No. 642,423. Patented Jan. 30, 1900.

W. H. BRODIE.

CURTAIN ACTUATING SYSTEM.

(Application filed Oct. 26, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

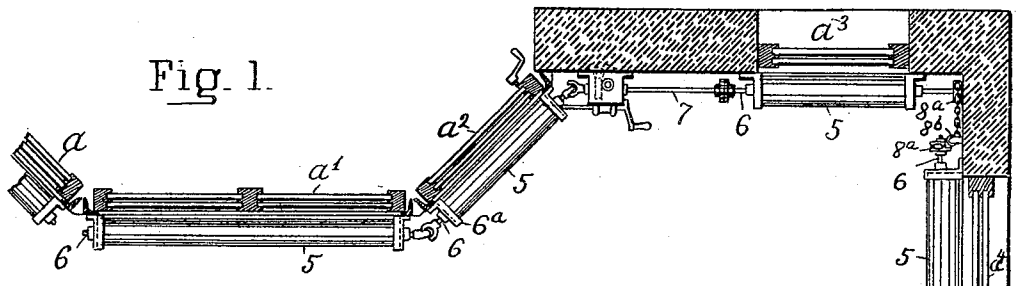
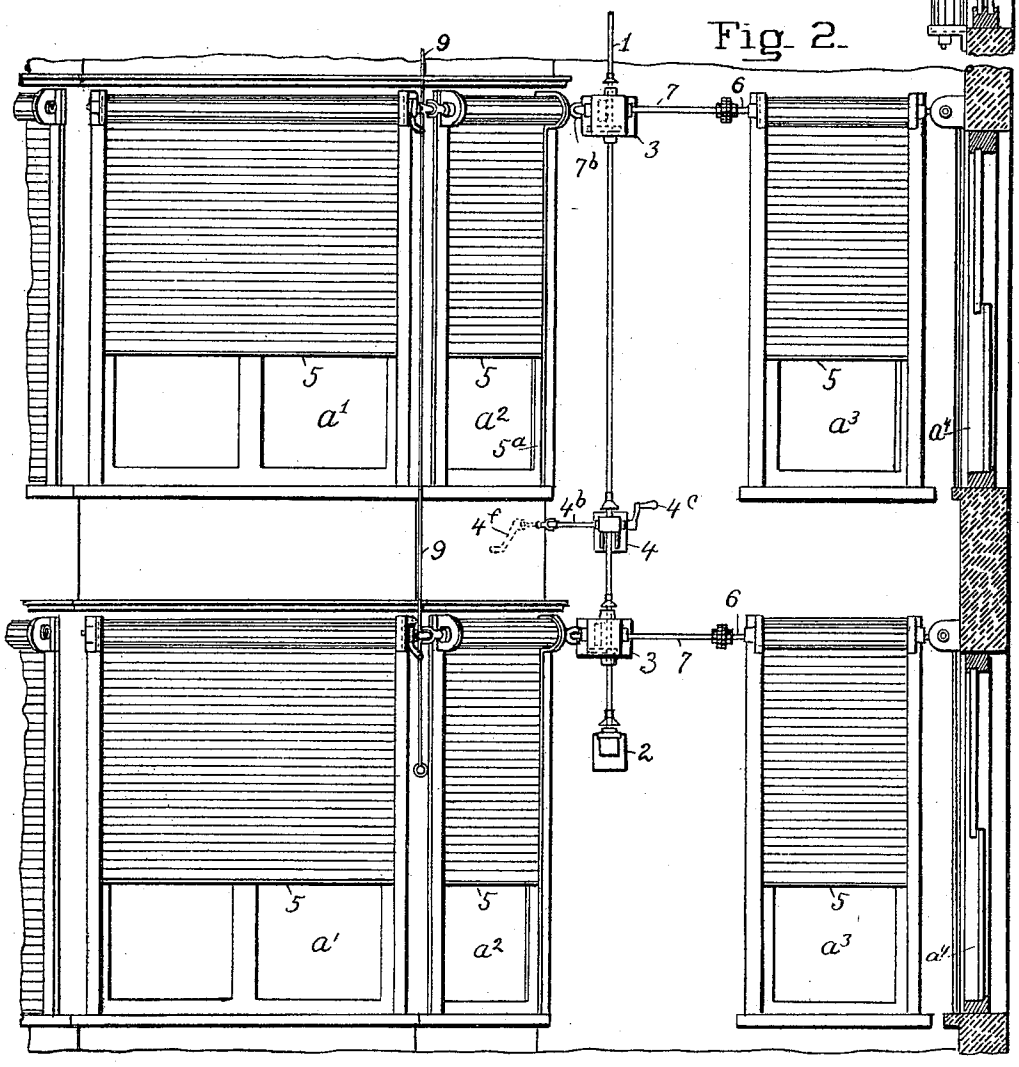


Fig. 2.



