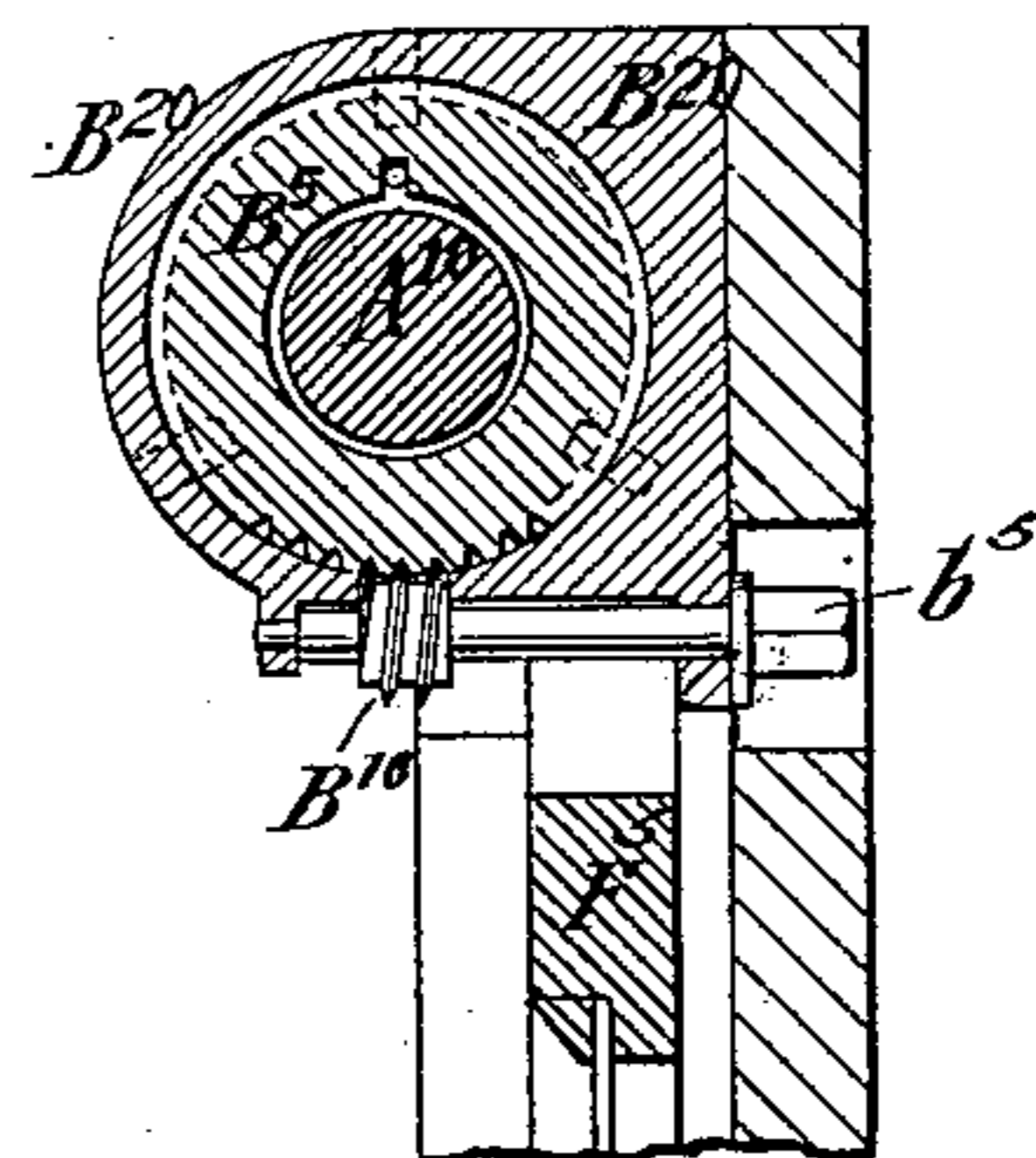
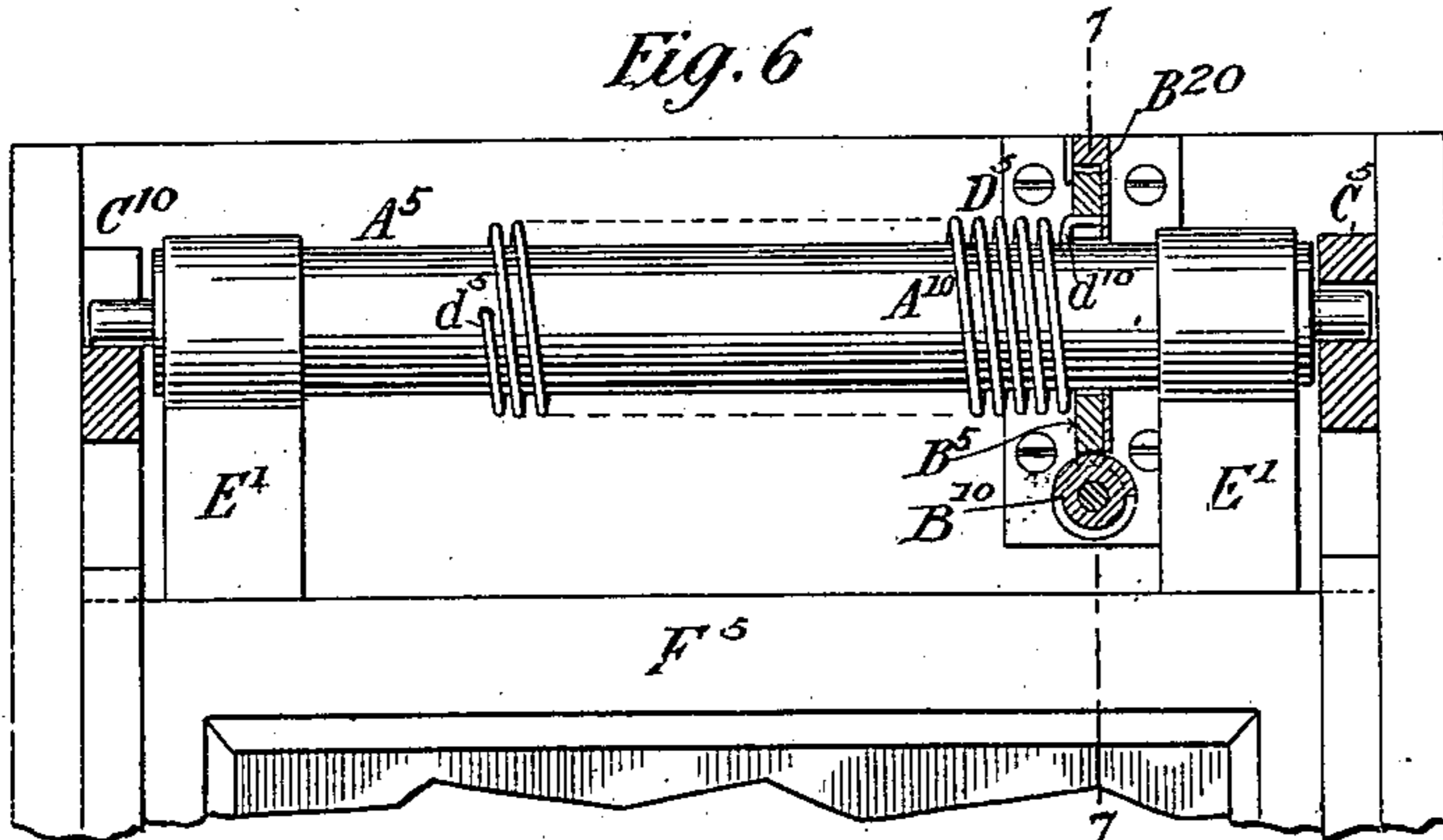
