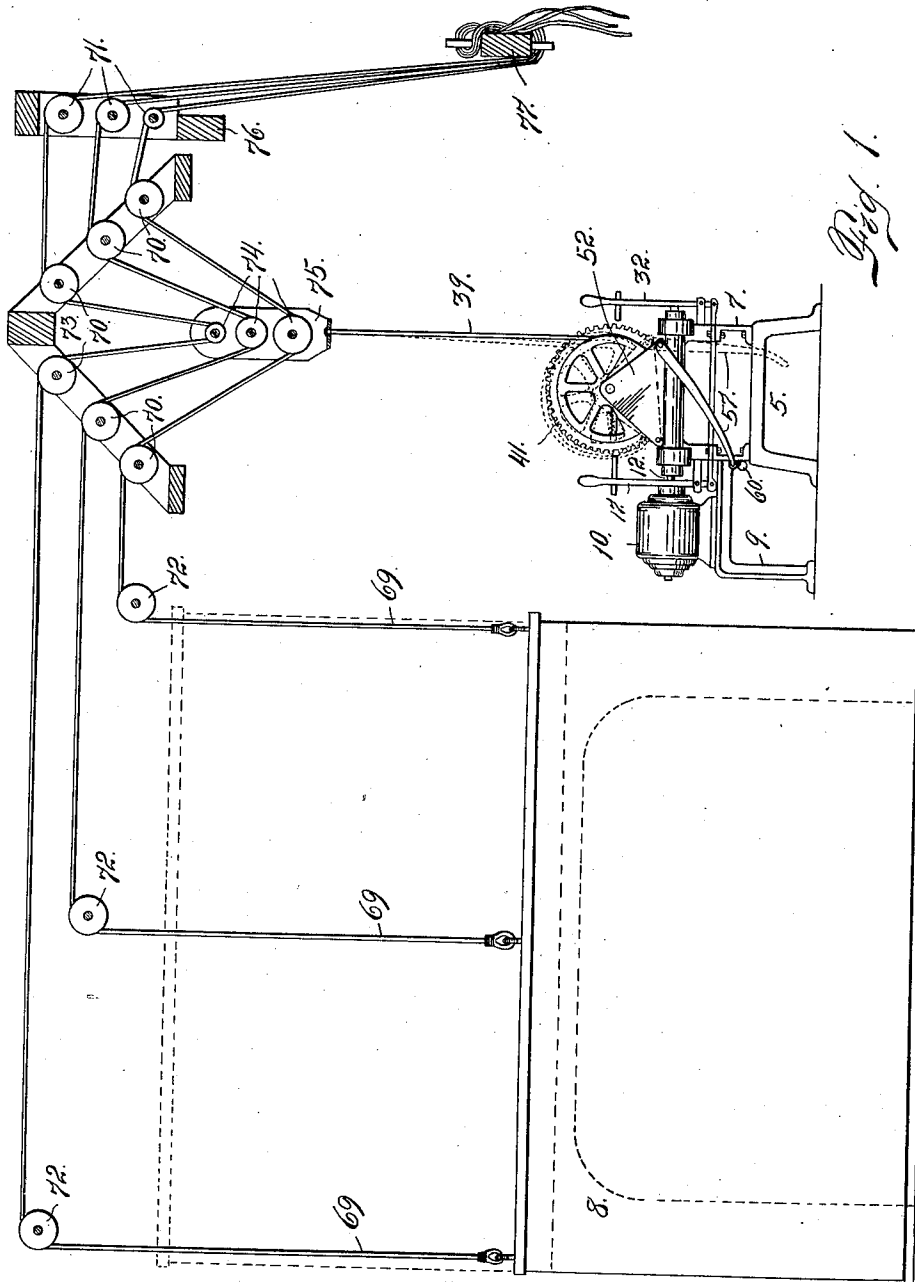


S. G. BAILEY.
SCENERY HANDLING APPARATUS.
APPLICATION FILED FEB. 1, 1913.

1,091,109.

Patented Mar. 24, 1914.

