

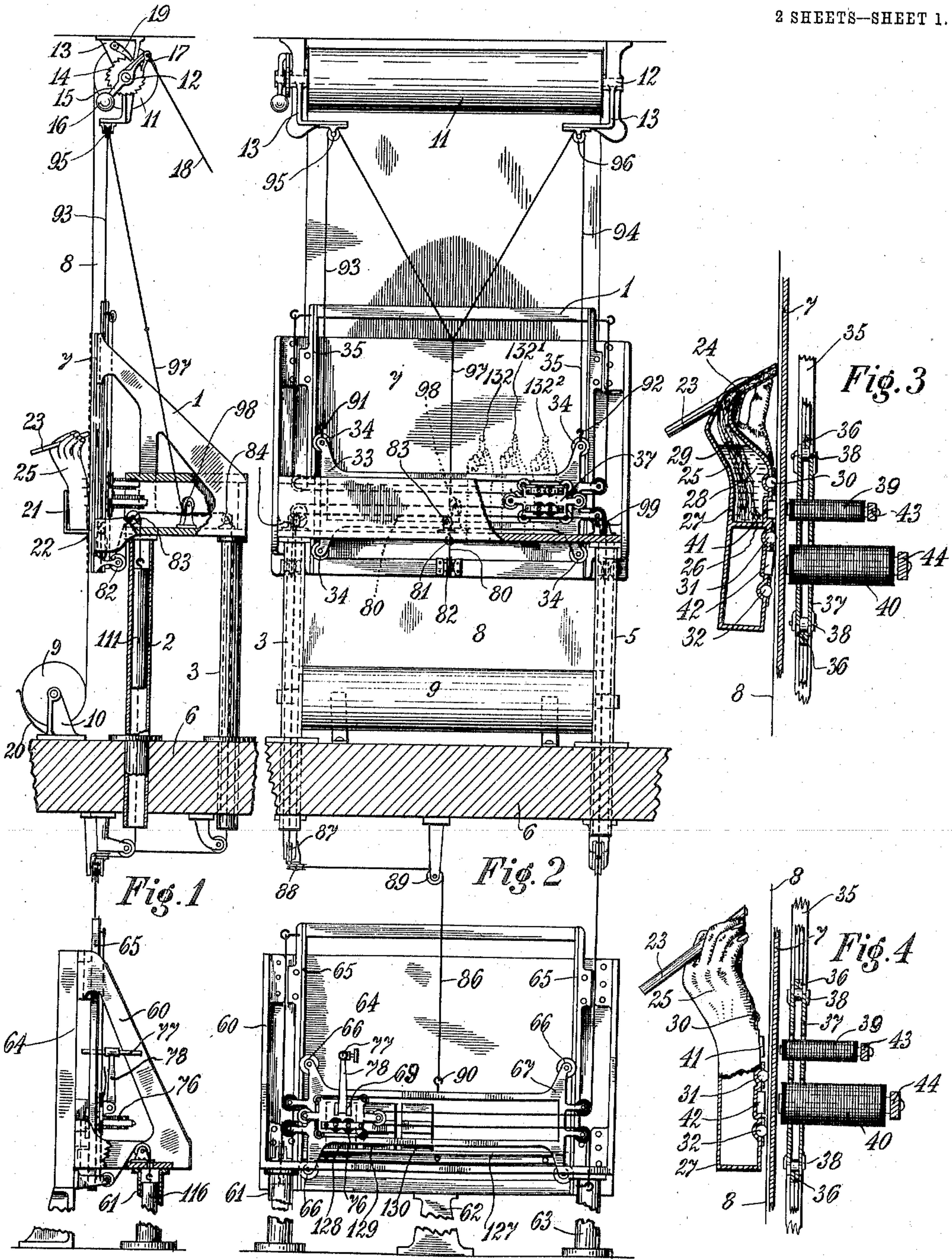
No. 817,092.

PATENTED APR. 3, 1906.

F. N. REEVES.
ILLUSION DEVICE.

APPLICATION FILED JAN. 20, 1906.