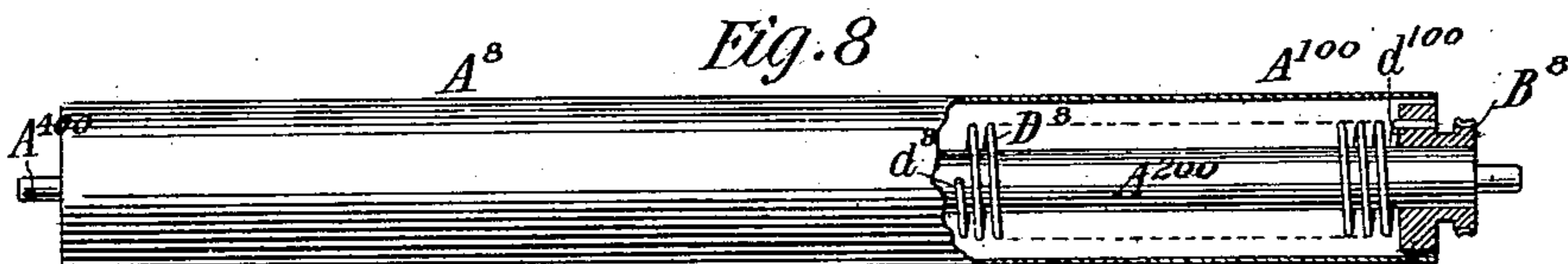


