

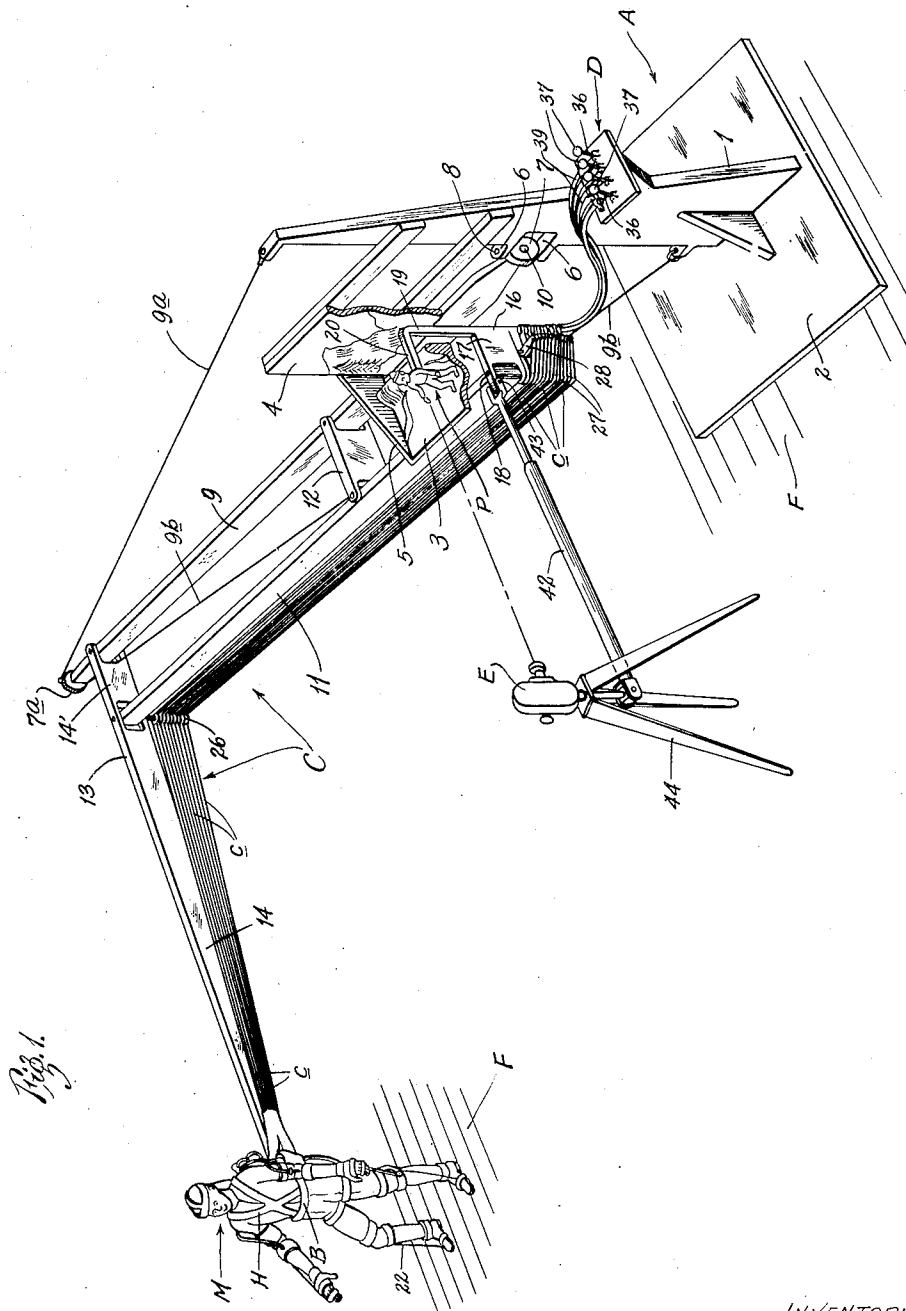
April 5, 1949.

