

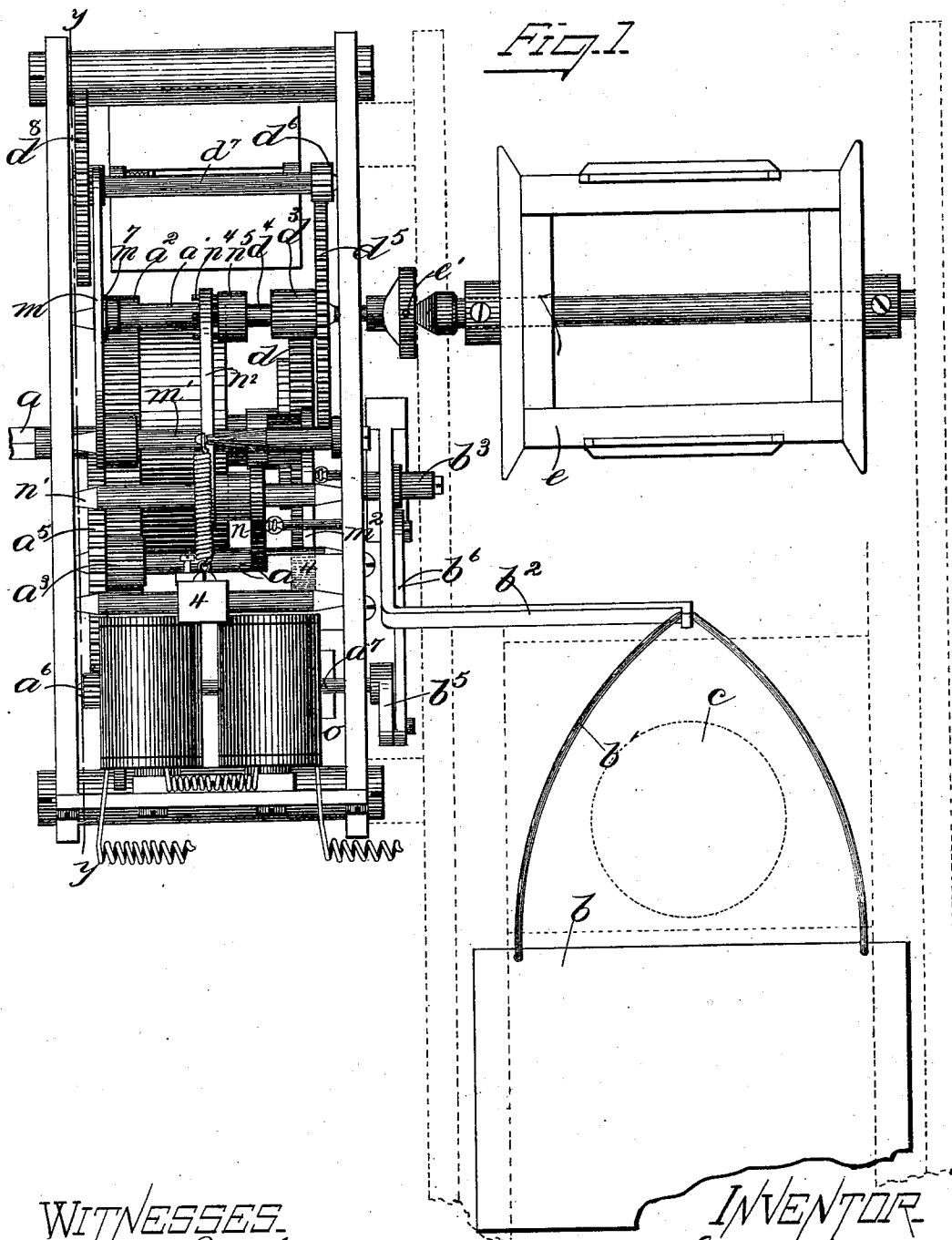
(No Model.)

4 Sheets—Sheet 1.

M. G. CRANE.
STEREOPTICON.

No. 556,531.

Patented Mar. 17, 1896.



WITNESSES.
Charles Blocker.
Julian L. Voyles.