2 SHEETS—SHEET 1.



WITNESSES:

J. R. Martin
W. E. Schoenborn

INVENTOR

Frank N. Reeves

BY

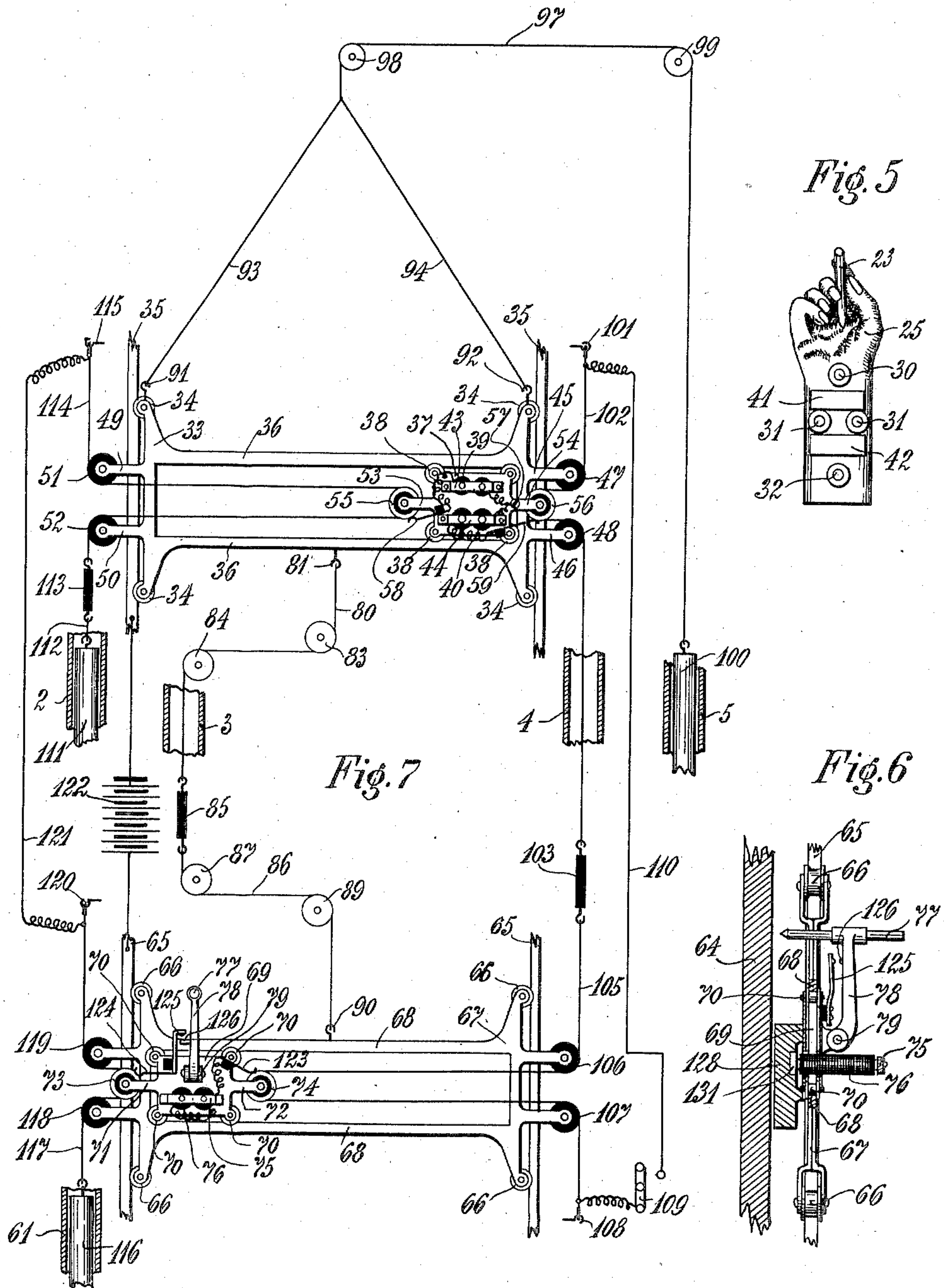
BY
John N. Hall,
his ATTORNEY

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2 SHEETS—SHEET 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK N. REEVES, OF NEW YORK, N. Y.

ILLUSION DEVICE.

No. 817,092.