C. U. DEATON  
ACTUATING MEANS FOR MARIONETTES.  
PUPPETS, AND THE LIKE

2,466,214

Filed Sept. 20, 1943

5 Sheets-Sheet 1



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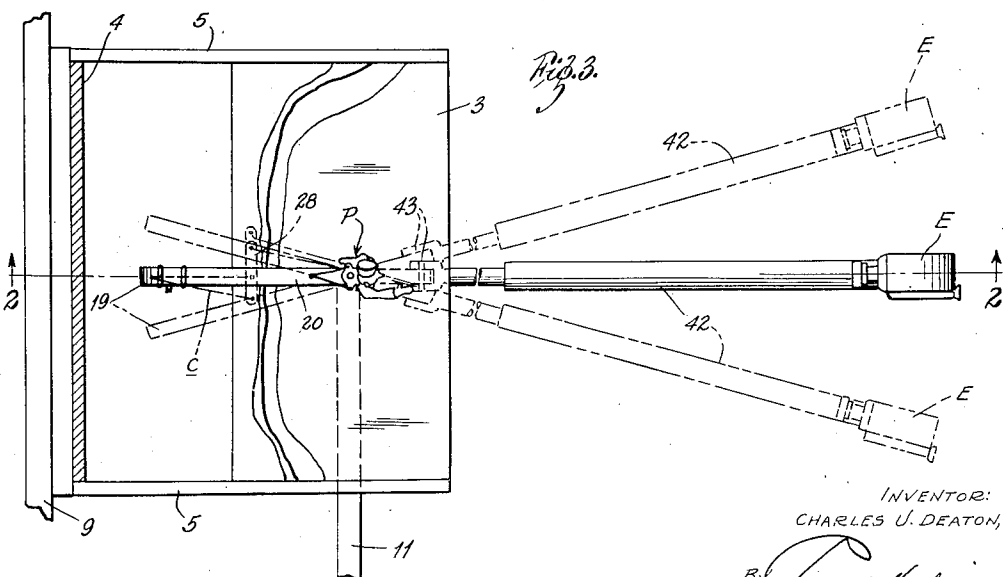
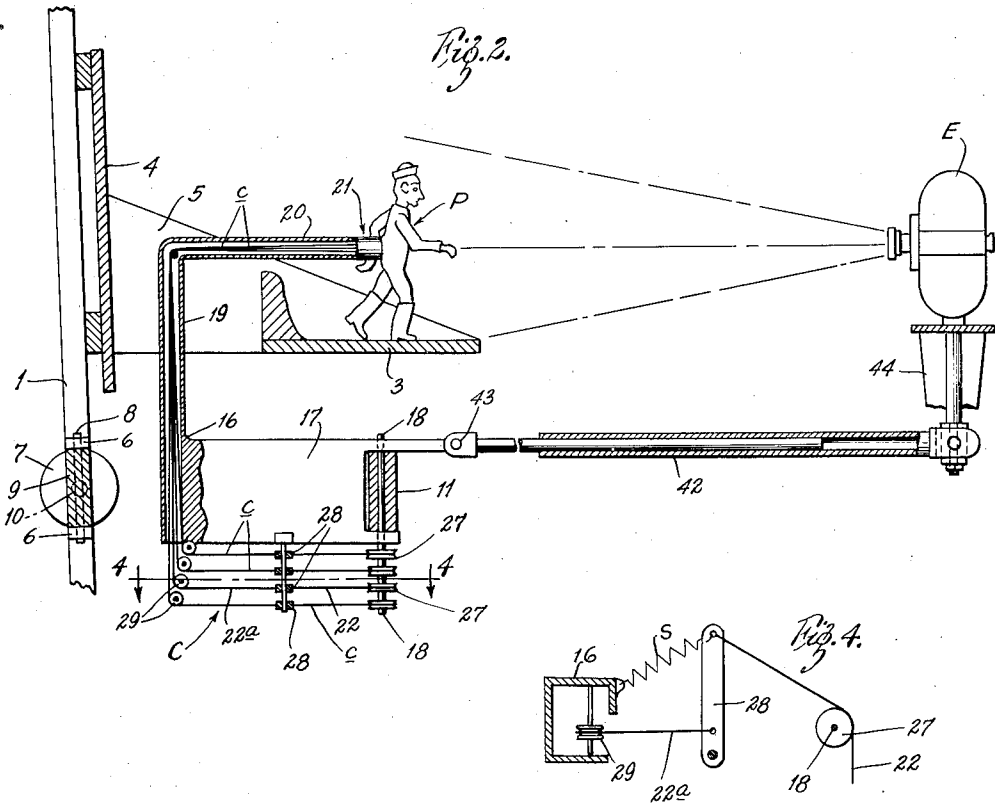
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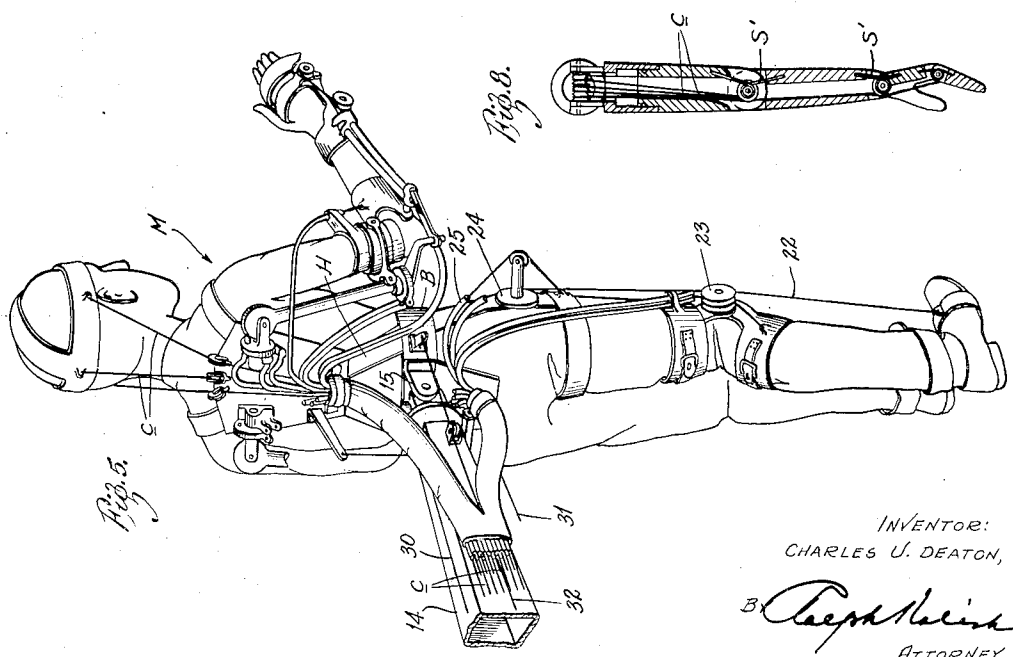
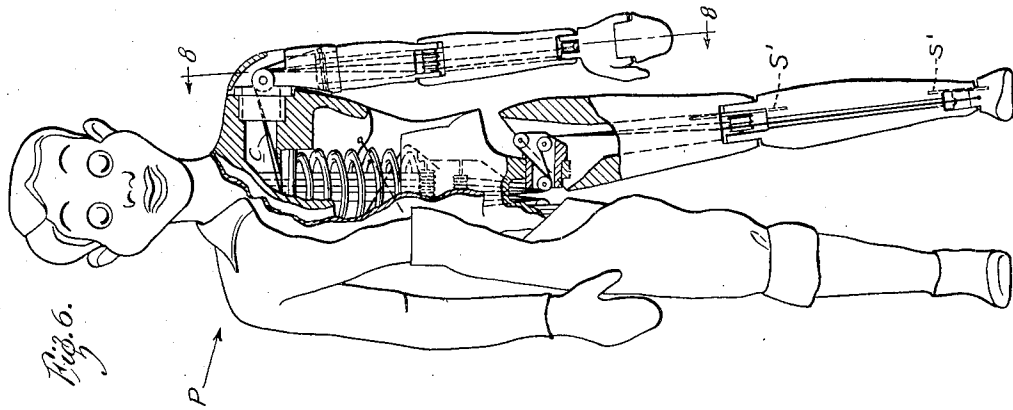
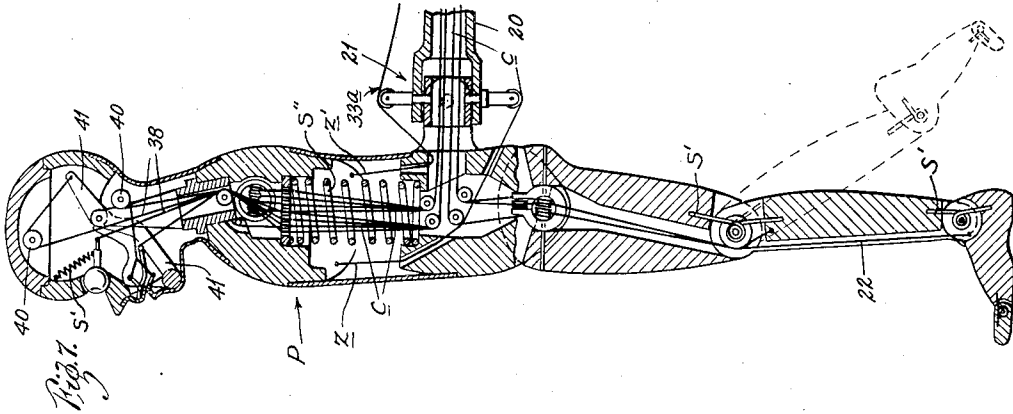
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5 Sheets-Sheet 3