Fig. 8



Witnesses:

Raphael Ketter
Caroline D. Morrill

Oliver M. Edwards, Inventor
by Henry L. Kneeling, Atty

UNITED STATES PATENT OFFICE.

OLIVER M. EDWARDS, OF SYRACUSE, NEW YORK.

SPRING-ROLLER.

SPECIFICATION forming part of Letters Patent No. 667,302, dated February 5, 1901.

Application filed December 15, 1899. Serial No. 740,398. (No model.)

To all whom it may concern:

Be it known that I, OLIVER M. EDWARDS, a citizen of the United States, residing at Syracuse, county of Onondaga, State of New York, have invented certain new and useful Improvements in Window Sash and Curtain Operating Devices, of which the following is a full, clear, and exact description, reference being had to the drawings accompanying and forming a part of the same.

My invention relates to devices wherein a single roller is employed to sustain or automatically raise a window sash or curtain by the winding upon such roller flexible material interposed between the roller and sash or the winding on the roller of the material of the curtain itself, which, of course, is flexible, the sash or curtain in its ordinary use being uncontrolled by automatic dogs or catches acting upon the rollers. Single rollers with springs and means by which the tension of the springs could be changed or adjusted to a certain extent only when the roller is removed from its mountings have been used; but, so far as I know, one part of such means had always to be held stationary in its mountings when the roller was in working position and other parts of such means had to be thrown out and held out of operative action at all times except when the roller was removed from, or in the act of being removed from, or put into its brackets or mountings, at which time these portions are temporarily thrown into operative action. This requires that the roller shall be placed in its brackets or mountings in a particular way and to be removed therefrom and returned whenever any change in adjustment of tension is to be made, which change must be in fixed and predetermined amounts. The many removals and replacements of the roller in its mountings increase the danger of improperly placing the roller therein, which improper placing has to be guarded against, as it makes accidents liable to occur instead of guarding against their occurrence. These rollers thus used have the body or barrel composed of a metal tube, with suitable interior supports and with means by which the curtain or flexible material interposed between the roller and sash can be attached thereto. Within the barrel or body there are a coiled spring and

spindle, one end of the spring being attached to the barrel and the other end to the spindle. This spindle extends loosely through one end of the barrel and it is provided with a disk having a single notch or recess adapted to receive the free end of a dog or pawl attached to the barrel in proper position to be made to engage with such notch. This spindle extends beyond the disk with its notch and is flattened to be received in a suitably-shaped slot in a bracket attached to the window-frame and to be held stationary therein against rotation. The body or barrel of the roller rotates upon the spindle at one end and upon a fixed journal or bearing working in a bracket at its opposite end. The roller is always placed in its brackets or mountings with the notch in the spindle underneath, so that the dog or pawl when once released from the notch in the spindle is held by gravity away from such notch and cannot engage therewith during the ordinary use of the roller. Thus gravity not only throws the dog or pawl out of operative action, but also holds it out until the dog or pawl is lifted upward against the force of gravity by the hand of the operator, which is done whenever the roller is to be removed from its mountings. This construction of rollers thus used and the ease with which they can be removed from their brackets and replaced therein without disturbing said brackets, and consequently the normal working position of such roller on the window, as well as the manner of adjusting the tension of the springs of these rollers, are well known to those familiar with their use in the manner explained. Again, single rollers with springs and means by which the tension of the springs could be changed or adjusted without removing the rollers from their brackets or mountings, which support them in working position on the window, have been made; but, so far as I know, there has been no provision made for removing the rollers from their brackets or mountings without first detaching the brackets, with the rollers mounted therein, from the window, and then removing more or less of the adjusting means from the roller or their brackets.

My invention has for its object the provision of means by which the tension of the springs of such rollers may be changed or ad-

justed to any degree of nicety desired without the removal or disturbance of the rollers in their brackets or mountings by which they are held in working position, and yet such
 5 rollers for other purposes can be readily removed from such brackets or replaced therein without disturbing them or their attachment to the window. Also when the change in the tension of the springs is once made it
 10 can be maintained until another change is desired.