INVENTOR
Moses L. Crane,
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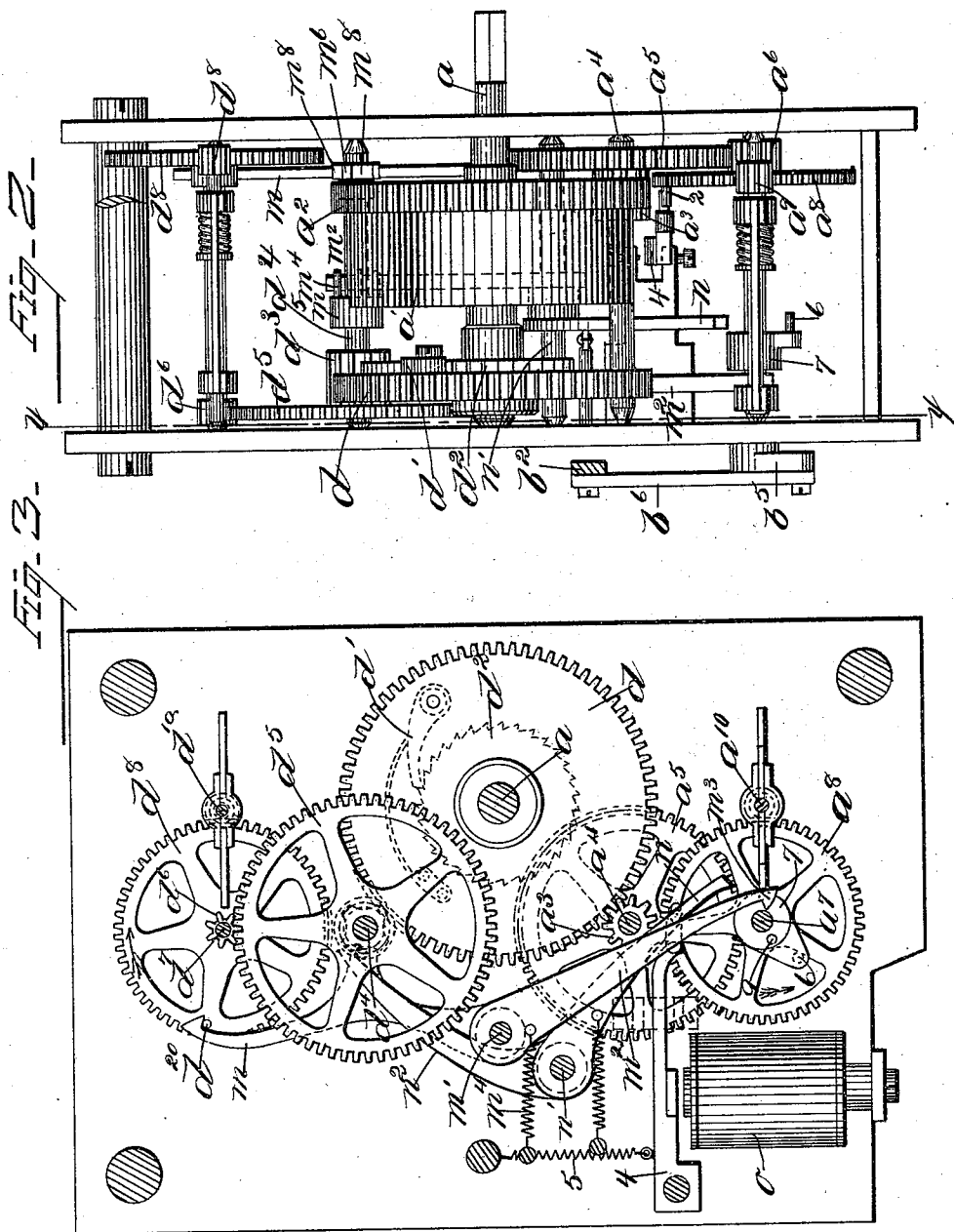
(No Model.)

4 Sheets—Sheet 2.

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Patented Mar. 17, 1896.



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(No Model.)

4 Sheets—Sheet 3.

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Fig. 4.