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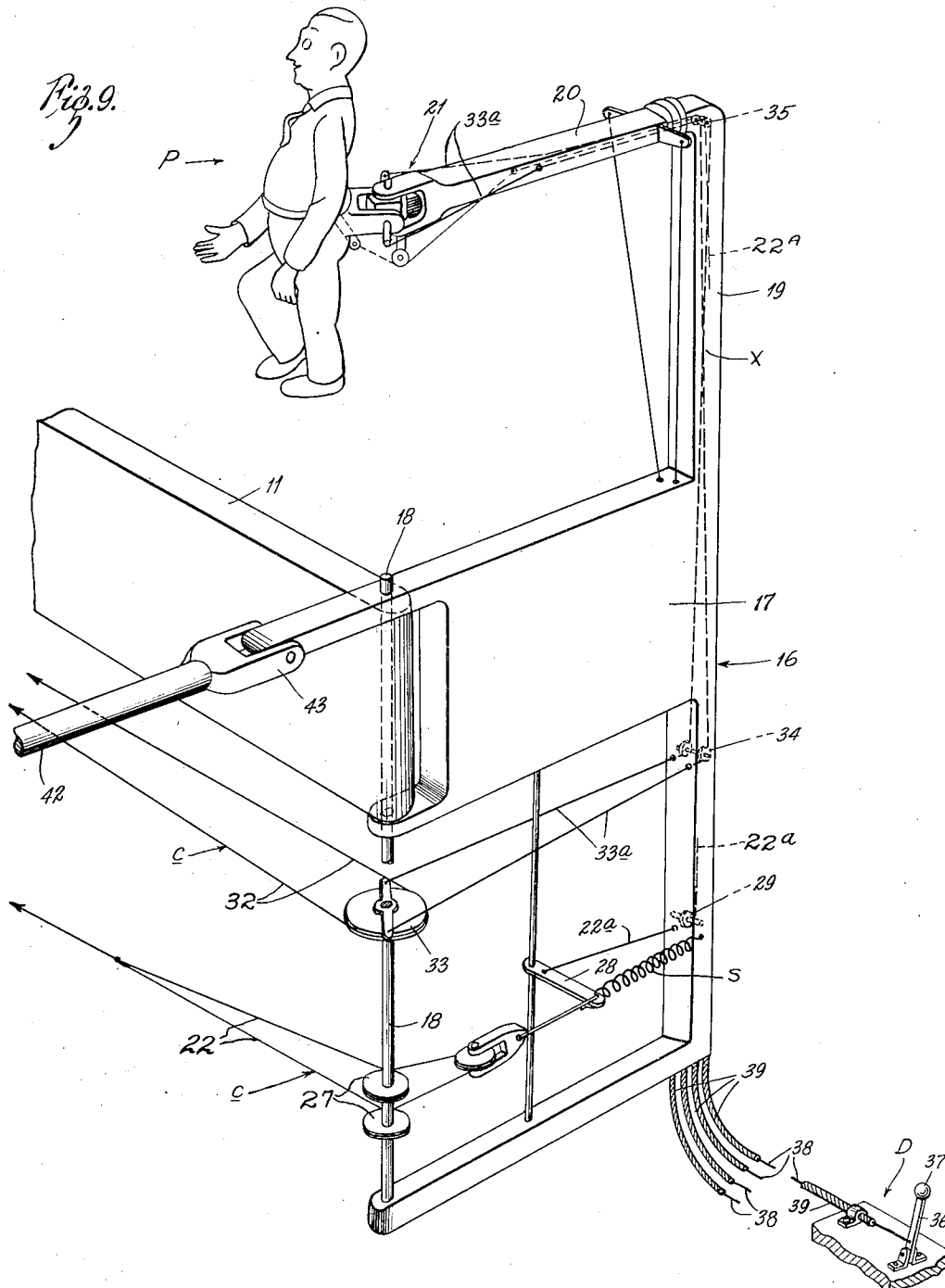
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5 Sheets-Sheet 4