5 SHEETS—SHEET 1.



Witnesses
Otto E. Hoddick
Solon J. Boughton

By

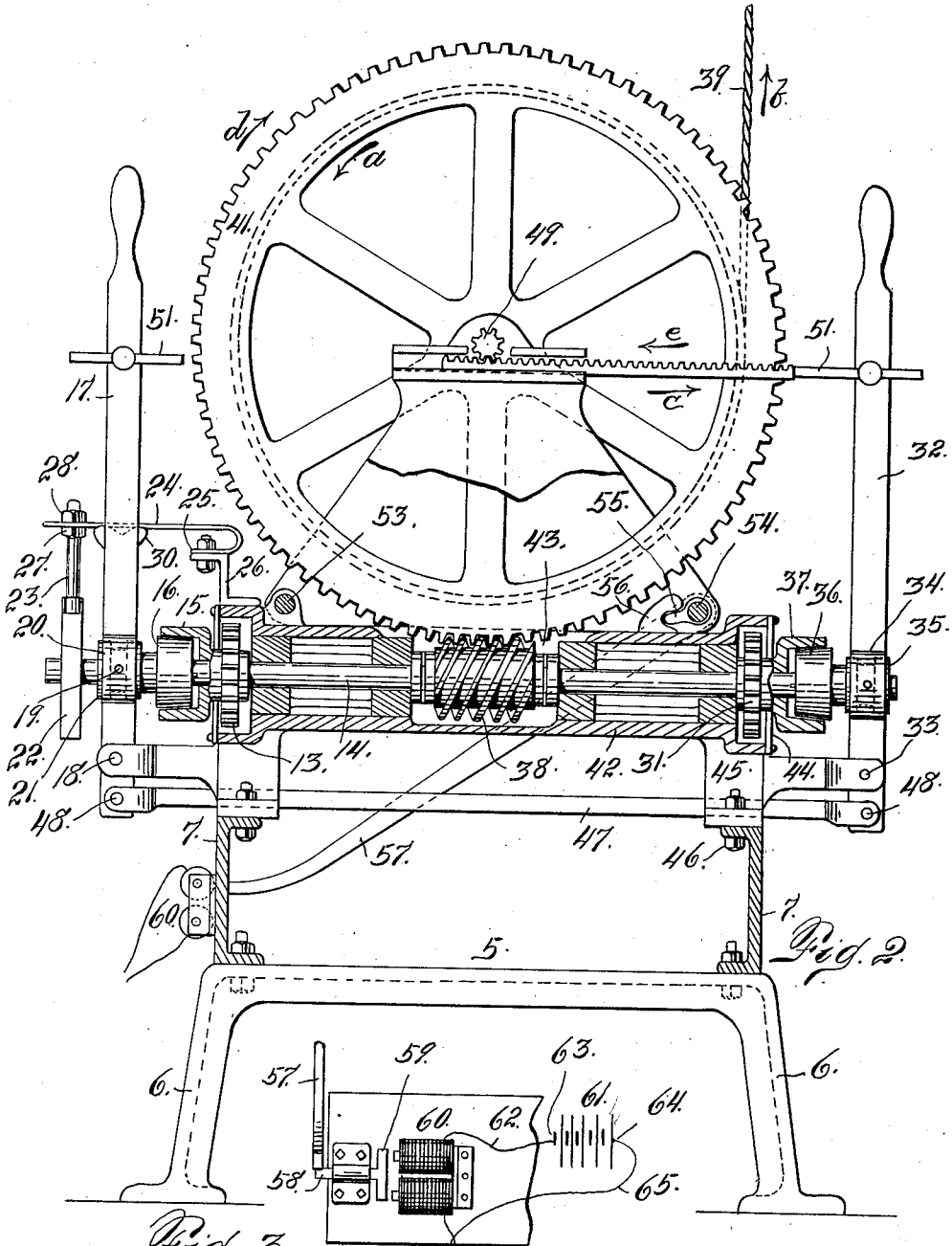
Seth G. Bailey.
A. J. O'Brien
Attorney

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6 SHEETS—SHEET 2.