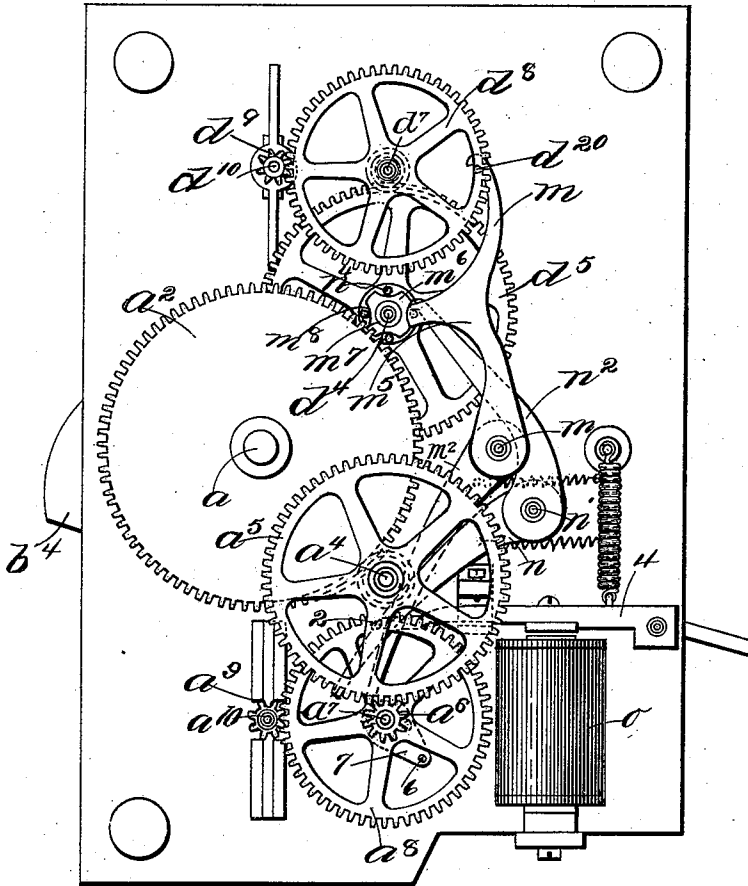


Fig. 6.

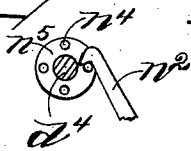
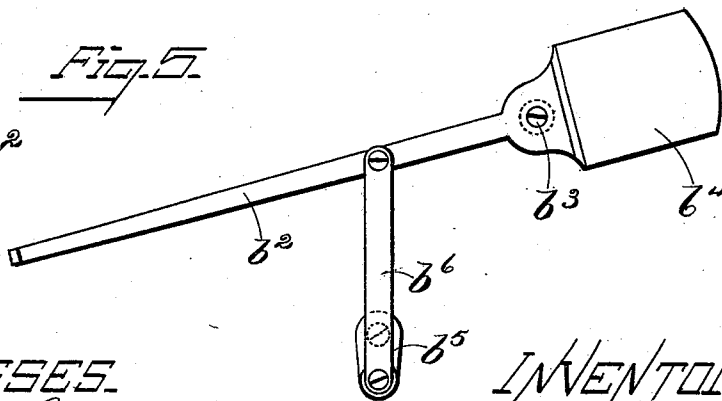


Fig. 5.



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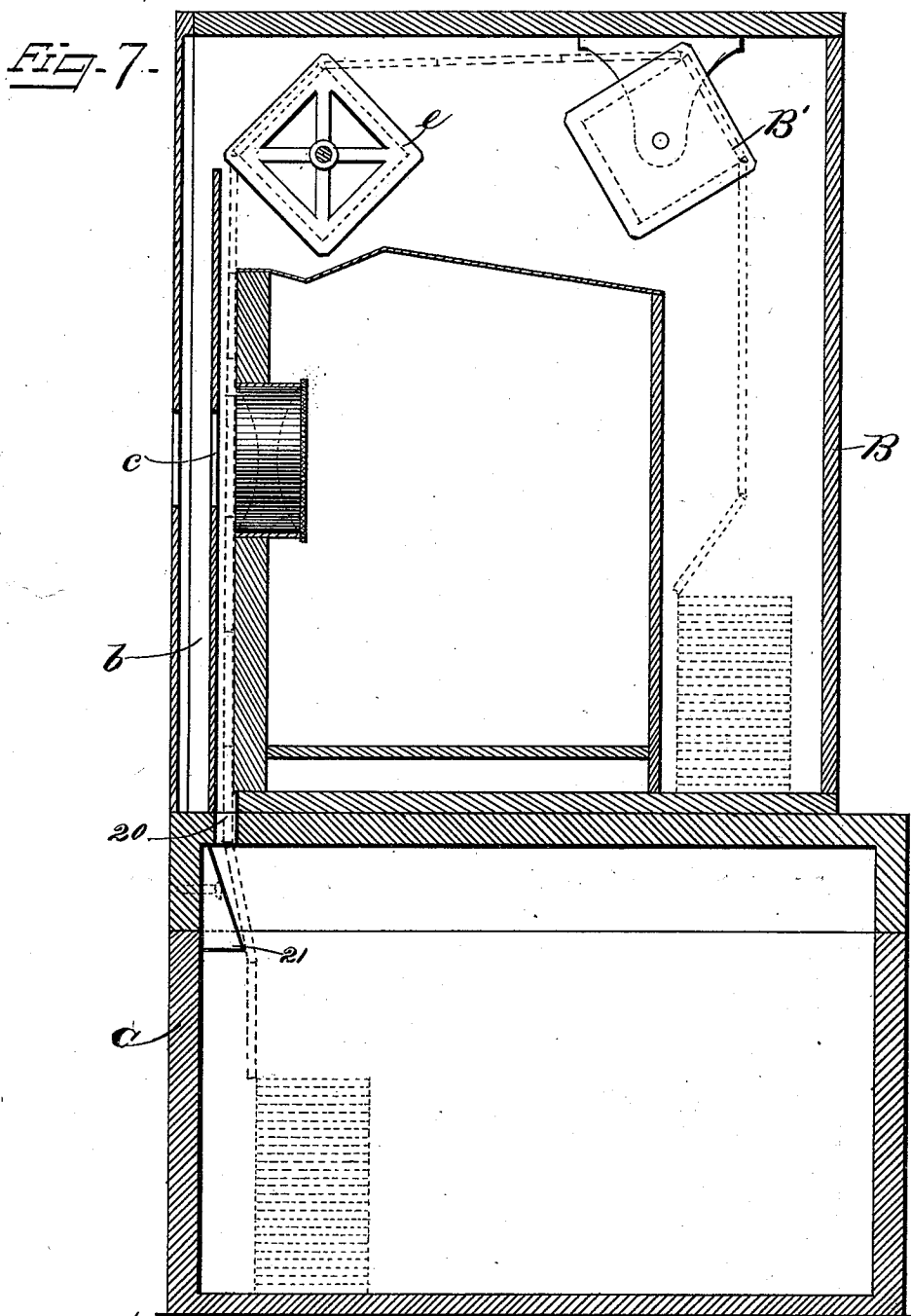
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Patented Mar. 17, 1896.