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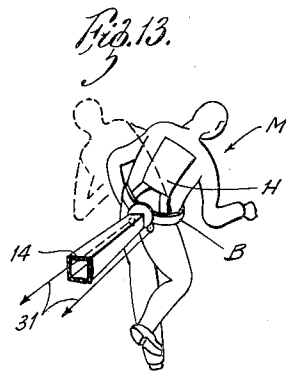
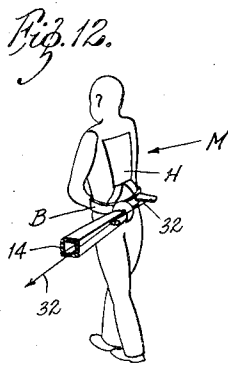
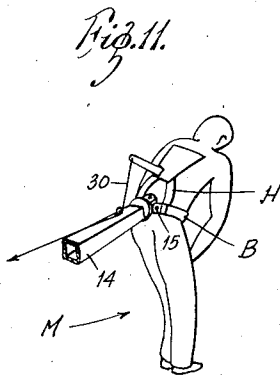
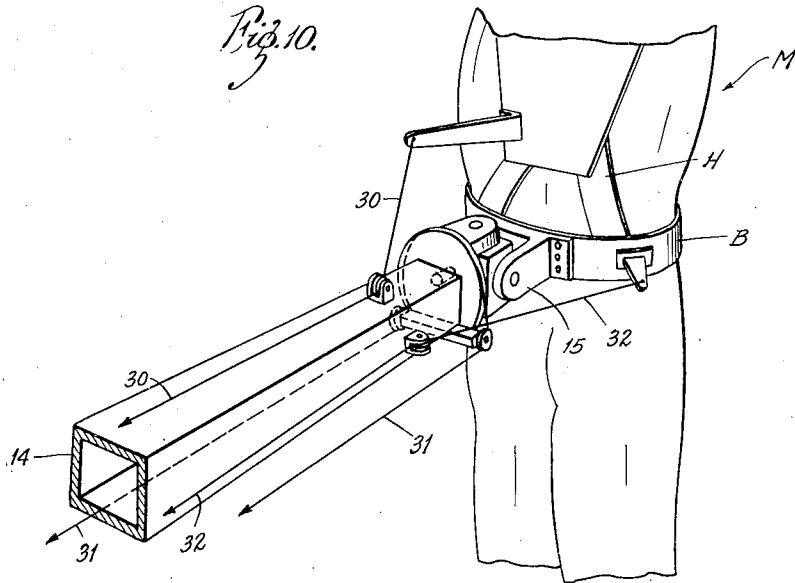
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5 Sheets-Sheet 5



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# UNITED STATES PATENT OFFICE

2,466,214

## ACTUATING MEANS FOR MARIONETTES, PUPPETS, AND THE LIKE

Charles U. Deaton, Centralia, Ill.

Application September 20, 1943, Serial No. 503,052

18 Claims. (Cl. 46—126)

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This invention relates to a certain new and useful improvement in marionettes, puppets, and the like.

My invention has for its chief object the provision broadly of mechanism whereby the marionette or puppet may be automatically animated in synchronism with, and directly responsive to movements of, a live person or individual—for brevity, designated "actor."

More particularly, my invention has for its objects the provision of mechanism to automatically effect unitary movement of a puppet or marionette from one location to another by movement of an individual or so-called "actor" spaced from the puppet but attached thereto by a movement transferring apparatus; to duplicate automatically in the body, limbs, and other parts of a puppet the relative movements of the body, limbs, and corresponding parts of an individual or "actor" generally simulated by the puppet; to effect in a puppet movements of different parts of the puppet operated from different sources, as, for example, movements of the legs or body by one individual or "actor" and movement of arms or facial features by another individual or "actor"; and to actuate a puppet having a plurality of relatively movable parts so that the means of operation will be hidden or concealed from view, at least from view in a given direction, so that the puppet may be viewed or photographed during its movements without disclosing the operator or the operating mechanism.