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Solon J. Boughton

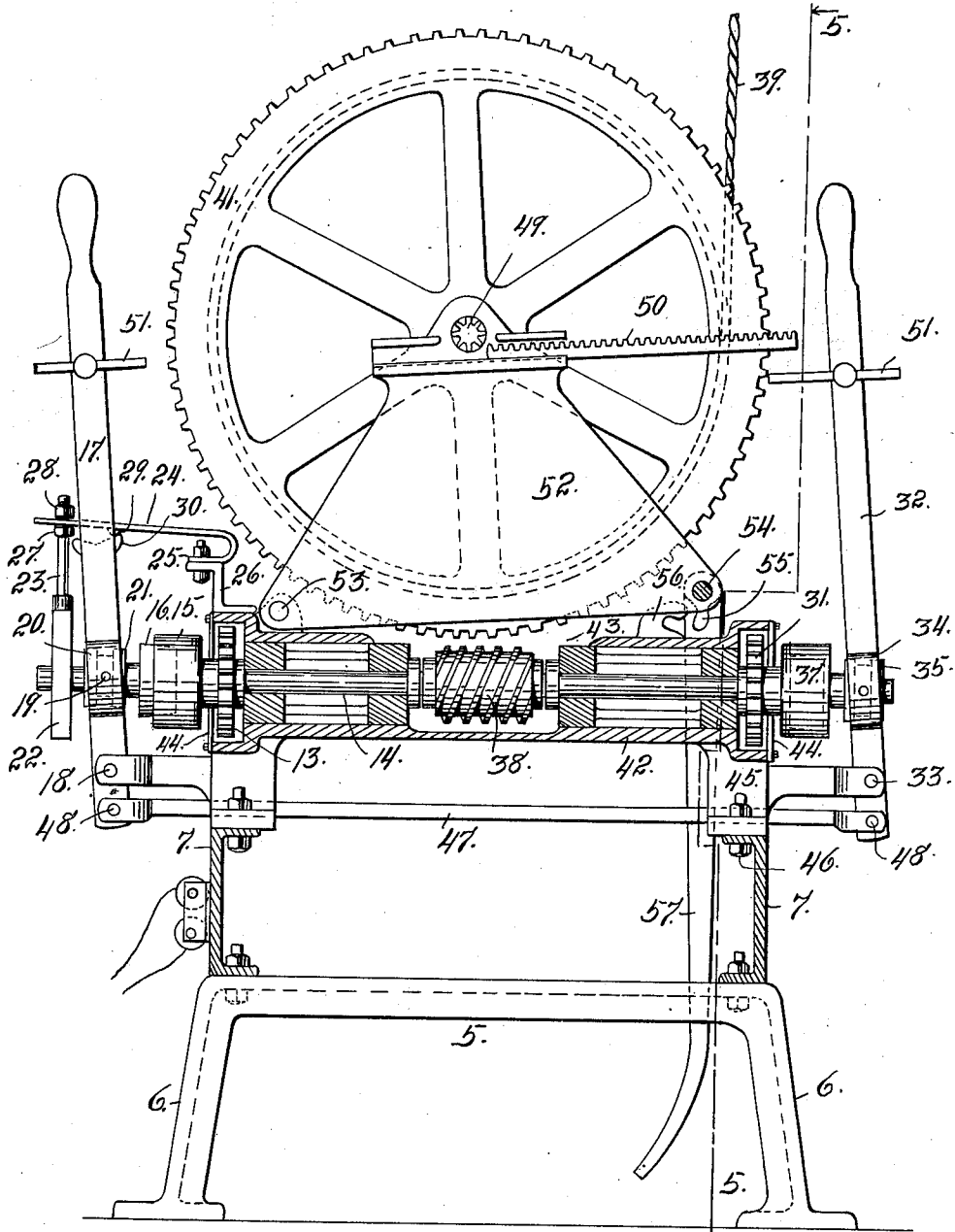
Inventor
Seth G. Bailey
By *N. J. Quinn*
Attorney

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5 SHEETS—SHEET 3.



Witnesses

Otto E. Hoddick.
Solon J. Boughton

Fig. 4.

Inventor
Seth G. Bailey.