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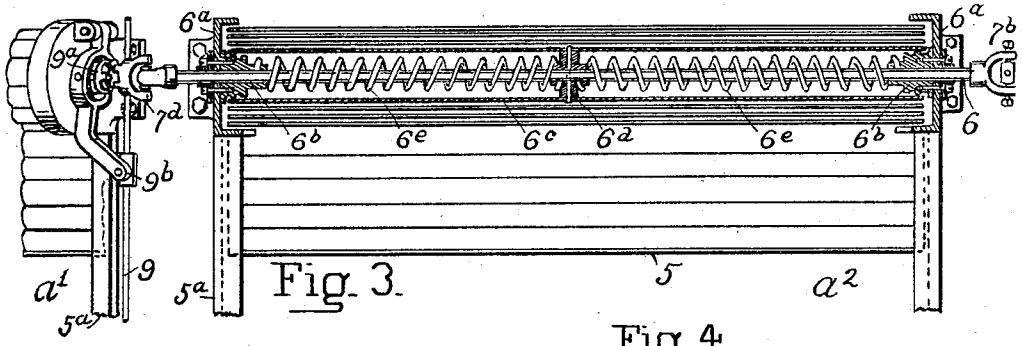


Fig. 3.

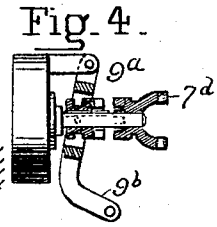


Fig. 4.

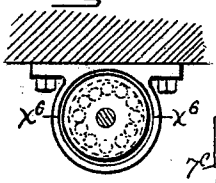


Fig. 5.

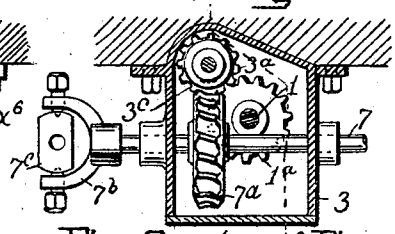


Fig. 7.

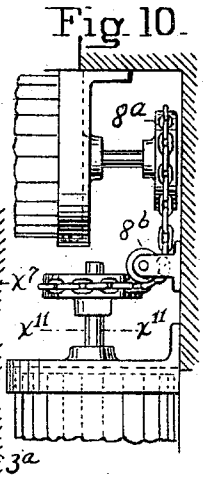


Fig. 10.

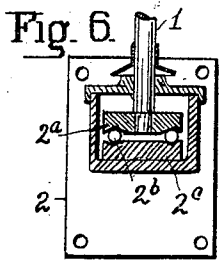


Fig. 6.

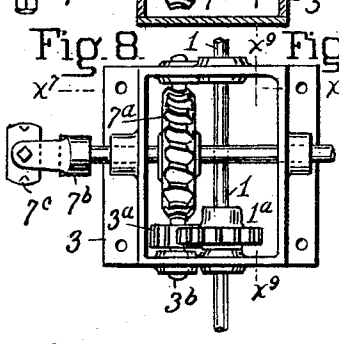


Fig. 8.

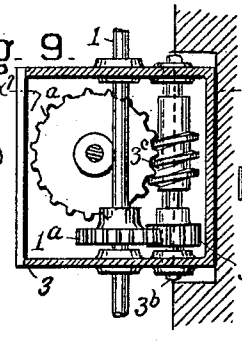


Fig. 9.

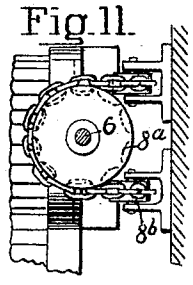


Fig. 11.