Specification of Letters Patent.

Patented April 3, 1906.

Application filed January 20, 1906. Serial No. 296,987.

To all whom it may concern:

Be it known that I, FRANK N. REEVES, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Illusion Devices, of which the following is a specification.

The primary object of this invention is the production of an illusion for attracting attention to store-windows for advertising purposes, though it may also be used for entertainment on the stage and for various other purposes. This illusion is produced by causing one or more unattached representations of human hands carrying each a marking device to pass over and write, draw, or otherwise mark upon a preferably vertical writing-surface. The illusion depends for its attraction upon the mystery which surrounds the manner of supporting and operating the hand. Since there are no means visible to the spectators whereby the hand is either supported or moved, the curiosity is at once aroused as to how this is accomplished.

In order to more fully describe my invention, reference will be had to the accompanying drawings, which illustrate one embodiment thereof, and in which—

Figure 1 is a side elevation of the device, partly in section; Fig. 2, a rear elevation of the same; Fig. 3, a section through one of the hands, showing the parts of its operating mechanism, partly in section and partly in elevation; Fig. 4, a similar view in which the hand is shown in part section and in which the hand is shown in position, in which the marking device carried thereby is lifted from the writing-surface; Fig. 5, a front elevation of one of the said hands; Fig. 6, a side elevation, partly in section, of the tracing-stylus and associated operating mechanism; and Fig. 7, an enlarged diagrammatic view of the pantographic mechanism and associated parts.

Similar numerals refer to similar parts throughout the several views.

In carrying out the form of my invention shown in the accompanying drawings I provide a suitable framework 1 and mount this upon four upright hollow supports 2, 3, 4, and 5, which are in turn supported by a suitable base 6, which latter may be the floor of a store-window, stage-floor, or other supporting structure. For reasons which will hereinafter more fully appear the supports 2 to 5 pass through the base 6, as shown.

Secured fast to the front of the frame 1 is a vertical plane surface 7, consisting, preferably, of a plate of non-magnetic material. This plate 7 forms a backing for the paper 8, upon which the visual impression—such as writing, drawing, or printing—is made by the mystic hand. This paper may be placed against the plate 7 in separate sheets; but I prefer that it be continuous. I therefore employ a paper-roll 9 and mount this roll for rotation between two brackets 10 upon the base 6. The paper from the roll 9 is then carried up in front of the plate 7 and thence to a drum 11, mounted on a shaft 12 for rotation between brackets 13, made fast to the ceiling or other supporting structure above. The shaft 12, upon which the drum 11 is mounted, carries a ratchet 14, fast thereon, and an arm 15, loose thereon, said arm carrying a counterbalance-weight 16 at one end and a pawl 17 at the other end, adapted to engage the teeth of the ratchet 14. By means of a cord 18, secured to the end of the arm 15 opposite the weight 16, rotation may be imparted to the drum 11 by successive pulls on said cord. By this arrangement the paper may be fed past the plate 7 and fresh surfaces thereby brought into position to receive the writing or marking.

Any suitable means may be employed for keeping the paper taut. In the drawings I have shown for this purpose a stop-pawl 19, engaging the ratchet 14 to prevent the backward rotation thereof, and a friction-spring 20, secured to the bracket 10 and adapted to bear against the paper-roll 9.

Secured fast to the front of the frame 1 is a preferably metal trough 21, the function of which is to act as a support or receptacle for the "mystic hands" when they are not in operation. This trough has its bottom cut away at 22, so as to allow the paper to pass between it and the plate 7.

One of the mystic hands, together with its marking device, is most clearly shown in Figs. 3, 4, and 5. This mystic hand consists, preferably, of a hollow representation of the human hand and wrist, made, preferably, of non-magnetic metal, though it may be of plaster, papier-mâché, or other suitable material. This hand may be made to carry a pen, pencil, or other marking device. In the specific form shown this marking device consists of a fountain-pen comprising a tube 23, held between the fingers as in the act of writing and communicating, by means of an

opening 24, with the interior of the hand proper, 25, which is provided with a partition 26 to form a reservoir 27 for the reception of ink 28. A wick 29, passing through the ink-reservoir into the tube 23, feeds the ink to the writing-surface by capillary attraction.