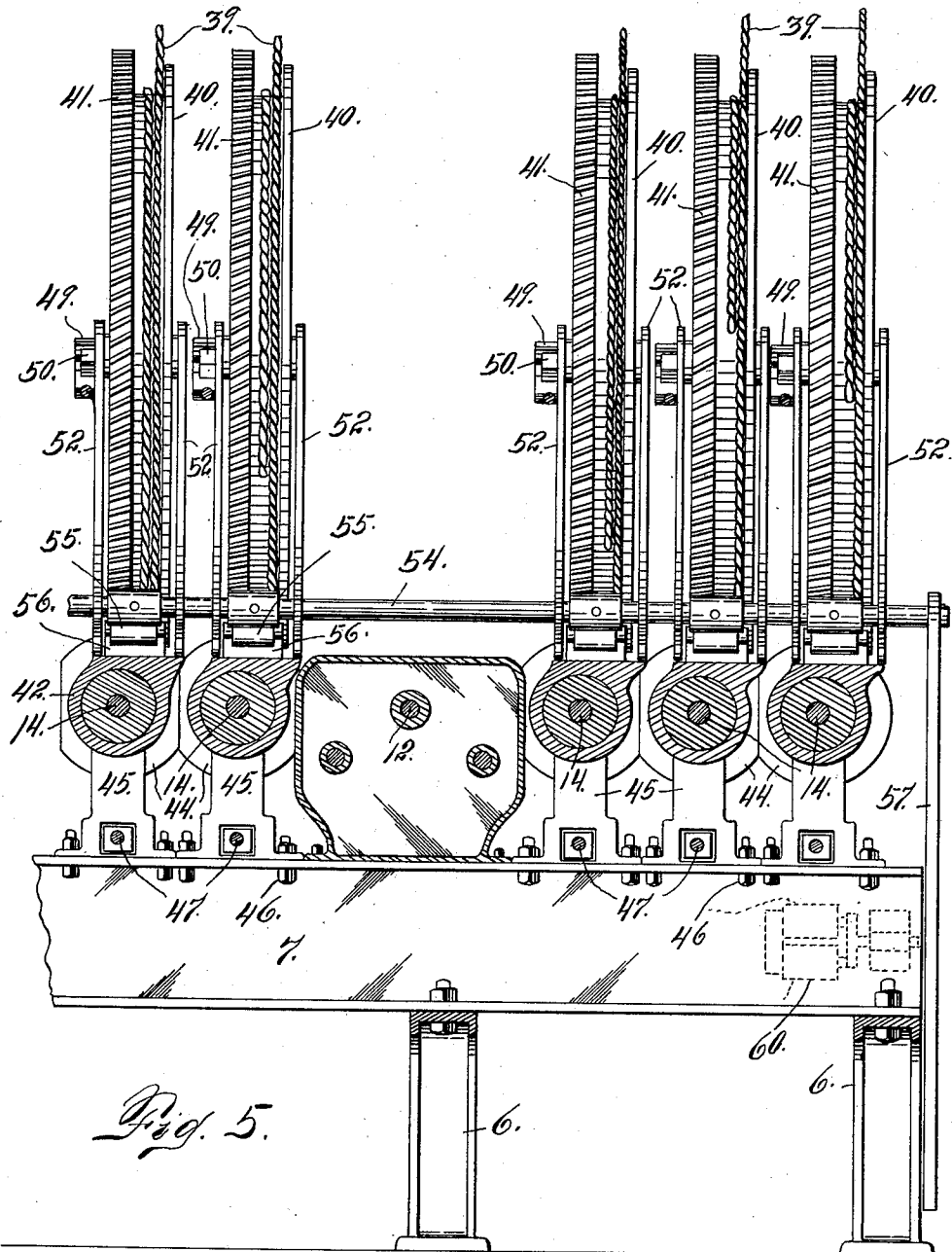
By *N. J. Quinn*
Attorney

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5 SHEETS—SHEET 4.