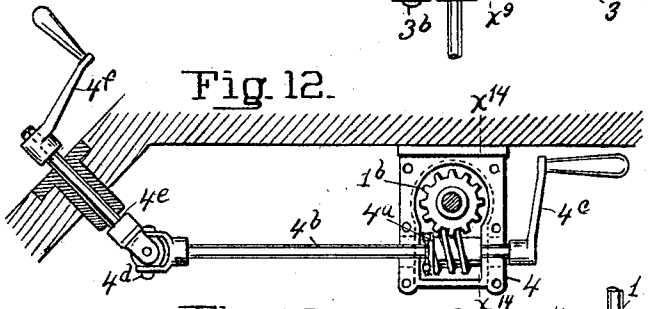


Fig. 12.

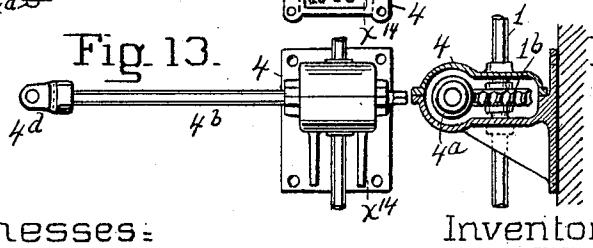


Fig. 13.

Fig. 14.

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UNITED STATES PATENT OFFICE.

WILLIAM H. BRODIE, OF NEW YORK, N. Y.

CURTAIN-ACTUATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 642,423, dated January 30, 1900.

Application filed October 26, 1899. Serial No. 734,832. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BRODIE, a citizen of the United States of America, and a resident of the borough of Brooklyn, city of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Curtain-Actuating Systems, of which the following is a specification.

The object of this invention is to provide means whereby the curtains of a number of windows located on different floors of a building may be raised or lowered simultaneously and at will from a single point and whereby one or more of the curtains can be disconnected from the others for independent movement.

With this object in view my invention consists in the construction, arrangement, and combination of the several parts of which it is composed, as will be hereinafter more fully described and claimed.

Referring to the accompanying two sheets of drawings, which form a part of this specification, Figure 1 is a top view of a set of curtains to be operated according to this invention, the building-wall being indicated in cross-section. Fig. 2 is a front view of the set shown in Fig. 1. Fig. 3 is a front view, partly in perspective and partly in cross-section, illustrating the construction whereby power is transmitted from one curtain-roller to another, these two curtains being at an angle with each other. Fig. 4 is a detail of the clutch shown in Fig. 3. Fig. 5 is a top view of the bracket containing the thrust-bearing for the vertical shaft, the cover of the bracket being removed. Fig. 6 is a vertical section through the bracket on the line x^6 x^6 of Fig. 5. Fig. 7 is a horizontal section through the gear-box on the line x^7 x^7 of Figs. 8 and 9. Fig. 8 is a front view of the gear-box with the front plate removed. Fig. 9 is a vertical section through the gear-box on the line x^9 x^9 of Figs. 7 and 8. Fig. 10 is a horizontal section through a building, showing the method of connecting curtains located at right angles to each other. Fig. 11 is a section on the line x^{11} x^{11} of Fig. 10. Fig. 12 is a horizontal section through a building, showing the operating-shaft and the worm and gearing between it and the vertical driving-shaft, the top cap of the casing inclosing the worm-gearing being removed. Fig. 13 is an elevation of the same. Fig. 14 is a vertical section of the same on the line x^{14} x^{14} of Figs. 12 and 13.

In Figs. 1 and 2 I have shown my invention as applied to a building having on each floor a bow-window with three window-openings a a' a^2 and also window-openings a^3 and a^4, located in walls at right angles to each other. The curtains at the windows a', a^2, a^3, and a^4 on each floor constitute a floor group operated by horizontal shafting and connections, the horizontal shafting of each of the corresponding floor groups being actuated by a vertical shaft 1. The number of curtains to be included in any floor group will depend upon the size and weight of the curtains, the location of windows, and the number of floor groups under the control of one operating-shaft, since it is practicable to operate more curtains on each floor when there are a fewer number of floors. Thus the curtains for the windows a might be included in the floor groups above given; but in the particular case under consideration it is supposed that they belong to another set of floor groups.

The vertical shaft 1 has a thrust-plate 2^a upon its lower end which rests on antifriction-balls 2^b, interposed between it and a base-plate 2^c, the said parts constituting a thrust-bearing for the shaft and being contained in the box-bracket 2, as indicated in Fig. 6.