Upon the side of the hand which is adapted to be nearest the paper there is provided a series of ball-casters 30, 31, and 32, the casters 31 being located intermediate between the others, and the portion of the hand which is adapted to be next to the paper is so shaped that the casters 31 may form bearings on which the hand may rock, whereby the point of the pen may be brought into contact with the writing-surface and lifted therefrom, as hereinafter described.

The illusion is produced by causing the hand to move over the surface of the paper and by means of the fountain-pen 23 to write, draw, or otherwise mark upon the surface of the paper, there being visible to the spectators no means whatever whereby the hand is held against the paper and moved over the surface of the same. I accomplish the necessary operation of the hand to produce the above mystifying effect by means of one or more magnets located on the opposite side of the writing-surface from the hand and acting upon one or more soft-iron armatures carried by the hand. Obviously if the hand is of magnetic material the additional armatures would be unnecessary. The necessary movement of the operating magnet or magnets may be secured either manually or automatically. In the former case the necessary movement of the hand over the paper may be secured by placing a human operator behind the apparatus and hidden from view to the spectators in front thereof and causing this operator to impart the necessary movement to the magnet or magnets by guiding the same with his hand. I prefer, however, to manipulate the operating magnet or magnets automatically—as, for example, by means of pantographic or other apparatus. In the form of my invention herein illustrated this apparatus for guiding or manipulating the magnet or magnets consists, among other parts, of a preferably light metal carriage 33, provided with a set of grooved metal rollers 34, which travel on guide-rails 35, made fast to the back of the framework 1, as shown most clearly in Fig. 2. This carriage 33 is recessed longitudinally to form two guideways 36, between which travel an auxiliary carriage 37, mounted upon grooved metal rollers 38, arranged to travel on the guideways 36. This auxiliary carriage carries two electromagnets 39 and 40, located one above the other a distance apart to correspond with the distance between two soft-iron armatures 41 and 42, made fast to the side of the hand which is adapted to lie next to the paper. These magnets are secured to the carriage 37 by means of the yoke-

pieces 43 and 44, respectively. The carriage 33 is provided at one end with two extensions 45 and 46, (see Fig. 7,) in which are journaled, respectively, two pulleys 47 and 48, of insulating material. At the other end of said carriage are two similar extensions 49 and 50, in which are journaled two insulating-pulleys 51 and 52. The auxiliary carriage 37 is provided with two extensions 53 and 54, in which are journaled, respectively, pulleys 55 and 56. These latter pulleys have a center of insulating material and a grooved metal rim.

One terminal of both magnets 39 and 40 is electrically connected, as at a point 57, to the metal frame of the carriage 37. The other terminal of magnet 39 is electrically connected to a metal spring contact-strip 58, carried by and insulated from the frame of the carriage 37 and resting upon the metal rim of pulley 55. The other terminal of magnet 40 is electrically connected to a similar metal contact-strip 59, carried by and insulated from the metal frame of carriage 37 and resting upon the metal periphery of pulley 56. The object of these electrical connections will hereinafter more fully appear.

Located at some suitable point below the supporting structure 6 is a framework 60 (see Figs. 1 and 2) similar to the framework 1 and mounted upon supports 61, 62, and 63. Secured to the front of this framework is a plane surface consisting, preferably, of a board or non-magnetic metallic plate 64, the object of which is to act as a support for any matter which it is desired to reproduce by writing, drawing, or the like on the paper 8. This lower frame also carries metal guideways 65, upon which travel grooved metal rollers 66, carried by a carriage 67, similar in all respects to the carriage 33. Mounted to travel in the guideways 68 of the subcarriage 67 is an auxiliary metal carriage 69, mounted upon grooved metal rollers 70. This auxiliary carriage is also provided with extensions 71 and 72, which carry insulating-pulleys 73 and 74, having metal rims similar to the rollers 55 and 56 of the upper auxiliary carriage.

Secured to the lower auxiliary carriage is a yoke-piece 75, to which is made fast an electromagnet 76. The carriage 69 also carries a stylus 77, the latter being mounted upon a metallic arm 78, fulcrumed in a support 79 upon the said carriage.