WITNESSES—
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Julian L. Hayes.

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UNITED STATES PATENT OFFICE.

MOSES G. CRANE, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO EDMUND HUDSON, OF HARTFORD, CONNECTICUT.

STEREOPTICON.

SPECIFICATION forming part of Letters Patent No. 556,531, dated March 17, 1896.

Application filed May 4, 1895. Serial No. 548,186. (No model.)

To all whom it may concern:

Be it known that I, MOSES G. CRANE, of Newton, county of Middlesex, and State of Massachusetts, have invented an Improvement in Stereopticons, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

In United States Letters Patent No. 518,104, granted April 10, 1894, a stereopticon is shown wherein a series of transparent slides are connected together as a chain and advanced intermittently by suitable actuating mechanism between the light and lens, and the actuating mechanism is constructed and arranged to be let off by an electromagnet, the circuit of which may be operated from a distant point at the will of the operator. A screen is also provided which is adapted to be moved automatically to cover and thereafter uncover the display-opening.

This invention is intended as an improvement upon the apparatus shown and described in said patent, relating particularly to the means or mechanism employed for automatically operating the screen and slides.

In accordance with this invention a screen-actuating train is constructed and arranged to raise and then lower the screen or to otherwise operate it to cover and then uncover the display-opening, and said screen-actuating train is normally wound and adapted to be let off by an electromagnet. When once let off it operates to move the screen over the display-opening and hold it there while the slides are being moved, and just before or as it brings the screen into correct position to cover the display-opening it operates to release a normally-wound slide-actuating train. As herein shown, the screen-actuating train ceases to operate as soon as it brings the screen into correct position to cover the display-opening and has released the slide-actuating train, being held temporarily in suspension. The slide-actuating train operates to advance the slides, bringing the next slide of the series or chain into position before the display-opening, and such operation takes place while the screen covers, or substantially covers, the display-opening, and while the screen-actuating

train is held in suspension and just before the slide-actuating train ceases to operate it sets free the temporarily-suspended screen-actuating train and allows it to continue its operation, moving the screen and uncovering the display-opening. The operation being thus completed the screen-actuating train is brought to rest.

A single main driving-spring is herein provided for operating both the screen and slide actuating trains, the force emanating from one end operating one of the trains and the force emanating from the other end operating the other train, and while such construction materially simplifies the mechanism it is obvious that two independent springs might be employed.