My invention consists, first, in the combination of a roller having a body portion or barrel of the general character described, with
 15 bearings adapted to be received in brackets or supports adjacent to the opposite sides of a window-frame, brackets or supports therefor, a rotatable part arranged between the brackets, which receive the supporting ends
 20 of the roller, so as to rotate in substantially the axial line of rotation of the roller, a spring one end of which is connected to the roller and the other is connected to the rotatable part, and means connected with the rotatable
 25 part by which it may be rotated while the roller remains in its supports and permit it to be removed from and replaced in the brackets without disturbing their attachment to the window, and, second, in the combination
 30 of a roller having a barrel and spindle of the general character described, a spring one end of which is connected to the barrel and the other is connected to the spindle, a bracket provided with means adapted to receive in an
 35 endwise direction the extending end of the spindle and rotate the same to the desired extent and hold it in place until it is desired to again rotate the spindle, and a bracket adapted to receive the bearing on the opposite end
 40 of the roller and to rotate therein; and it also consists in the combinations of devices hereinafter described, and particularly pointed out in the claims.

I have shown in the drawings embodiments
 45 of my improvement as the same may be applied to sustain and lift the sashes of car-windows; but it is obvious that it may be employed in constructions for sustaining and lifting the sashes of the windows of other
 50 structures than railway-cars or in sustaining and lifting of curtains or other things in a similar manner.

Like letters of reference wherever they occur indicate corresponding parts in the several figures of the drawings.

Figure 1 shows an elevation of a portion of the window of a car, illustrating the roller supported in brackets attached to the opposite sides of the window-frame, with the sash
 60 partly raised, by the winding of the web of material partially on the roller, the sash and frame being broken away, as seen. Fig. 2 shows a vertical section on line 2 2 of Fig. 1; and Fig. 3 shows in plan view the portion of
 65 the roller, the bracket, and the window-frame at the right-hand end of Fig. 1, the bracket and frame being in section on line 3 3 of the

last-named figure and a portion of the part designated as B broken away. Fig. 3^a shows one form of constructing the bracket C' 70 seen at the left of Fig. 1. Fig. 4 shows in side elevation a modification of the construction illustrated in the preceding figures, and Fig. 5 shows in section on line 5 5 the construction seen in Fig. 4. Fig. 5^a shows a construction of locking-detent which may be
 75 added to the constructions shown in Figs. 1 to 5, inclusive, if desired. Fig. 6 shows in elevation and partly in section another modification, the sash being partly raised and the
 80 frame and sash being broken away, as is the case in Fig. 1. Fig. 7 shows in vertical section on line 7 7 the construction illustrated in Fig. 6; and Fig. 8 shows, partly in longitudinal section, still another modification, the
 85 roller herein shown being adapted to be received in brackets or supports similar to those seen in Figs. 1, 2, and 3 or of other desired form.

The roller A in Figs. 1, 2, and 3 is constructed 90 like those hitherto described, except that there is no dog attached to the barrel or disk with a notch attached to the spindle, as is customary with those rollers. This roller A has a body portion or barrel A', and within its interior there is a loosely-mounted spindle A², 95 one end of which extends or projects from the body portion A'. This extending or projecting portion of the spindle is flattened on two of its sides, as seen in Fig. 2, where this flattened portion is seen in cross-section, and it is designated *a*, and upon this portion between
 100 the supporting ends of the roller there is received a disk B, with an oblong opening in its center adapted to fit over the flattened portion *a* of the spindle, also as seen in Fig. 2. The periphery of this disk B is provided with gear-teeth, and it forms a "worm-gear," with which the worm B' engages, as seen, so that
 105 as the worm is rotated it rotates the disk B, which disk forms a rotatable part arranged between the supporting ends of the roller and its bracket. The worm B' is mounted in bearings in the bracket C, as seen in Figs. 1, 2, and 3, and it is free to revolve therein. As
 110 there seen, this worm is provided at one end with squared head *b*, adapted to receive a socket-wrench, by which the worm B' can be turned in either direction, accordingly as it is desired to turn the disk B. The spindle A² 120 extends loosely through the end of the body portion or barrel A' and turns freely therein. The projecting end of this spindle projects beyond the disk B, as seen in Fig. 3, and it is cylindrical at this point and is received in a
 125 corresponding recess in the bracket C and turns freely therein whenever the spindle is turned by the rotation of the disk B. This extending end of the spindle forms a bearing A³, on which the barrel of the roller revolves as 130 the flexible material is wound thereon and is unwound therefrom, and it also when received by the bracket C supports that end of the roller. At the opposite end of the barrel there