The upper carriage 33 is connected to the lower carriage 62 through the medium of a flexible wire or metal cord 80, connected, as at point 81, to the carriage 33 and passing over pulleys 82, 83, and 84 and thence through hollow support 3 to an insulating turnbuckle 85. In the diagram Fig. 7 the pulley 82 is omitted. The turnbuckle 85 is in turn connected to a flexible metal cord or wire 86, which passes over pulleys 87, 88, and 89 to

the point 90, at which it is secured to the sub-carriage 67. In the diagram Fig. 7 the pulley 88 is omitted as unnecessary in that view. Secured, as at points 91 and 92, on the upper carriage 33 are two cords 93 and 94, respectively, which pass over pulleys 95 and 96 and connect to a cord 97, which passes over pulleys 98 and 99 to a weight 100 in the hollow support 5. Pulleys 95 and 96 have been omitted in the diagram Fig. 7 as unnecessary in that view. It will therefore be seen that for each vertical movement of the subcarriage 67 the carriage 33 will move a corresponding amount.

In order to impart to the upper auxiliary carriage 37 the necessary lateral movement for each lateral movement of the subauxiliary carriage 69, I make fast to a fixed point 101 a flexible metal cord or wire 102, which is made to pass over pulley 47, thence over pulley 56, thence over pulley 48, through hollow support 4, to an insulating turnbuckle 103, which is connected to a metallic cord 105. The cord 105 then passes over pulleys 106, 74, and 107 to a fixed point 108. The metal cord or wire 105 is electrically connected through a switch 109 and conductor 110 from some point below the pulley 107 to a point in the cord 102 above the pulley 47. (See Fig. 7.)

A weight 111 is suspended within the hollow support 2 from a metallic cord or wire 112, which is secured to an insulating turnbuckle 113. This turnbuckle is then secured at its other end to a similar metallic cord 114, which passes over pulleys 52, 55, and 51 to a fixed point, as 115. A weight 116 is suspended within the hollow support 61 of the lower frame from a metallic cord or wire 117, which passes over the pulleys 118, 73, and 119 to a fixed point, as 120. A conductor 121 is connected to the conducting-cord 114 at some point above the pulley 51 and to the conducting-cord 117 at some point above the pulley 119.

A battery 122 or other suitable source of electromotive force is connected between the metallic guides 35 and 65. (See Fig. 7.)

One terminal of the magnet 76 is electrically connected to the metal frame of the carriage 69, while the other terminal of the said magnet is electrically connected to a contact-spring 123, carried by and insulated from said carriage and resting at one end on the metal periphery of pulley 74. A similar contact-spring 124 rests at one end upon the metal periphery of pulley 73 of the subauxiliary carriage, by which it is carried and from which it is insulated. The contact-spring 124 is electrically connected to a yielding metal contact-piece 125, mounted on and insulated from the frame of the carriage 69 and adapted to be engaged at times by a contact-point 126 on the arm 78, as hereinafter described.

The lower frame 60 is provided with a ledge or shelf 127, the object of which is to serve as a support for a plurality of blocks 128, 129, and 130 of any suitable material. These blocks serve as telltales when a plurality of mystic hands are employed, and when of non-magnetic material each is provided with a soft-iron armature 131 for attraction by the magnet 76. The use of these telltale-blocks will hereinafter more fully appear.