And with the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawings (five sheets)—

Figure 1 is a reduced, partly broken, perspective view of a marionette or puppet actuating, animating, and photographing mechanism constructed in accordance with and embodying my invention—more fully stated, Figure 1 is a perspective view of a structure of my invention embodying a pantographic apparatus and a correlated cord-and-pulley arrangement, there being a harness at one operative end of the apparatus for application to the "actor" and there being a puppet or marionette at the other operative end of the apparatus so uniquely constructed and connected to the harness that the puppet may be moved as a unit, and its parts may be moved relatively to each other, to correspond to the movements of the "actor" as a unit and to the relative movements of the body, head, limbs,

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and other parts of the "actor"; the puppet or marionette is partially surrounded by a scenic-setting, broken away in part for better illustration; also shown is a supplementary operating device or means for actuating parts of the puppet or marionette in addition to and independently of the operation of puppet parts by the pantographic apparatus and cord-and-pulley arrangement; also shown is a camera for photographing the puppet from the same angle irrespective of movements of the puppet;

Figure 2 is a vertical section through the scenic-setting and the puppet support and associated elements and is taken approximately on the line 2—2, Figure 3;

Figure 3 is a plan view of the parts shown in Figure 2;

Figure 4 is a detail plan view of some of the parts shown in Figures 2 and 3 and is taken approximately on the line 4—4, Figure 2;

Figure 5 is an elevational view of a simulated human or "actor" equipped with a harness for actuating or animating the marionette or puppet figure in synchronism and exact accordance with physical movements of his body and limbs;

Figure 6 is an elevational view, partly broken away and in section, of a jointed and wired or corded marionette or puppet adapted for actuation or animation by the pantographic apparatus and cord-and-pulley arrangement in synchronism with movements of the "actor" of Figure 5 and to whom the harness is attached;

Figure 7 is a vertical transverse section through the puppet or marionette of Figure 6, taken substantially on the axis of the puppet-head and body and one leg;

Figure 8 is a similar section taken through one of the arms of the puppet as indicated by the line 8—8 in Figure 6;

Figure 9 is an isometric detail showing the puppet, its support, and associated parts;

Figure 10 is an isometric detail showing a portion of the harness attached to the simulated individual or "actor" of Figure 5; and

Figures 11, 12, and 13 are diagrammatic views illustrating the functioning of the parts shown in Figure 10.

Referring now more in detail and by reference characters to the drawings, which illustrate a preferred embodiment of my invention, the pantographic structure generally designated A includes a stationary frame 1 upstanding upon a base 2 and mounting a stationary scenic-setting or stage indicated by a platform 3, a background 4, and sides 5.

Upright 1 has spaced laterally presented brackets 6 receiving a bearing 7, which pivots in the brackets 6 about vertical pintles 8. A horizontally disposed supporting-bar 9 has its one or so-called inner end journalled, as at 10, in the bearing 7 for rotatory movement about its longitudinal axis, the bar 9 being also swingable in a horizontal plane with bearing 7 about pintles 8 and being secured or retained against vertical movement by opposed guys 9<sup>a</sup> and 9<sup>b</sup> engaging an intermediate bearing 7<sup>a</sup> located on the opposite or outer end of bar 9.

A bar 11 extends in suitably spaced relation alongside bar 9 and is supported thereon by a link 12 and a boom-like lever 13 both having vertical pivots to bars 9 and 11 and holding them in parallel relation, as best seen in Figure 1. Bar 11 may swing with bar 9 about the axis of the latter and about pintles 8 and may, to a limited extent, move lengthwise of bar 9, but bar 11 cannot rotate on its own axis or pivot relatively to bar 9, as will be seen.

Lever 13 extends forwardly, as at 14, from the outer end of bar 11 and at its forward end mounts a universal joint connection 15, best seen in Figure 10, to the belt B of a harness H applicable or attachable to a live or simulated individual or character here indicated as a male-actor M.

A substantially U-shaped carrier member 16, best seen in Figures 1 and 9, is mounted on the inner end of the supported bar 11 and includes a base or widened leg-portion 17 pivoted on bar 11 by an upright shaft 18, a tubular bight-conduit 19 extending upwardly from base 17 and having a horizontal or other leg-portion 20 terminating in a universal joint-connection 21 vertically aligned with shaft 18, the joint 21 corresponding to the universal joint-connection 15 and mounting a puppet or marionette P here shown as simulating a man.

The frame-members 1, 2, parallel bars 9 and 11, link 12, lever 13, and member 16 form, in substance, the pantographic apparatus A, whereby unitary movements of the "actor" M are automatically duplicated by the puppet P. For example, if the "actor" M crouches towards, or jumps upwardly from, the floor F, "actor" M will tilt or shift lever 13, bars 9 and 11, carrier 16, and the puppet P about the journal 10 of bar 9, causing bar 11, carrier 16, and the puppet P to be lowered or raised, tilted or shifted, correspondingly but in proportion to the length of the link-part 14' of lever 13 to the total length of the lever.

If the "actor" M moves forwardly or rearwardly, the "actor" M will swing all parts of the apparatus about the pintles 8 of bar 9, causing bar 11, carrier 16, and the puppet P to be moved forwardly or rearwardly, respectively, the movements of the puppet P being proportionately reduced. It will be seen that the bars 9, 11, 12, and 13 are pivoted together in the manner of a pantograph and the proportional relations between the lengths of such members and the pivot points therebetween will, just as in a conventional pantograph, determine the ratio between the amount of movement of the "actor" M and the puppet P. Obviously, if it were desired to distort the movement of the puppet P in one plane relatively to the movement of the "actor" M in that plane as compared with the "actor" and puppet movements in another plane, then the ratio between the several bars 9, 11, 12, and 13 and the pivot points therebetween may be

suitably distorted, just as would be true of any conventional pantograph.