is another bearing A⁴, cylindrical in form and which is received in a suitable recess in a bracket C', attached to the window-frame in position to properly receive the bearing A⁴ and support that end of the roller. If desired, the recess in the bracket C' may be provided with an opening, as seen in Fig. 3^a, by which the bearing A⁴ may be passed down and into the recess. Within the body portion or barrel of the roller there is a coiled spring D of considerable length, as indicated in dotted lines in Fig. 1, one end of which is connected to the roller at *d* and the other is connected to the spindle at *d'* in a well-known manner. The spring D is the preferred form, owing to its long continued and successful use; but I do not wish to limit my invention to this particular form of spring, as it is obvious to those skilled in the art of springs that some other form might serve the purposes of the present improvement. To the barrel A' there is secured one edge of a web of cloth or other suitable flexible material E, so as to be wound thereon and unwound therefrom whenever the roller A is rotated in one direction and then in the other. The opposite edge of this web or flexible material E is attached to the top edge of a window-sash F, mounted to move up and down in a guideway in the window-frame in a well-known manner. This sash is provided with the usual glass used in car-windows. Each of the brackets C and C' is provided with buffer projections *c* and *c'*, respectively, against which the uppermost portion of the sash may strike when it is raised sufficiently for this purpose. These buffer projections are not necessary for the present improvement, but they may be used, if desired. In applying these rollers to a window the brackets are properly secured in place upon or adjacent to the opposite sides of the window-frame. The roller, with its spring unwound and not under stress or tension, is taken, the disk B applied to the flattened portion of the spindle, and then the extending end of the spindle is entered in the recess of the bracket bearing the worm B', and the bearing A⁴ is passed through the opening into the recess of bracket C', when the roller is supported by the brackets C and C'; but the spring D is not under tension. By applying a suitable socket-wrench of any well-known construction to the squared head *b* of the worm B' it can be rotated in the direction to put the spring under tension to any desired extent without removing the roller from its supports or brackets or disturbing its operative relation therein, when the tension of the spring can be tested and, if desired, another change or adjustment be made, and this can be repeated as often as desired until the amount of stress or tension required is obtained, when the socket-wrench may be removed. If for any reason other than adjustment of the tension of the spring it is desired to remove the roller from its supporting-brackets, the worm is to be turned in the op-

posite direction from that just explained until the spring is unwound and is no longer under tension, when the roller can be removed and, when desired, can be replaced, as before explained, and the spring again placed under the required tension.

Instead of the disk B being mounted on the spindle, as just explained, it may be mounted in bearings on the bracket C, as seen in Figs. 4 and 5, and made a part thereof, so that the gear-teeth on the disk always remain in operative relation to the worm B' and the plain flattened end of the spindle be received in an endwise direction in a suitably-shaped recess in the center of the disk, which disk is free to rotate in its bearings in the bracket C while being held and supported therein. The disk B in Figs. 4 and 5 is constructed with a hub on each side, as seen in Fig. 5, and the longer of the two hubs is received in the back plate of the bracket C, and the shorter hub is received by a plate *x*, secured to the front of this bracket, which is held in place by two screws, as shown in Figs. 4 and 5, or otherwise, as preferred. This construction permits the rollers hitherto in use, by the substitution of new brackets after the dog has been removed, to be used and have the tension or stress of the springs adjusted or changed while the rollers remain in their brackets or supports and without disturbing their operative relation thereto. It also permits of a compact and simple construction and one in which all of the parts are held in place without danger of being disarranged in application or at other times. As seen in Fig. 5, the recess in the disk B may be tapered from the rear to the front or entrance end, if desired. This permits of the entrance of the flattened end of the spindle when not fully in the axial line of the disk and its recess and also to securely hold the spindle in operative relation to the disk so long as any substantial portion of it enters such recess. This recess may be otherwise formed, if desired; but I prefer the tapered form here shown for the reasons stated.