The operation of the device is as follows: Let it be assumed first that only one mystic hand is employed, that this hand is in front of the magnets 39 and 40 on the right in Fig. 2, and that the "copy" which it is desired to follow by the stylus 77 is upon the plate 64 on the side thereof next to the said stylus. The operator first closes the switch 109 and in doing so completes an electric circuit, which may be traced as follows: from the plus pole of battery 122 to metal guideway 65, rollers 66, frame of subcarriage 67, rollers 70 of subauxiliary carriage 69, frame of carriage 69, coils of magnet 76, contact-spring 123, rim of pulley 74, conducting-cord 105, switch 109, conductor 110, conducting-cord 102, rim of pulley 56, contact-spring 59, coils of magnet 40, metal frame of upper auxiliary carriage 37, rollers 38 of said carriage, metal frame of carriage 33, rollers 34 of said carriage, guideway 35, back to the negative pole of battery 122. Current from battery 122 flowing over this circuit energizes magnets 40 and 76. The latter magnet we need not at present consider. The magnet 40 becoming energized attracts the lower armature 42 of the mystic hand. (See Figs. 6 and 7.) The operator then moves the stylus 77 to the point where he wishes to commence tracing the copy. This movement through the cord connections between the main and auxiliary carriages imparts a corresponding movement to the magnet 40 and therethrough to the mystic hand and marking device carried thereby, for it will be readily seen that the upper carriage 33 will respond to any up-and-down movement of the lower carriage 67, while the upper auxiliary carriage 37 will respond, though in an opposite direction, to any lateral movement of the subauxiliary carriage 69. Since the carriage 37 responds in an opposite direction to the movement of the carriage 69, the mystic hand will write in the proper direction. Obviously by a combination of these two movements any angular movement may be obtained. The operator then forcing the stylus 77 forward traces with said stylus the copy before him. This act of forcing the stylus 77 forward causes the contact-point 126 to engage the resilient contact 125, which completes a second electric circuit, which may be traced as follows: from plus pole of battery 122 to the metal frame of subauxiliary carriage 69, as described with respect to

the first-traced circuit, thence to arm 78, contacts 126 125 124, metal rim of pulley 73, conducting-cord 117, conductor 121, conducting-cord 114, metal rim of pulley 53, spring-contact 58, coil of magnet 39, metal frame of upper auxiliary carriage 37, rollers 38, carriage 33, rollers 34, guideway 35 to negative pole of battery 122. Current passing over this latter circuit energizes magnet 39, causing it to attract armature 41 of the mystic hand, thus tilting the hand forward, as shown in Fig. 3. This brings the point of the marking device into contact with the writing-surface. When it is desired to raise the point of the marking device from the writing-surface, this is done by releasing the pressure on the stylus 77, and thereby breaking the circuit at the contacts 125 and 126, whereby the magnet 39 becomes deenergized, and the magnet 40 acting on the armature 42 will tilt the hand away from the writing-surface, as shown in Fig. 4. By this arrangement the point of the marking device may be brought into contact with the writing-surface and raised therefrom at will by the operation of the contact controlled by the lever carrying the stylus 77. This arrangement enables the operator at will to interrupt the line of writing, such as between words or sentences, and to begin again at any place he may select within the reach of the instrument. In the operation of the machine the operator should after writing the desired matter return the hand to the supporting shelf or trough 21, preferably always at the same end of the trough, so that it will be known where to find the hand when it is desired to start the writing of new matter. Upon returning the hand to its original position of rest the operator should also be careful to open the switch 109.

If desired, a plurality of hands may be employed, and each of these may be made to write or otherwise mark in a different color, which may be obtained by supplying the hands each with a different-colored pencil, or if they are provided with fountain-pens then by supplying each hand with a different-colored ink.

In the event that a plurality of hands are employed I provide for each hand a telltale-block. In the drawings I have shown three such blocks 128, 129, and 130 to correspond to the three hands 132, 132', and 132". (Indicated in dotted lines, Fig. 1.) These telltale-blocks are painted each in a color to correspond to the color in which the respective hands are adapted to write, so that by the positions of the telltale-blocks the operator will at all times know the positions of the three hands and will, moreover, know in which color he is at a given time writing. These telltale-blocks are provided each with an armature 131, which is adapted to be attracted by the magnet 76. By means of this

arrangement the different telltale-blocks will follow the course of the magnet 76. The magnet 76 is energized whenever the switch 109 is closed, the said magnet being connected by said switch in series with the magnet 40, the circuit of which has been traced.

In practice the device will be so exhibited as to hide from the spectators the arrangement of the mechanism by which the hand is manipulated, and for this purpose the device should, preferably, be inclosed in a box or other suitable covering which will hide the mechanism from view except the mystic hand and the surface upon which it is desired to write and the supporting trough or shelf. Since this box or covering may be made small enough to clearly make it impossible to accommodate a human operator, this will greatly add to the mystery which surrounds the operation of the hand.