If the "actor" M moves to his right or left, lever 13 will swing about the pivotal connection of the latter to bar 9, moving bar 11 and carrier 16 longitudinally with respect to the stage 3, 4, 5, but to a lesser distance in accordance with the relative lengths of elements 13 and its link portion 14' between the bars 9 and 11.

In addition to the overall or "bodily" movements of the "actor" M from one location to another, and their transmission to the puppet P through the pantographic apparatus A as described, there are other movements of the "actor," such as the twisting and bending of his body and the movements of his head, arms, hands, legs, and feet relatively to the body and to each other which it is desired to transmit to the puppet P. Such movements are effected by a plural cord-and-pulley arrangement, indicated generally at C, the several cords c of which extend along the outer portion 14 of lever 13, along bar 11, and then along carrier 16, being reeved over respective pulleys journalled in axial alignment with the pivotal connection between lever 13 and bar 11 and the pivotal connection between bar 11 and carrier 16 and also being reeved over other respective pulleys journalled on the universal joint 15, the harness H, and the carrier 16.

The operation of the cord-and-pulley arrangement will be readily understood by reference to the drawings, and it is unnecessary to describe in detail the elements effecting operation of each part of the puppet P by a part of the "actor" M. However, for example, it may be noted that a cord 22 attached to the right foot of the "actor" M, Figure 5, runs over a pulley 23 of the harness H near the knee-joint and a second pulley 24 of the harness H near the hip-joint and then through a tube 25 and along lever-link 14, over a pulley 26, along bar 11, over a pulley 27 on shaft 18, as best seen in Figures 2 and 9, to a reducing-lever 28, where the extent of movement of the remainder of the cord 22 is reduced, the cord 22 and the reducing-lever 28 being tensioned by the spring s. The cord 22 continues, as at 22<sup>a</sup>, over a pulley 29 and additional puppet pulleys, best seen in Figure 6, to connect to the right foot of the puppet P. It will be understood that normally the ratio between the arms of lever 28 corresponds to the ratio between lever 13 and its inner link portion 14', so that the movement of the puppet attached cords c will be reduced in extent in the same proportion as the other movements of the puppet P relatively to the movements of the "actor" M.

Some of the cords c, such as indicated at 30, 31, and 32, Figure 10, are actuated by the movements of the parts of the universal joint 15 caused by the movement of the body of the "actor" M, as in bending and twisting, as illustrated in Figures 11, 12, and 13. These movements do not in themselves affect the cords c leading to the "actor's" head and limbs. Similar movements of the puppet P are effected by cords c which pass over pulleys 33 on shaft 18 and are extended, as at 32<sup>a</sup>, to run over pulleys 34 and 35 and similarly actuate the universal joint 21, Figure 9, and the body of the puppet P without substantially affecting the cords c connected to the head and limbs of the puppet P.

It will be understood that the movements of the "actor" M transmitted through the pantographic apparatus A, the movements transmitted from the universal joints, and the movements

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transmitted through the various cords *c* of the harness *H* may be transmitted simultaneously, so that the combination of movements by the "actor" *M* will be duplicated in and by the puppet *P*.

In addition to the movements of the puppet *P* effected automatically by the mechanisms described, there is provided a separate control for actuating the facial elements of the puppet *P*. This control is indicated generally at *D*, Figures 1 and 9, and comprises levers 36 with knobs 37 adapted for grasping manually by an operator, not shown, other than the "actor" *M*, the levers 36 being connected by respective cords 38 extending through cables 39 and conduit 19 to the interior of the head of the puppet *P*, where they extend over suitable pulleys 40 to levers 41 to the jaw, lips, and eyes of the puppet *P*.

The joints and various other movable members of the puppet *P* are tensioned or normally held in the position of their most extreme retracted movement by springs, such as those indicated at *s'* in Figures 6, 7, and 8. For instance, the spring at the knee joint will operate so that the leg is drawn upwardly and backwardly to whatever desired position may be selected as the most extreme backward position of such member, as schematically shown in dotted lines in Figure 7. The cord 22, which controls that member, will then be drawn tightly against the tension of such spring *s'*. As a result, when the "actor" puts his foot into the harness which controls the other end of the cord 22, he will have to draw it down into an intermediate position suitable to himself against the tension of the spring *s'*. Thereupon, if he kicks his foot forwardly, drawing the cord 22 further forwardly, the cord 22 will accordingly pull the corresponding leg member of the puppet *P* forwardly in a similar manner. On the other hand, if the "actor" kicks his foot backwardly toward the rearmost position, the cord 22 will tend to be relaxed and the spring *s'* will draw the member backwardly in corresponding fashion, keeping the cord 22 tensioned. A similar arrangement is carried out for all the other movable members. Similarly, the torso or trunk of the puppet *P* is held preferably erect by the large spiral spring *s''* so that the cords will control the "uprightness" of the puppet's trunk and will maintain such upright position and hold the trunk-controlling cords tensioned. If the "actor" bends forwardly at the waist, the cord *z*, as shown in Figure 7, which is connected to cord 39 (see Figure 5), will be drawn tight and the puppet's body caused to bend forwardly. On the other hand, if the "actor" bends backwardly at the waist, the companion cord *z'*, which is connected to cord 31, will be drawn tight and the puppet caused to bend backwardly in corresponding fashion. It may be noted in this connection that the cords will become slack if the "actor" moves a particular member in some direction past the position of maximum retracted movement of the corresponding member of the puppet *P*.