If for any reason it may be thought desirable that the disk B be positively held against rotation, a detent of the form and arrangement shown in Fig. 5^a or other desired form and arrangement may be used. I prefer the form and arrangement of detent S, (seen in Fig. 5^a,) because it is automatically thrown into engagement with the worm B' by spring action and is thrown out of engagement therewith upon the application of the socket-wrench to the squared head *b*. The position of this detent S when disengaged from the head *b* is indicated in dotted lines in Fig. 5^a. As shown, this detent S is loosely pivoted to the body of the bracket C and at its free end is provided with an opening or slot *s*, adapted to straddle the head *b*, as seen, when two opposite sides of the head are substantially parallel with the sides of the opening or slot in the detent S. A spring S', one end of

which is attached to the detent and the other is attached to the bracket, always tends to bring the detent into engagement with the head *b*, and the spring yields to permit the
 5 detent to be pushed upwardly out of engagement with the head by the end of the socket-wrench in its application thereto.

If the flexible material to be interposed between the roller and the window-sash be in
 10 the form of two narrow strips, one near each end of the roller, or in the form of chains or straps, as it may be, then the construction shown in Figs. 6 and 7 may be employed. As here shown, the body portion or barrel A^{10}
 15 is in the form of a plain solid cylinder, which may be of wood, if desired, and it is provided with two plain journals, one at each end, which may be made integral with the barrel, and they are adapted to enter brackets or
 20 supports adjacent to the opposite sides of the window, as shown, or in any other way desired. The barrel is here shown as connected to the sash by two narrow strips of flexible material E' E' , and they wind upon and un-
 25 wind from the barrel in raising and lowering the sash, essentially the same as the single wide web of cloth does in the construction shown in Fig. 1. In Figs. 6 and 7 the spring D^5 is coiled around the exterior of the barrel,
 30 with one end d^5 attached to the roller and the other end d^{10} attached to an annular-shaped rotatable part or disk B^5 , as seen at Fig. 6, the disk B^5 being arranged between the supporting ends of the roller and its brackets.
 35 This annular disk B^5 , as here shown, is provided with worm-gear teeth on its periphery, as in Figs. 1, 2, 3, 4, and 5, and it is mounted in a case or support B^{20} , attached to a portion of the window, as clearly indicated in Figs.
 40 6 and 7, so as to be held in operative position and be free to rotate therein, its axial line of rotation being substantially that of the rotation of the roller A^5 , the disk being substantially concentric thereto. The case or sup-
 45 port in which the annular disk B^5 rotates can be removed from the window-frame and replaced thereon without in any way disturbing the attachment of the brackets which support and hold the roller in place, and the
 50 support B^{20} is on its lower portion provided with an opening through which a worm B^{10} may engage with the gear-teeth on the disk, and it is also provided with portions which serve to receive the bearings formed on the
 55 worm, as shown. The worm in this case, as in the others, is provided with a squared head b^5 , by which it can be turned and the rotatable part or annular disk B^5 rotated to the desired extent and the spring D^5 be wound
 60 up and put under the required stress or tension. As seen in Figs. 6 and 7, the worm is arranged horizontally instead of vertically, as in Figs. 1 to 5. This worm may be arranged in any desired relation to the horizon;
 65 but the arrangement seen in Figs. 1 to 5 is the preferred arrangement when the improvement is applied to the sashes of car-windows,

as shown herein. In this construction (seen in Figs. 6 and 7) the roller, with the annular disk B^5 and its supporting-case B^{20} , en-
 70 circling the roller, is placed in its supports or brackets, and the case B^{20} is secured in place, as shown, when the spring D^5 can be placed under stress or tension to the required extent, as before explained. The mode of op-
 75 eration in each case is essentially the same so far as concerns the changing or adjusting of the tension of the spring, while the roller remains in its supports or brackets. To re-
 80 move the roller from its supporting brackets, the case B^{20} is detached and the roller removed from the brackets without disturbing their attachment to the window, and consequently the roller can be replaced therein in the same
 85 relation to the window-frame and its sash as before.