Having thus described a form of my invention, what I claim is—

1. In an illusion device, a surface adapted to receive visible impressions, a mechanically-disconnected body freely movable over said surface, magnetic means to impart motion to said body, and a marking device carried by said body and adapted to make visible impressions on said surface.

2. In an illusion device, a surface adapted to receive visible impressions, a mechanically-disconnected body freely movable over said surface and consisting of a mechanical representation of a human hand, magnetic means to impart motion to said body, and a marking device carried by said body and adapted to make visible impressions on said surface.

3. In an illusion device, a surface adapted to receive visible impressions, a marking device freely movable in front of said surface and adapted to make visible impressions thereon, and magnetic means comprising an armature operatively attached to said marking device and a magnet on the opposite side of said surface from said marking device to operate said marking device.

4. In an illusion device, a surface adapted to receive visible impressions, a mechanically-disconnected body freely movable by magnetic attraction in front of said surface, a marking device carried by said body, and a magnet movable on the opposite side of said surface from said marking device and body to impart motion to said marking device over said surface and to control the operation of the same.

5. In an illusion device, a surface adapted to receive visible impressions, a mechanically-disconnected body freely movable by magnetic attraction in front of said surface, said body comprising a mechanical representation of a human hand, a marking device carried by said body, and a magnet movable on the opposite side of said surface from said

marking device and body to impart motion to said marking device over said surface and to control the operation of the same.

6. In an illusion device, a plane surface adapted to receive visible impressions, a mechanically-disconnected body freely movable by magnetic attraction over said plane surface, a marking device carried by said body and adapted to make visible impressions on said plane surface, magnets on the opposite side of said plane surface to impart movement to said body and to control the marking device carried thereby, and mechanical means to support and move said magnets.

7. In an illusion device, a plane surface adapted to receive visible impressions, a mechanically-disconnected body freely movable by magnetic attraction over said plane surface, a marking device carried by said body and adapted to make visible impressions on said plane surface, electromagnets on the opposite side of said plane surface to impart movement to said body and to control the operation of the marking device carried thereby, mechanical means to support and move said magnets, and electric means included therein to control the operation of said magnets.

8. In an illusion device, a plane surface adapted to receive visible impressions, a mechanically-disconnected body freely movable by magnetic attraction over said plane surface, a marking device carried by said body and adapted to make visible impressions on said plane surface, magnets on the opposite side of said plane surface to impart movement to said body and to control the marking device carried thereby, and pantographic apparatus operatively connected to said magnets.

9. In an illusion device, a plane surface adapted to receive visible impressions, a mechanically-disconnected body in the form of a mechanical representation of a human hand freely movable by magnetic attraction over said plane surface, a marking device carried by said body and adapted to make visible impressions on said plane surface, magnets on the opposite side of said plane surface to impart movement to said body and to control the marking device carried thereby, and pantographic apparatus operatively connected to said magnets.

10. In an illusion device, a plane surface adapted to receive visible impressions, a mechanically-disconnected body freely movable over said surface and provided with a fulcrum movable therewith and adapted to engage said surface whereby a rocking motion may be imparted to said body, a marking device carried by said body and adapted to be brought into contact with said surface and removed therefrom by the rocking motion of said body, and magnetic means to

control said rocking motion and to move said body over said surface.

11. In an illusion device, a plane surface adapted to receive visible impressions, a mechanically-disconnected body freely movable over said surface and comprising a mechanical representation of a human hand having an ink-reservoir therein, a fountain-pen carried by said hand and adapted to receive ink from said reservoir, armatures carried by said body, casters also carried by said body to form a support therefor against said surface and to form a fulcrum whereby a rocking motion may be imparted to said body to bring said fountain-pen into engagement with and withdraw the same from said surface, and magnets to control said rocking motion and to move said body over said surface.