In Figure 9, a somewhat similar arrangement is schematically shown. In that case, however, only one trunk-controlling cord is shown for causing the puppet *P* to bend forwardly, rearward bending movement being entirely omitted. In such case, even though the "actor" were to bend backwardly, such backward bending movement would not be transmitted to the puppet *P* for the reason that the puppet *P* would not be set up for such purpose. In connection with

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Figure 9, it may also be well to point out that the cords 33<sup>a</sup> are crossed as they run upwardly through the hollow column 16, thereby synchronizing the movement of the puppet *P* with the movement of the "actor." If it were not for the crossing of the cords, the puppet *P* would twist to the right when the "actor" twisted to the left and vice versa.

Control *D* may be positioned near or remote from the puppet *P* and near or remote from the "actor" *M*, and the operator of the control may follow the facial movements of the "actor" or may operate the control to provide the puppet *P* with facial movements independently of the facial movements, if any, of the "actor" *M*, as will be understood.

All of the described operating structure may be concealed from the view of spectators in front of the puppet *P*, or it may be desired to use the entire structure for moving pictures or television. In such use, it may be desirable to shift the puppet *P* or the line of sight from the camera to the puppet relatively to the background or scenic setting 3, 4, 5, without affecting the movements of the puppet *P* by the "actor" *M* and the operator of the control *D*. For such purpose, there is provided a telescoping rod 42 having a horizontal pivot 43 to carrier base 17. At its outer end, rod 42 is connected to a camera *E* focused upon the puppet *P* and mounted upon a tripod 44, which may be rolled over the studio floor *F* and elevated or lowered as desired. Due to the telescoping construction of connection 42, the camera *E* may be moved towards and away from the stage and puppet *P* without affecting the latter, and due to the horizontal pivot 43, the camera *E* may be elevated and lowered relatively to the stage 3 and puppet *P* without affecting the latter. If the camera *E* is moved horizontally to the right or to the left, it swings carrier 18 about shaft 18 as a pivot, thereby maintaining the camera *E* substantially in alignment with the front of the puppet *P* but effecting a relative shifting of the puppet *P* and the background 4. All of these movements of the camera *E*, including the latter-mentioned swinging of the puppet *P* about shaft 18, may be made without affecting the puppet *P* otherwise and without affecting movements of the puppet *P* by the pantographic apparatus *A* and by the cord-and-pulley arrangement *C*.

For the purpose of illustration, the puppet *P* is shown in simulation of a man standing upright similar to the "actor" *M*, but it is within the scope of my invention to have the puppet *P* take other forms, such as an ape, a dog, an elephant, a dragon, or other imaginary creature, and it is also within the scope of my invention to have a live animal or other animated individual than a human serve as the "actor," which expression is employed in an inclusive sense in this specification and the appended claims.

It will also be understood that the harness *H* may be varied to meet various operating conditions, the essential features being the cords *c*, which are moved or pulled by the "actor" *M* and his or its respective limbs or head, as the case may be.

And it may here be remarked that the puppet *P* may also be of any selected jointed effect comprising a jointed body, jointed arms, and jointed legs and a head equipped with shiftable lips, eyes, and chin, the particular cord *c* from any particular part of the "actor" *M* being attached to a simulative or corresponding part or



element of the puppet or figure P, as the case may be.

Thus the limb, body, and facial movements of the particular "actor" M are transmitted and reproduced automatically and synchronously by the puppet P through the unique transmitting mechanism C—D, and it is to be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the puppet may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a puppet structure, apparatus including a device for attachment to, and for actuation by, an actor, an actuating device for attachment to a puppet, and means connecting said devices so that movement by the actor is automatically transmitted from one device to the other for effecting corresponding movement of the puppet.

2. In a puppet structure, a device for attachment to, and actuation by, an actor, a puppet spaced from said device, and means connecting said device and puppet so that bodily movement of the actor from one location to another automatically effects corresponding bodily movement of the puppet.

3. Puppet structure as recited in claim 2, which includes leverage for varying the extent of the puppet movement relatively to the extent of movement of the actor.

4. In a puppet structure, a pantographic apparatus, a puppet operatively connected to one end of said apparatus, and means at the other end of said apparatus for attaching the same to, and for actuation by, an actor so that movement of the actor from one location to another will effect substantial duplication of movement of the puppet from one location to another.

5. In a puppet structure, a stationary frame, a supporting bar mounted on the frame to rotate about its own axis and to swing in one plane about a pivot on the frame, a supported bar paralleling the supporting bar, linkage pivotally connecting said bars for maintaining the same in parallel relation and including a lever projecting from one end of the supported bar, means on the outer end of said lever for attaching the same to, and for actuation by, an actor, and a puppet carried by the other end of the supported bar, and automatically actuated on movements thereof.

6. In a puppet structure, a puppet having relatively movable parts, an apparatus including a device spaced from the puppet and arranged for attachment to, and for actuation by, relatively movable parts of an actor, and means connecting the device and puppet so that relative movements of the actor are substantially duplicated by corresponding parts of the puppet.