Witnesses
Otto E. Haddock.
Solon J. Boughton

Inventor
Seth G. Bailey
By A. J. O'Brien
Attorney

S. G. BAILEY.
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5 SHEETS—SHEET 5.

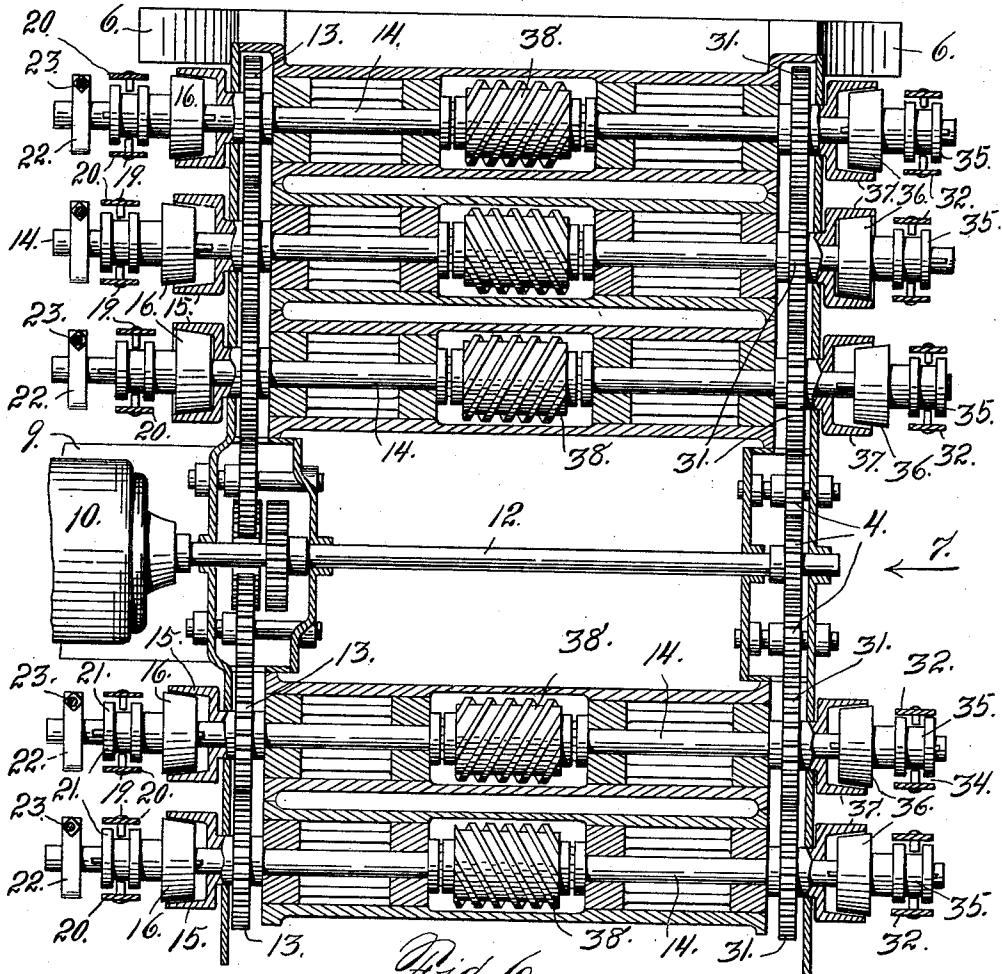


Fig. 6.

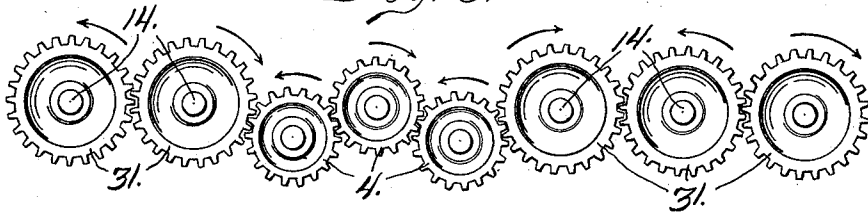


Fig. 7.

Witnesses

Otto E. Hoddick.

L. E. Petersen.

Inventor

Seth G. Bailey.

By.

A. J. [Signature] Attorney

UNITED STATES PATENT OFFICE.

SETH G. BAILEY, OF DENVER, COLORADO, ASSIGNOR TO THE BAILEY THEATER FLY-RAIL MACHINE COMPANY, OF DENVER, COLORADO, A CORPORATION OF COLORADO.

SCENERY-HANDLING APPARATUS.

1,091,109.

Specification of Letters Patent.

Patented Mar. 24, 1914.

Original application filed December 2, 1911, Serial No. 663,626. Divided and this application filed February 1, 1913. Serial No. 745,557.

To all whom it may concern:

Be it known that I, SETH G. BAILEY, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Scenery-Handling Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in apparatus for handling loads of any kind where it is necessary that such loads be raised and lowered, and while the invention is more especially intended for handling hanging scenery in theaters, it will be understood that it is also adapted for handling other loads which are to be treated in like manner.

This invention is a division of my co-pending application, Serial No. 663,626, filed December 2, 1911.

One of the objects of the invention is to provide means for simultaneously and instantaneously releasing all of the curtains and flies in case of fire upon the stage for the purpose of smothering the fire and placing the scenery in such condition that it will not be readily ignited.

Other objects will appear hereinafter as I proceed with the description of that embodiment of the invention which, for the purposes of the present application, I have illustrated in the accompanying drawings, in which:

Figure 1 is a general view illustrating the application of my improved apparatus where it is employed in connection with hanging scenery in theaters. This view is partly in section, and is taken looking at one end of the series of units which are arranged in line for manipulating all of the scenery parts. Fig. 2 is a view partly in elevation, and partly in section illustrating one of the operating shafts of each unit together with its connections. Fig. 3 is a fragmentary detail view illustrating the electromagnetic device employed when it is desired to drop all of the curtains upon the

stage simultaneously. Fig. 4 is a view similar to Fig. 2 showing the curtain releasing means in the position for dropping the curtain. Fig. 5 is a side elevation partly in section taken on the line 5—5, Fig. 4. Fig. 6 is a top plan view showing the power shaft and a number of the operating shafts together with the gear connections between the power shaft and the operating shafts. In this view the worm wheel drums are removed and the housings of the operating shafts shown in horizontal section. Fig. 7 is a view of the gears at one side of the series of units shown in Fig. 6 being a view looking in the direction of arrow 7, Fig. 6.