The shaft 1 extends upwardly past the several floors, passing at each floor through a gear-box 3 and carrying within each box a gear-wheel 1^a, meshing with a pinion 3^a upon the auxiliary shaft 3^b, mounted in the box. The shaft 1 also passes through an operating-casing 4, conveniently located, and has inclosed by the casing a worm-wheel 1^b, which is in mesh with a worm 4^a on the worm-shaft 4^b, mounted in the casing. One end of the worm-shaft may be provided with a hand-crank 4^c for rotating the vertical shaft through the gearing before stated. The opposite end of the worm-shaft may be connected by a universal joint 4^d with a shaft 4^e, extending through the wall of the building, whereby the vertical shaft may also be rotated from the

interior of the building by means of the crank 4^f, which is of value when the curtains are intended as fire-guards. The curtains 5 for this purpose may be of any approved construction and are shown as consisting of connected metallic slats, as is well known, and are mounted on rollers. Grooves 5^a are applied to the window-casings for the reception of the edges of the curtains.

The horizontal shafting consists of a plurality of connected shafts 6 and a shaft 7. The shafts 6 pass through the brackets 6^a and are journaled in the brackets. A spring-plug 6^b is screwed to the bracket and projects inwardly from the bracket and serves also as a bearing for the end of the hollow roller 6^c, on which the curtain is rolled. A disk 6^d is fitted in the roller and on the shaft and rigidly connects the two, so that they will turn together. Spiral springs 6^e are placed in the rollers to balance the weight of the curtain. One end of each spring is made fast to a hub on the disk 6^d, thereby connecting this end of the spring with the roller, and the other end of the spring is made fast to the spring-plug 6^b, which is a fixed part, since it is connected to the bracket. Since one spring is made fast to the spring-plug at its right-hand end and the other is made fast to the plug at its left-hand end, they are oppositely wound, so that both will be coiled more tightly when the curtain is down. By this arrangement a shaft can be passed through a spring shade-roller and utilized not only to revolve the shade-roller through which it passes, but also to drive rollers which lie on the opposite side of the curtain from the side at which the power is applied.

In the case of wide or extra-heavy curtains the disk is made fast to the roller near its middle and two springs used, as shown. If only one spring is used, the spring is placed at one end and the disk 6^d is made fast to the roller at a distance from the end requisite to leave the necessary space for the spring.

The several shafts 6 of each floor group are operated from a shaft 7, horizontally journaled in the gear-box 3 for the floor group. This gear-box contains a worm-wheel 7^a on the horizontal shaft, which meshes with a worm 3^c on the auxiliary shaft 3^b in the gear-box. The power is transmitted from the vertical shaft to the auxiliary shaft through the gear 1^a and pinion 3^a, as already described. By the use of the auxiliary shaft the thrust of each worm is taken up in its gear-box, and the vertical shaft can be placed closer to the wall, where it will be more out of the way than it would be if the worms were placed on the vertical shaft and the shaft so positioned that the worms could gear directly with the worm-wheels on the horizontal shafts.

The shaft 7 may be directly connected to the shafts 6 through the curtain-rollers if they are in line with each other and the shaft 7; but if the shafts are at a slight angle with each other, as is the case with the shafts for the curtains on the bow-windows a' and a^2, they are conveniently coupled through universal joints, as illustrated. Such a connection is shown between the shaft 7 of the gear-box and the shaft 6 through the curtain-roller of the window a^2. On the adjoining end of each shaft is a forked sleeve 7^b. These forks interlock and are pivoted to an intermediate ball 7^c, thus constituting the universal joint. If the shafts are at right angles with each other, or nearly so, the connection may be made through a chain. Such a connection is shown between the shafts through the curtain-rollers of the windows a^3 and a^4. The connection as shown in Figs. 10 and 11 is made by placing on the adjacent ends of each of the shafts a sprocket-chain wheel 8^a and securing idler-wheels 8^b to the wall of the building, an endless chain 8 being led over the grooved wheel and around the idler-wheels. It will thus be seen that the shafts 6, through the curtain-rollers at the windows a', a^2, a^3, and a^4, are connected directly or indirectly with the horizontal shaft 7 of that floor group, and the several horizontal shafts are in turn in gear with the vertical shaft, whereby all the curtains of all of the windows may be simultaneously operated.

When the curtains are used as fire-shutters, it is desirable to construct the system so that one or more shutters on each floor may be readily disconnected from the outside and separately opened for the purpose of ventilating the building and giving access for the firemen in case of fire within the building, while the other curtains are left down to prevent the spread of the fire to adjoining buildings.