Instead of making the barrel of a solid cylinder, as in the construction shown in Figs. 6 and 7, it may be constructed of a tubular
 90 form out of metal, as in the construction shown in Figs. 1 to 5, inclusive, and as seen in Fig. 8. Also instead of mounting the spindle A^{200} loosely in the interior of the barrel,
 95 as in Figs. 1 to 5, it may be formed integral with such interior portion, as seen in Fig. 8, so as to move bodily with the barrel, as if integral therewith. In the construction illus-
 100 trated in Fig. 8 the spindle A^{200} has the spring D^8 coiled around it, and it receives the rotatable part or disk B^8 , which, as seen, is arranged between the supporting ends of the
 105 roller and brackets and is free to rotate on the spindle, and it is held in place endwise of the spindle by the action of the spring D^8 or otherwise on one side and by the bracket C
 110 on its other side, the disk being constructed with a portion which is received within the barrel at its end adjacent to the disk, and this portion holds it substantially concentric
 115 with the disk and spindle, so that the axial line of rotation of all three is substantially the same. One end d^8 of the spring D^8 is attached to the spindle A^{200} , and thus to the
 120 roller, and the other end d^{100} is attached to the rotatable part or disk B^8 , so that upon the rotation of B^8 on A^{200} the spring D^8 is wound up or unwound, accordingly as the disk B^8 is rotated. This disk B^8 , as in the other cases, is supplied with worm-gear teeth adapted to engage with a suitable worm and be rotated
 125 thereby.

I have shown herein gear-teeth upon the rotatable parts or disks B , B^5 , and B^8 adapted for use with worms; but I do not wish to limit myself to this form of teeth, although
 130 it is the form that I prefer; but any of the known and desired forms of gear-teeth may be used, of course the device engaging therewith to be adapted for use for this purpose. I prefer that the gear-teeth be formed integral with the rotatable part and have so shown them; but they may be otherwise formed, if desired. Also what would not be technically known as "gear-teeth" may be employed, be-

cause the character of the improvement does not depend on the special form of teeth or other devices by which the rotatable part is made to rotate except in those claims where-
 5 in such forms of teeth are specifically mentioned. The gear-teeth upon the rotatable part or disk and the worm or other device engaging with such teeth form means by which such rotatable part or disk is rotated. These
 10 means may be mounted wholly upon one of the brackets, as seen in Figs. 4 and 5, or only a portion of such means—as, for instance, the worm—may be mounted on one of the brackets, as seen in Figs. 1, 2, and 3; or, if desired,
 15 no portion of such means need be mounted on the brackets, as seen in Figs. 6 and 7 of the drawings.

The roller shown in Fig. 8 may be used in place of the roller shown in Fig. 1, assuming
 20 that the supports or brackets seen therein be changed in size so as to receive the journals of the roller of Fig. 8, and when this is done the mode of operation of the parts, so far as concerns the changing or adjusting of the
 25 tension of the spring and the removal of the roller from and its replacement in the brackets, is the same as in the case of the roller seen in Fig. 1.

Various modifications in the construction
 30 and arrangement of the parts here shown will be suggested to those skilled in this art which will, in all essential respects operate as the construction and arrangement of parts hereshown and described operate. Therefore
 35 I do not wish to limit myself to the specific forms and arrangements of parts or devices shown.

What I claim as new is—

1. The combination, substantially as set
 40 forth, of a roller having a barrel and bearings at its opposite ends, which bearings are adapted to be received in brackets adjacent to the opposite sides of a window-frame, brackets adapted to receive the bearings, a rotatable
 45 part arranged between the brackets which receive the supporting ends of the roller, a spring one end of which is connected to the roller and the other is connected to the rotatable part and means connected with the ro-
 50 tatable part and adapted to rotate the same, whereby the tension of the spring may be adjusted while the roller remains in its brackets and the roller may be removed therefrom without disturbing the attachment of such
 55 brackets to the window-frame.

2. The combination, substantially as set forth, of a roller having a barrel and bearings which are adapted to be received in brackets adjacent to the opposite sides of a window-
 60 frame, brackets adapted to receive the bearings, a rotatable part arranged between the brackets which receive the supporting ends of the roller, and provided with gear-teeth by which it may be rotated, a spring one end of
 65 which is connected to the roller and the other is connected to the rotatable part, and means engaging with the gear-teeth on the rotatable

part adapted to rotate such part, whereby the tension of the spring may be adjusted while the roller remains in its brackets and the
 70 roller may be removed therefrom without disturbing the attachment of such brackets to the window.

3. The combination, substantially as set forth, of a roller having a barrel with a bearing formed on one end, a spindle forming a bearing for the other end, a spring one end of which is connected with the barrel and the other with the spindle, brackets adapted to receive the spindle and the bearing at the
 80 other end of the barrel, a rotatable part arranged between the brackets and connected with the spindle, and means connected with the rotatable part adapted to rotate such part and hold it in position, whereby the tension
 85 of the spring may be adjusted while the roller remains in its brackets and the roller may be removed therefrom without disturbing the attachment of such brackets to the window.