Similar reference characters refer to like parts throughout the views.

Let the numeral 5 designate a suitable frame work which as illustrated in the drawing is composed of transversely arranged castings 6 located at suitable intervals and upon which are mounted longitudinally arranged channel bars 7, which form a support for the superstructure. Centrally located of the series of units is a casting 9 upon which is mounted a motor 10 whose operating shaft 12 is arranged to drive a series of gears 13, one upon each unit of the machine. Each of the gears 13 is loosely mounted upon a shaft 14. The gears 13 and shafts 14 may be continued indefinitely on opposite sides of the shaft 12, the gears 13 meshing with each other and rotating in reverse directions. Each gear 13 is normally loose on its shaft 14 and formed integral with a hollow friction clutch member 15, adapted to receive a cooperating clutch member 16 of counterpart shape, which is splined on its shaft 14. Each clutch member 16 is shiftable on its shaft to cause it to frictionally interlock with the hollow clutch member 15, while it is disengaged from said clutch member through the instrumentality of a lever 17 which is fulcrumed on the frame work as shown at 18. Above the fulcrum, pins 19 are applied to opposite sides of the lever, the part 20 of which is provided with an elongated opening in which is located the sleeve of the clutch member 16, the said sleeve being provided near its outer extremity with a collar 21 having a circumferential groove into which the pins 19 of the lever, protrude.

Outside of each lever 17, at the left hand

extremity of each operating shaft, referring to Figs. 2, 4, and 6 is located a rectangular frame 22 which surrounds the adjacent extremity of each operating shaft 14. Within the frame 22 is mounted a brake illustrated in detail in my co-pending application above referred to. Whenever the lever 17 is shifted to disengage the clutch member 16 from its counterpart clutch member 15 the frame 22 is lowered to apply the brake to the shaft 14, since when the said clutch members are disengaged, it is desirable to instantly stop the rotation of the shaft 14. This is accomplished through the agency of the following mechanism: A vertically disposed stem 23 is secured to the top of the frame 22 while its upper extremity is connected with a spring 24, one extremity of which is rigidly bolted, as shown at 25 to a stationary part of the frame work through the instrumentality of an angle iron 26. The opposite extremity of the spring 24 is connected to the stem 23 by means of nuts 27 and 28, threaded on the stem and engaging the spring on opposite sides. This spring carries a projection 29 which, when the shaft 14 is rotating in the regular performance of its function, engages one of the projections or cams 30, located on opposite sides of a V-shaped recess formed in a block applied to one side of the lever, thus raising the spring 24 and lifting the rectangular frame 22, to release the brake, while on the other hand, when the lever 17 is moved toward the left, to the position of Fig. 2 to cause the clutch member 16 to move toward its cooperating frictional clutch member 15 but not into engagement with the same (or to its normal position), the projection 29 of the spring will move downwardly into engagement with the recess in the block of the lever under the influence of the tension of the spring 24 and this downward movement of the spring imparts a corresponding downward movement to the rectangular frame 22, whereby the brake is set.

Upon the extremities of the shafts 14 remote from the gears 13 are similar gears 31, also loosely mounted upon the shafts, each gear 31 being so connected to the power shaft 12, by means of small gears 4, as to cause it to rotate in a direction opposite that to which the gear 13 upon the same shaft rotates. The details of these connections are fully illustrated in my co-pending application. The gears 31 are adapted to be locked upon the shafts for transmitting motion to the latter in directions corresponding with the rotation of the gears by virtue of levers 32, fulcrumed at 33, and provided with an opening, as shown at 34, to receive circumferentially grooved collars 35, splined on the shafts 14 and formed integral with clutch members 36 cooperating with hollow clutch members 37 formed integral with the

gears 31, the operation of the levers 32 and the clutch members 36 corresponding in every respect with that of the levers 17 and the clutch members 15 and 16, as heretofore explained.

Each shaft 14 is centrally equipped with a worm 38. The worms upon adjacent shafts have their threads oppositely arranged throughout the entire series of units, in order to enable the cables 39 connected with the drums 40 of the worm wheels 41 to be located on the same side of their respective drums and in order to accomplish this, the adjacent operating shafts which rotate in reverse directions by virtue of the gearing connections as heretofore explained must have oppositely arranged worms in order to impart movement to their corresponding worm wheels and attached drums in the same direction. Each shaft 14 is for the most part inclosed by a sleeve or housing 42, which is centrally open at the top as shown at 43 to allow a segment of the worm wheel 41 to enter and engage the worm 38 in operative relation. The sleeves or housings 42 are closed at their opposite extremities by plate members 44, the said housings being supported upon brackets 45, employed in connection with the various units, the said brackets being secured to the channel bars 7 by suitable fastening devices as bolts 46.