Figure 1 shows a front side elevation of the screen and slide actuating mechanism of a stereopticon embodying this invention; Fig. 2, a rear side view of the actuating mechanism shown in Fig. 1, the electromagnet being omitted for clearness; Fig. 3, a view of the actuating mechanism shown in Fig. 2, taken on the dotted line *x x*; Fig. 4, a view of the actuating mechanism shown in Fig. 1, taken on the dotted line *y y*; Fig. 5, a detail of the screen-operating counterbalanced arm; Fig. 6, a detail showing a portion of the releasing mechanism of the screen-actuating train which is operated by the slide-actuating train, and Fig. 7 a view showing the slide-carrier and receptacle for the chain of slides.

The winding-shaft *a* has mounted loosely upon it a circular barrel or casing *a'*, which contains the main driving-spring, the outer end of which is connected with the barrel and the inner end with the winding-shaft.

Upon the barrel or casing *a'* a toothed wheel or gear *a²* is formed or secured, which engages a pinion *a³* secured to a shaft *a⁴* having its bearings in the framework, and a toothed wheel *a⁵* is also secured to said shaft *a⁴*, which engages a pinion *a⁶*, secured to a shaft *a⁷*, to which is secured a toothed wheel *a⁸*, which engages a pinion *a⁹* on the escape-shaft *a¹⁰*. This train of mechanism is driven by the force emanating from the outer end of the main driving-spring, and is employed to operate the screen *b*. The screen *b* is suspended by a yoke *b'* from the outer end of a bent

arm b^2 , pivoted at b^3 and having a suitable counterbalance b^4 .

A crank b^5 is secured to the shaft a^7 , which is connected by a link b^6 with the arm b^2 , so that upon each revolution of said shaft a^7 the crank b^5 will be revolved and the arm b^2 raised and lowered, covering and thereafter uncovering the display-opening c , as represented in Fig. 1. A toothed wheel or gear d is also loosely mounted upon a winding-shaft a , and bears upon one side the pawl d' , which engages a ratchet-wheel d^2 secured to the winding-shaft, and by such connections the winding-shaft may be turned to wind the main driving-spring, the ratchet-wheel d^2 turning with it and slipping beneath the pawl; but as the winding-shaft is turned in the opposite direction, as by a force emanating from the inner end of the main driving-spring, the ratchet-wheel d^2 will be turned in the opposite direction, and thereby in turn advancing the toothed wheel or gear d .

The toothed wheel or gear d engages a pinion d^3 secured to a shaft d^4 , to which is secured a toothed wheel or gear d^5 , which engages a pinion d^6 on a shaft d^7 , to which is secured a toothed wheel d^8 , which engages a pinion d^9 on the escape-shaft d^{10} . This train of mechanism is thus driven by a force emanating from the inner end of the main driving-spring, and is employed to advance the slide carrier or drum e , which supports the slides, and which by turning intermittently advances the slides one by one by or in front of the display-opening.

The slide-carrier e is connected with the shaft d^4 of the train by a universal joint of usual form, as represented at e' , Fig. 1.

The toothed wheel a^8 is the main stop-wheel for both trains, having on it a stop-pin 2, which is engaged by a pin 3 on the armature-lever 4 of an electromagnet o , a suitable retractile spring 5 being attached to said armature-lever. The electromagnet o is herein represented as included in an open circuit, which when closed attracts an armature and allows the stop-pin 2 to escape. As the stop-wheel a^8 is thus released, the shaft a^7 turns, operating to raise the screen b . This movement continues until the pin 6, projecting from a hub 7, secured to the shaft a^7 , strikes the lower end of an arm n , at which time the train will be temporarily suspended and the screen will be in its most elevated position. The arm n is then moved by means to be described, releasing the pin 6 held by it and thereby permitting the stop-wheel a^8 to continue until its stop-pin 2 again strikes the pin on the armature-lever, and during this movement the screen descends. Thus the stop-wheel a^8 makes one complete revolution in raising and thereafter lowering the screen.

It is desirable to move the slides just as soon as the screen has been raised a certain distance to more or less cover the display-opening, and I have therefore arranged the releasing-lever of the slide-actuating train so

that it shall be controlled or governed by the screen-actuating train and operated by it after said screen-actuating train has run a short time.

m represents the releasing-lever of the slide-actuating train, it projecting upwardly from a shaft m' near one end thereof, and an arm m^2 projects downwardly from said shaft m' near its opposite end, which has a lower beveled or inclined end m^3 , which lies in the path of movement of a pin 9 projecting from the opposite side of the hub 7 on the shaft a^7 , so that as said hub is turned the pin 9, striking the lower beveled or inclined end m^3 of the arm m^2 , moves said arm to rock the shaft m' against the stress of the return-spring m^4 , and thereby disengage the stop-wheel d^8 of the slide-actuating train. As soon as this releasing-lever m is thus moved, the stop-wheel d^8 begins to revolve and the shaft d^4 , to which the slide-carrier e is connected, begins to turn.