12. In an illusion device, a plane surface, a mechanically-disconnected body freely movable by magnetic attraction in front of said surface, a marking device carried by said body and adapted to make a visible impression on said surface, a backing behind said plane surface, a frame supporting said backing, guideways carried by said frame, a carriage movable vertically on said frame, an auxiliary carriage mounted to travel longitudinally on said first-named carriage, magnets carried by said auxiliary carriage to impart movement to said body and to control the marking device carried thereby, a second frame, a plane surface carried thereby, a carriage mounted to travel vertically in said frame, an auxiliary carriage mounted to travel longitudinally on said last-named vertically-movable carriage, a tracing device carried by said last-named auxiliary carriage, flexible connections between said vertically-movable carriages and between said longitudinally-movable carriages and counterweights whereby movements of said tracing device are conveyed to said magnets for the manipulation of said marking device.

13. In an illusion device, a plane surface, an impression-receiving surface movable in front of said plane surface, a frame supporting said plane surface, guideways on said frame, a carriage mounted to travel vertically on said guideways, an auxiliary carriage mounted to travel longitudinally on said first-named carriage, electromagnets carried by the second-mentioned carriage, a plurality of hollow supports for said frame, a plurality of pulleys, a cord passing from said vertically-movable carriage over said pulleys, weights suspended within certain of said hollow supports from cords, a second plane surface and supporting-frame therefor, guideways on said second frame, a carriage mounted to travel vertically on said guideways, an auxiliary carriage mounted to travel horizontally on the second-mentioned vertically-traveling carriage, a pivoted arm

mounted on the last-mentioned auxiliary carriage, a stylus carried by said arm, a plurality of hollow supports for said last-mentioned frame, a plurality of pulleys, a cord
 5 passing over said pulleys to form an operative connection between the vertically-movable carriages, cord connections between said horizontally-movable carriages whereby the movement of one of said carriages may be
 10 imparted to the other, a plurality of pulleys on the vertically and horizontally movable carriages over which said cords pass, counterweights suspended from said last-mentioned cords in certain of said hollow sup-
 15 ports, an electric circuit and a switch therein for the energization of one of said magnets, an electric circuit for the energization of the other of said magnets, a switch in said last-mentioned circuit operated by the pivoted
 20 arm carrying the said stylus, a mechanically-disconnected body freely movable over said impression-receiving surface and having caster-bearings adapted to engage said surface and on which said body is adapted to rock as
 25 a fulcrum, armatures carried by said body, and a marking device also carried by said body and adapted to make visible impressions on said impression-receiving surface.

14. In an illusion device, a plane surface,
 30 an impression-receiving surface movable in front of said plane surface, a frame supporting said plane surface, guideways on said frame, a carriage mounted to travel vertically on said guideways, an auxiliary carriage
 35 mounted to travel longitudinally on said first-named carriage, electromagnets carried by the second-mentioned carriage, a plurality of hollow supports for said frame, a plurality of pulleys, a cord passing from said
 40 vertically-movable carriage over said pulleys, weights suspended within certain of said hollow supports from cords, a second plane surface and supporting-frame therefor, guide-

ways on said second frame, a carriage mounted to travel vertically on said guideways, an
 45 auxiliary carriage mounted to travel horizontally on the second-mentioned vertically-traveling carriage, a pivoted arm mounted on the last-mentioned auxiliary carriage, a stylus carried by said arm, an electromagnet
 50 also carried by the last-mentioned auxiliary carriage, a plurality of hollow supports for said last-mentioned frame, a plurality of pulleys; a cord passing over said pulleys to form an operative connection between the verti-
 55 cally-movable carriages, cord connections between said horizontally-movable carriages whereby the movement of one of said carriages may be imparted to the other, a plurality of pulleys on the vertically and hori-
 60 zontally movable carriages, over which said cords pass, counterweights suspended from said last-mentioned cords in certain of said hollow supports, an electric circuit and a switch therein for the energization of one of
 65 the first-named magnets and the last-named magnet, an electric circuit for the energization of the other of said first-mentioned magnets, a switch in said last-mentioned circuit operated by the pivoted arm carrying the
 70 said stylus, a plurality of mechanically-disconnected bodies freely movable over said impression-receiving surface and having caster-bearings adapted to engage said surface and on which said bodies are adapted to rock
 75 as a fulcrum, armatures carried by said bodies, a marking device also carried by each of said bodies, and a plurality of telltale-blocks arranged for operation by the second-mentioned electromagnet.
 80

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

FRANK N. REEVES.

Witnesses:

MAX SIDON,
 E. A. FALLER.