The two levers 17 and 32 located at the opposite extremities of each unit as heretofore explained are connected by a rod 47, the extremities of the rod being pivotally attached to the levers below their fulcrums, as shown at 48. By virtue of this connection, when the one lever 32, is moved to cause its clutch member 36, to engage its cooperative clutch member 37, the opposite lever 17 will be shifted to carry its corresponding clutch member 16 away from its cooperating clutch member 15 as well illustrated in Fig. 4, though in the last named figure, the worm wheel 41 is shown disengaged from its worm and in a position which all the worm wheels occupy when it is desired to release the worm wheel drums from the controlling influence of the worms 38, whereby all of the curtains or flies are allowed to drop to the stage under the influence of gravity.

Assuming that the two levers 17 and 32 are in the relative positions illustrated in Fig. 4, and that the worm wheel 41 is in operative engagement with its worm 38 as shown in Fig. 2, the wheel 41 and its drum 40 will be rotating in the direction of arrow *a* in Fig. 2 and the rope or cable 39 will be moving in the direction of arrow *b* in the same figure to lower the curtain. At the same time a pinion 49 fast on the worm wheel shaft will act on the cogged rack 50 to move the latter in the direction of arrow *c*, Fig. 2 until the

curtain is lowered to the desired limit, and, as soon as this occurs, the outer extremity of the rack 50 will engage a pin 51 adjustably mounted on the lever 32 and impart a slight movement to the lever, the said movement being of sufficient magnitude to disengage the clutch member 36 from its cooperating clutch member 37. At the same time, the lever 17 will be moved from the position shown in Fig. 4, to the position shown in Fig. 2, whereby the projection 29 of the spring 24 is allowed to drop into the V-shaped recess of the block of the lever. This occurs before the clutch member 16 has engaged its cooperating clutch member 15. The spring 24 will then, by virtue of its tension, move downwardly and actuate the rectangular frame 22 sufficiently to apply the brake to the shaft 14, whereby the latter is instantly stopped, thus preventing its possible continued movement under the influence of momentum, since, in this case, as the curtain is descending, its weight has a tendency to rotate the drum and worm wheel, so that the worm in any event has a retarding or speed-limiting action only. Now, if we assume that the parts are in the position illustrated in Fig. 2,—that is to say, with both clutch members 16 and 36 disengaged from their cooperating clutch members 15 and 37, if it is desired to raise the curtain, the operator will move the lever 32, (see Fig. 2),—toward the right sufficiently to impart a corresponding movement to the lever 17 of sufficient magnitude to throw the clutch member 16 into operative frictional engagement with the clutch member 15. At the same time, the projection 29 of the spring 24, together with the member of the spring carrying said projection, will be raised sufficiently to lift the rectangular frame 22 and release the brake from the shaft 14. At the same time, the shaft 14 will begin to rotate to cause the worm wheel 41 and the drum 40 to rotate in the direction indicated by the arrow *d* in Fig. 2, and, as this occurs, the rack 50 will be moved in the direction indicated by the arrow *e*,—(see Fig. 2) and, when the curtain has been raised to the desired limit of movement, the lefthand extremity,—(see Fig. 2),—of the rack 50 will have moved to engagement with the pin 51 of the lever 17, and the movement of the rack in the said direction will continue until the lever 17 is automatically actuated to shift the levers 17 and 32 to the position shown in Fig. 2, in which event, the projection 29 on the spring will slip into the recess of the lever 17 and the frame 22 will be moved downwardly to apply the brake and instantly check the rotation of the shaft 14.

Each shaft, on which the worm wheel 41 and drum 40 are made fast, is journaled in triangular shaped frame members 52, which