It will be observed that the pin 9 operates to move the arm m^2 just before the pin 6 strikes the end of the arm n , so that the slide-actuating train is set free by the screen-actuating train, and just before the latter becomes temporarily suspended, and while so held acts to hold the screen in its most elevated position. The slide-actuating train thus set free continues to operate, while the screen-actuating train remains at rest, and as soon as the stop-wheel d^8 has completed one revolution its stop-pin d^{20} is prevented from engaging the latched end of the releasing-lever m by reason of a projection m^5 , which is formed on the releasing-lever m , at such time striking a projection m^6 formed on a hub m^7 secured to the shaft d^4 , said hub being formed with four such projections m^6 and alternate recesses m^8 , four projections being selected for the reason that the slide-carrier is to be turned one-quarter of a revolution each time to move the slide. At the end of the second revolution of the stop-wheel d^8 one of the recesses m^8 is brought into position before the projection m^5 , so that the releasing-lever m may be drawn in by its spring m^4 sufficiently to engage the stop-pin d^{20} and thereby stop the train.

The arm n , against which the pin 6 has been resting while the slide-actuating train has been operating to turn the slide-carrier, is secured to a shaft n' , and to said shaft an upwardly-extended arm n^2 is secured, the upper end of which has a beveled or inclined portion and normally rests upon one of a series of pins n^4 projecting from a hub n^3 , secured to a shaft d^4 , there being, as herein represented, four such pins, and as soon as the pin 6 strikes the end of the arm n said arm is thus held positively as the hub n^3 turns until the next pin, n^4 , of the series strikes the inclined end of the arm n^2 and thereby moves outwardly said arm n^2 , rocking the shaft n' and moving the arm n to permit the pin 6 to pass by. The pin n^4 thus operates upon the arm n^2 just before the slide-actuat-

ing train ceases to operate to thereby release the temporarily-suspended screen-actuating train that it may complete its operation and cause the screen to descend.

5 I do not desire to limit my invention to all the features herein shown, as it is obvious that many changes may be made which would come within the skill of an ordinary mechanic, and therefore come within the spirit
10 and scope of this invention.

Referring to Fig. 7, the slides or stereopticon-plates, connected together as a chain, may be contained in a pile in the box or case B, passing up over an idle wheel or drum B',
15 thence over the train-actuated or motor-driven slide-carrier *e*, and thence down by the opening *c*, falling into the receptacle C. The slides enter the receptacle C through the throat or slot 20 and at once strike the beveled-faced block or projection 21, and by
20 means of said projection are caused to fold one upon another as they enter the receptacle.

I claim—

1. In a stereopticon, a normally-wound
25 screen-actuating train, a let-off therefor, a normally-wound slide-actuating train, and a let-off therefor, operated by the screen-actuating train, and a second let-off for the screen-actuating train operated by the slide-actuating
30 train, whereby the screen may be raised, then the slides operated and finally the screen lowered, substantially as described.

2. In a stereopticon, a screen-actuating train, and two releasing devices therefor, a
35 slide-actuating train and a releasing device

therefor, said releasing devices operating successively to first release the screen-actuating train to raise the screen, then to release the slide-actuating train to operate the slides,
40 and then to again release the screen-actuating train to lower the screen, substantially as described.

3. In a stereopticon, a normally-wound screen-actuating train, a let-off therefor, a
45 stopping device for arresting the screen-actuating train when it has moved the screen sufficiently to cover the display-opening, a normally-wound slide-actuating train, a let-off
50 therefor operated by the screen-actuating train, and means operated by said slide-actuating train for operating the aforesaid stopping device of the screen-actuating train, that
it may be again released and its operation continued, substantially as described.

4. In a stereopticon, the screen *b*, counter-
55 balanced arm *b*³ supporting it, pivoted at *b*³, shaft *a*⁷, motor for rotating it, crank *b*⁵ secured to said shaft, link *b*⁶ connecting said crank with said screen-supporting arm, and
60 means for starting the motor, and for stopping it when the shaft *a*⁷ has made a single revolution, substantially as described.

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

MOSES G. CRANE.

Witnesses:

BERNICE J. NOYES,
FLORENCE H. DAVIS.