As shown, the system is arranged so that the shaft for the curtain for the window a' on each floor may be disconnected from the system. The forked sleeve 7^d is loosely mounted on the shaft of the curtain-roller for this window, and a clutch-collar 9^a is splined on the shaft. Teeth are cut on the adjoining faces of the clutch-collar and forked sleeve, so that the two can be engaged and disengaged by shifting the clutch-collar longitudinally on the shaft. The collar is shifted by a lever 9^b. In Fig. 2 the clutch-levers at all of the floors are shown connected by a rod 9, so that they may be simultaneously shifted and consequently more expeditiously disengaged for the convenience of firemen in case of fire in the building. When the clutches are disengaged, the curtains at each of the windows provided therewith can be run up and down at the window by taking hold of the curtain and without disturbing any other curtain.

The several box-brackets 2, gear-boxes 3, and operating-casing 4 are supported in line on the wall of the building and serve as bearings for the vertical actuating-shaft 1, the weight of which is, however, entirely carried by the thrust-bearing in the box-bracket 2.

Having thus described my invention, what

I claim, and desire to secure by Letters Patent of the United States, is—

1. In a curtain-actuating system, the combination of a curtain, a hollow curtain-roller, supporting-brackets, a spring contained in the roller one end of which is fastened to the roller and the other of which is fastened to one of the brackets, a shaft attached to the roller and journaled in the bracket to which the spring is fastened, and means for actuating the shaft, substantially as described.

2. In a curtain-actuating system, the combination of a curtain, a hollow curtain-roller, supporting-brackets, oppositely-wound spiral springs contained in the roller one end of each being fastened to the roller near its middle, and the other end of each being fastened to one of the brackets, a shaft attached to the roller near its middle, and journaled in the brackets, and means for actuating the shaft, substantially as described.

3. In a curtain-actuating system, comprising a plurality of curtains, the combination of a curtain, a hollow curtain-roller, supporting-brackets, a spring contained in the roller, one end of which is fastened to the roller and the other end of which is fastened to one of the brackets, a shaft attached to the roller which passes through the roller and is journaled in the brackets, means for operating the shaft from one side of the curtain and connections at the other side of the curtain between the shaft and other curtains of the system, substantially as described.

4. In a curtain-actuating system, the combination of a plurality of curtains and rollers therefor disposed on several levels, horizontal shafting for operating the rollers on each level, and a vertical actuating-shaft geared to the horizontal shafts at each level, substantially as described.

5. In a curtain-actuating system, the combination of a vertical actuating-shaft, horizontal shafting for operating the curtains, an auxiliary shaft, gearing between the vertical shaft and the auxiliary shaft, and gearing between the auxiliary shaft and the horizontal shafting, substantially as described.

6. In a curtain-actuating system, the combination of a plurality of curtains disposed on several levels, horizontal shafting for operating the curtains on each level, a vertical actuating-shaft geared to the horizontal shafts at each level, and a thrust-bearing with interposed balls for the vertical shaft, substantially as described.

7. In a curtain-actuating system, the combination with a vertical actuating-shaft, of a horizontal shaft geared thereto and a series of angularly-disposed curtain-rollers driven from the horizontal shaft by flexible connections, substantially as described.

8. In a curtain-actuating system, the combination with angularly-disposed curtain-rollers and driving-shafts, of a universal joint located between the angularly-disposed driving-shafts, substantially as described.

9. In a curtain-actuating system, the combination with angularly-disposed curtain-rollers, driving-shafts therefor connected together by flexible joints, and a vertical shaft actuating the driving-shafts, substantially as described.

10. In a curtain-actuating system, the combination with an actuating-shaft, of curtain-rollers geared thereto, and a clutch for disengaging at will one of the said rollers, substantially as described.

11. In a curtain-actuating system, the combination with an actuating-shaft of curtain-rollers geared thereto, and clutches for disengaging at will certain of the rollers, the clutches being connected to move together, substantially as described.

12. In a curtain-actuating system, the combination with curtain-rollers, each having a driving-shaft, a clutch for connecting the driving-shafts together, and an actuating-shaft connected with one of the driving-shafts, substantially as described.

13. The combination with spring curtain-rollers, each having a driving-shaft, angularly disposed to each other, of a universal joint, one member of which is rigidly secured to one driving-shaft, and a clutch for securing the other member of the joint to the other driving-shaft, substantially as described.

Signed by me, in New York city, New York, this 24th day of October, 1899.

WILLIAM H. BRODIE.

Witnesses:
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SAMUEL W. BALCH.