are pivotally mounted on the frame, as shown at 53, or at one of the lower angles of each frame member. Engaging the opposite lower angle of each frame member, and journaled therein, is a rock shaft 54 carrying a fast projection 55 adapted to interlock with a hook 56 formed on the stationary framework, when the worm wheel is in interlocking engagement with its worm 38, the rock shaft 54 being held in position to produce this result by virtue of a lever arm 57 fast at one extremity on the said rock shaft and having its other extremity in engagement with a movable pin 58 forming a part of the armature 59 of the electromagnet 60, normally deenergized. This electromagnet may be energized through the instrumentality of a battery or other source of electricity 61. From the magnet, a conductor 62 leads to one pole 63 of the battery, while, from the opposite pole 64, a wire 65 leads to a contact 66; and from one extremity of a switch arm 67, a conductor 68 leads to the magnet, completing the circuit therethrough, when the switch arm 67 is moved into engagement with the contact 66 for the purpose of closing the circuit. This circuit-closing function may be performed in any suitable manner, as by a push-button, a switch-arm, or any other preferred form of make-and-break device. As soon as the magnet 60 is energized, it attracts the armature 59 and actuates the latter sufficiently to disengage the pin 58 from the lever arm 57, in which event, the weight of the curtains, acting on the drums 40 and the worm wheels 41, will have a tendency to tilt the triangle-shaped frame member 52 in a manner to lift the angles of the said members where the rock shaft 54 is located, and, as this occurs, the resistance of the hook 56, acting on the projection 55, will cause the rock shaft to turn in a direction to release the projection from the hook, with the result that all of the worm wheels will be disengaged from their corresponding worms 38, in which event, the worm wheels and corresponding drums will be free to rotate in response to the weight of the loads or curtains carried thereby, thus allowing all of the curtains to be dropped simultaneously upon the stage, as for the purpose of smothering a fire, or for placing all the curtains, flies and scenery in such shape that a fire in connection therewith would be practically impossible.

In Fig. 1, I have illustrated in a general way the manner of applying my improved apparatus. As illustrated in this figure, the said apparatus, including a series of units equal in number to that of the flies or curtains 8 to be controlled, is interposed between the curtains and the fly-rail with which the various ropes or cables 69, directly connected with the respective curtains 8, are connected, suitable guide pul-

leys 70, 71 and 72 being employed. As illustrated in the drawing, there are three ropes or cables 69, connected with each curtain, and these cables, after passing over pulleys 72 and 70 on one side of an arch-shaped frame 73, pass underneath pulleys 74 mounted on a vertically movable block 75 and thence over other guide pulleys 70 on the opposite side of the frame 73 and thence over pulleys 71 on a frame 76, and thence down to the pin-rail 77, where the said ropes are so adjusted that the curtains are properly regulated or "trimmed." The cable 39 is directly connected at one extremity with the block 75, and hence, as the drum 40 is rotated in one direction, the curtain or fly will be raised, while, when the said drum is rotated in the opposite direction, the said curtain will be lowered. The specific construction and arrangement of the guide pulleys illustrated in Fig. 1, is covered specifically in my Patent No. 1,027,028, granted May 21, 1912, and therefore will not be further set forth in detail in this application.

Whenever it shall become necessary, as in the case of fire, to drop all of the flies or curtains simultaneously upon the stage, the circuit is closed through the electromagnet 60 and the armature 59 actuated to release the lever arm 57, allowing the weight of the curtains to act upon the drums 40 and worm wheels 41 to tilt the triangular frame plates 52 to the position illustrated in Fig. 4, whereby all of the worm wheels are disengaged from their cooperating worms. In this event, no provision will be made for locking the worm wheels and drums against rotary movement in response to the gravity of the curtains or flies. Consequently, the said wheels and drums will rapidly rotate in response to the weight of their respective loads until the curtains are all lying in a mass upon the stage.

Having thus described my invention, 45 what I claim is:

1. In combination a series of drums mounted to rotate, operating shafts normally inactive, means for successively imparting rotary movement to any shaft in reverse directions, worm gear connections between the said shafts and the respective drums, the drums being tiltably mounted to permit the breaking of the worm gear connection between the drums and shafts, the drums being all connected with their loads on the same side, whereby there is a tendency to tilt the drums through the instrumentality of the weight of their respective loads, means for locking the drums against tilting movement, and means for simultaneously unlocking all of the drums to permit the said tilting action, substantially as described. 55 60

2. In combination, a series of drums mounted to rotate operating shafts normally inactive, means for successively imparting rotary movement to any shaft in reverse directions, operative, rotative connections between the said shafts and the respective drums, the drums being tiltably mounted to permit the breaking of the said operative rotative connections, the drums being all arranged to rotate in the same direction for raising their loads, whereby there is a tendency to tilt the drums through the instrumentality of the weight of their respective loads, means for locking the drums against tilting movement and means for simultaneously unlocking all of the drums to permit the said tilting action, substantially as described. 65 70 75 80

In testimony whereof I affix my signature in presence of two witnesses.

SETH G. BAILEY.

Witnesses:

SOLON J. BOUGHTON,
ANNA L. LEHMAN.