4. The combination, substantially as set forth, of a roller having a barrel and bearings at its opposite ends, which bearings are adapted to be received in brackets adjacent to the opposite sides of a window-frame, brackets adapted to receive the bearings, a rotatable
 95 part arranged between the brackets which receive the supporting ends of the roller adapted to rotate in substantially the axial line of rotation of the roller, a spring, one end of which is connected to the roller and the other
 100 is connected to the rotatable part, means connected with the rotatable part by which it may be rotated while the roller remains in its brackets, and a detent arranged and adapted to engage with and disengage from some por-
 105 tion of the means by which the rotatable part is rotated, whereby the tension of the spring may be adjusted and said means locked against movement until the detent is disengaged therefrom.

5. The combination, substantially as set forth, of a roller having a barrel with a bearing formed on one end, a spindle forming a bearing for the other end, a spring one end of which is connected with the barrel and the
 115 other is connected with the spindle, brackets adapted to receive the spindle and bearing at the other end of the barrel, a rotatable part arranged between the brackets and connected with the spindle, and means a portion of which
 120 is mounted on the bracket which receives the spindle and is connectable and disconnectable from the other portion, which means are adapted to rotate the rotatable part, whereby the tension of the spring may be adjusted
 125 while the roller remains in its brackets and the roller may be removed therefrom without disturbing that portion of the rotating means mounted on the bracket or the attachment of such brackets to the window-frame.

6. The combination, substantially as set forth, of a roller having a barrel with a bearing formed on one end, a spindle forming a bearing for the other end, a spring one end of

which is connected with the barrel and the other is connected with the spindle, the spindle and bearing being adapted to be received by brackets adjacent to opposite sides of a window-frame, a bracket provided with a rotatable part mounted in bearings therein, which part is adapted to engage with the spindle and rotate the same, the bracket also being provided with means adapted to rotate such part, and a bracket adapted to receive the bearing on the other end of the barrel, whereby the spindle may be rotated while the roller remains in its brackets and the spindle is removable from the rotatable part without necessarily disturbing the operative relation of the rotating means or the attachment of such brackets to the window-frame.

7. The combination, substantially as set forth, of a roller having a barrel with a bearing formed on one end, a spindle forming a bearing for the other end, a spring one end of which is connected with the barrel and the other is connected with the spindle, the spindle and bearing being adapted to be received by brackets adjacent to the opposite sides of a window-frame, a bracket provided with a rotatable part in the form of a "worm-gear" mounted in bearings therein, which part is adapted to engage with the spindle and rotate the same, the bracket also being provided with a "worm" engaging with said gear, and a bracket adapted to receive the bearing at the opposite end of the barrel, whereby the spindle may be rotated while the roller remains in its brackets and the spindle is removable from the rotatable part without necessarily disturbing the operative relation of the worm and gear or the attachment of such brackets to the window-frame.

8. The combination, substantially as set forth, of a roller having a barrel with a bearing formed on one end, a spindle forming a bearing for the other end and having an extending portion, a spring one end of which is connected with the barrel and the other is

connected with the spindle, the spindle and bearing being adapted to be received by brackets adjacent to the opposite sides of a window-frame, a bracket provided with a rotatable part mounted in bearings therein and having a recess adapted to receive the extending end of the spindle and thereby rotate the same, and also provided with means adapted to rotate such part, and a bracket adapted to receive the bearing at the opposite end of the barrel, whereby the spindle may be rotated while the roller remains in its brackets and the spindle is removable from the rotatable part without necessarily disturbing the operative relation of the rotating means, or the attachment of such brackets to the window-frame.

9. The combination, substantially as set forth, of a roller having a barrel with a bearing formed on one end, a spindle forming a bearing for the other end and having an extending portion, a spring one end of which is connected with the barrel and the other is connected with the spindle, the spindle and bearing being adapted to be received by brackets adjacent to opposite sides of a window-frame, a bracket provided with a rotatable part mounted in bearings therein and having a recess of tapered form adapted to receive the extending end of the spindle and thereby rotate the same, and also provided with means adapted to rotate such part, and a bracket adapted to receive the bearing on the opposite end of the barrel, whereby the spindle may enter the recess in the rotatable part when not in line with the axis of rotation of such part and is removable therefrom without necessarily disturbing the operative relation of the rotating means or the attachment of the brackets to the window-frame.

OLIVER M. EDWARDS.

Witnesses:

CLIFFORD A. MACDONALD,
WM. GOLLHOFER.