7. In a puppet structure, a puppet, means arranged for separate attachment to the body, and to relatively movable parts, of an actor, said means having connection with the puppet and being constructed and arranged so that bodily movement of the actor from one location to another automatically effects corresponding bodily movement of the puppet and relative movements of the parts of the actor automatically effects similar relative movements of the corresponding parts of the puppet.

8. In a puppet structure, a puppet and an apparatus arranged for attachment at its opposite ends respectively to an actor and to the puppet

so that bodily movement of the actor from one location to another automatically effects corresponding bodily movement of the puppet, said apparatus including elements arranged for attachment to relatively movable parts of the actor, and means connecting said elements to relatively movable parts of the puppet so that relative movements of the parts of the actor automatically effects similar relative movements of the corresponding parts of the puppet.

9. In a puppet structure, a pantographic apparatus comprising a stationary frame, a bar mounted on said frame to rotate about its axis and to swing about a vertical pivot on the frame, spaced links extending transversely of said bar and pivoted thereto to swing in the plane thereof, a supported bar paralleling said first-mentioned bar and pivotally connected to said links at equal distances from said first-mentioned bar, a puppet pivotally supported from said supported bar at a point spaced from said links, one of said spaced links forming a lever extending from the bars, and means on the outer end of the lever for attachment to, and actuation by, an actor whereby movements of the latter will produce similar movements in the puppet.

10. In combination with a puppet structure as recited in claim 9, a plurality of cords extending along the lever and the supported bar and over pulleys journaled at the pivots for said lever and bar and connected to relatively movable parts of the puppet, and a harness at the outer end of the lever having relatively movable elements arranged for attachment to relatively movable parts of the actor, said elements being secured to respective cords whereby relative movement of parts of the actor may be transmitted to and duplicated in the puppet irrespective of movements in the latter by the pantographic apparatus.

11. In a puppet structure, a harness arranged for attachment to an actor and including a main member for attachment to the body of the actor and a plurality of parts for attachment to the parts of the actor movable relatively to the body, a puppet having a body and other parts corresponding generally to the body and parts of the actor, a pantographic device having a connection at one end to said main member and its other end to the body of the puppet, and a cord-and-pulley arrangement including a plurality of cord members each of which is respectively attached at one end to a selected part of the harness and the other end of which is attached to the corresponding part of the puppet, the pantographic apparatus transmitting movements of the part of the body of the actor to which said main member is attached to the body of the puppet independently of relative movements of the other parts of the actor and the puppet, and the cord-and-pulley arrangement transmitting relative movements of said other parts of the actor to the said other parts of the puppet independently of movements of the first-mentioned part of the body of the actor and the puppet.

12. In a puppet structure, a harness for attachment to an actor, a puppet generally simulating the actor for which the harness is adapted and having relatively movable parts, an apparatus connecting the harness to the puppet so that movements of the actor to whom the harness is attached are automatically transmitted to and substantially duplicated in the puppet, and means for actuating the relatively movable parts of the puppet by an operator independently of

the movement of the puppet by said apparatus and the actor to which the harness is attached.

13. In a puppet structure, a harness having separate elements for attachment respectively to the head and relatively movable parts of an actor, a puppet generally simulating such actor and including a head and other parts movable relatively to each other, there being features in the head movable relatively thereto and to each other, an apparatus connecting the elements of the harness to corresponding parts of the puppet so that movements of the actor attached to the harness are automatically transmitted to and substantially duplicated in the puppet, and means attached to said puppet features and adapted to be actuated selectively by an operator independently of the actuation of said apparatus.

14. In a puppet structure, a puppet, a relatively stationary background for the puppet, a puppet carrier, means spaced from the puppet and the carrier for manual operation of the puppet, and a camera mounted on the carrier for photographing the puppet and the background, the carrier, puppet, and camera being movable about a common axis and relatively to said background.

15. In a puppet structure, a puppet, a relatively stationary background for the puppet, a puppet carrier, a pantographic apparatus for moving the puppet including an arm pivotally supporting the carrier, a cord-and-pulley arrangement associated with said apparatus for moving the parts of the puppet relatively to each other irrespective of movement of the puppet by said apparatus, and means for moving the carrier without affecting the action of said apparatus and cord-and-pulley arrangement.

16. In a puppet structure, a puppet, a relatively stationary background for the puppet, a puppet carrier, a pantographic apparatus for moving the puppet including an arm supporting the carrier, a cord-and-pulley arrangement associated with said apparatus for moving the parts of the puppet relatively to each other irrespective of movement

of the puppet by said apparatus, there being a vertically disposed pivot connecting said arm and the carrier and the puppet being positioned in line with the axis of said pivot, a telescoping device having one element connected to the carrier by a horizontal pivot and having its other element arranged to mount a camera directed towards the puppet and background.

17. In a puppet structure, a stationary stage, a yoke-like carrier having a base beneath said stage and a member extending upwardly from said base at the back of said stage and then forwardly above the floor of the stage, a puppet supported by said member over the stage, a stationary upright, a pantographic device having a supporting arm swingably mounted on the upright and a movable supported arm extending under said stage and pivotally mounting said carrier base in substantial vertical alignment with the puppet, and means associated with the device for operating the same to shift the puppet relatively to the stage.

18. In a puppet structure, a puppet, a relatively stationary background for the puppet, a puppet carrier, means spaced from the puppet and the carrier for operation of the puppet, the carrier being movable relatively to said background irrespective of the operation of said means, a camera for visual reproduction of the puppet, and means connecting the camera and the carrier for movement of the camera and carrier without effecting movement of the puppet relatively to the background.

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