May 26, 1925. 1,538,899

R. M. LANGLEY ET AL

DISPLAY DEVICE

Filed June 19, 1922 3 Sheets-Sheet 1

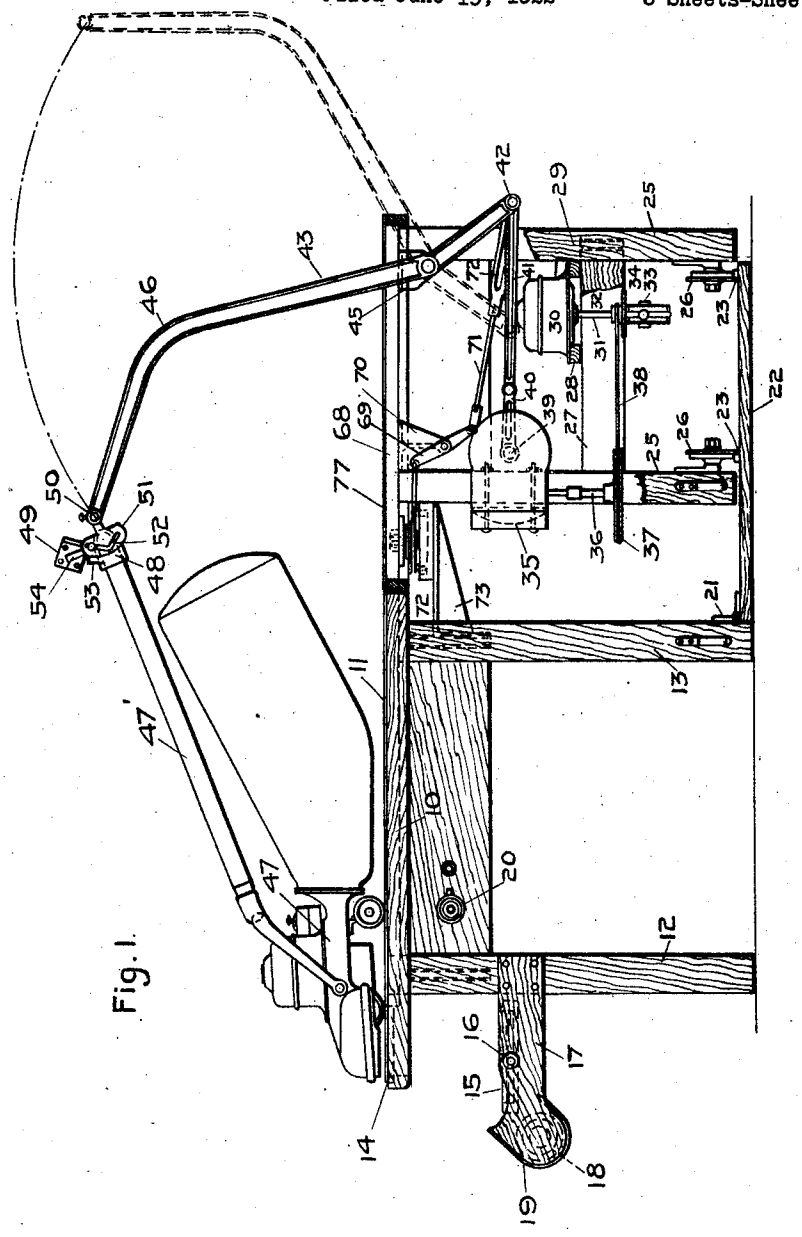


Fig. 1.

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Filed June 19, 1922 3 Sheets-Sheet 2

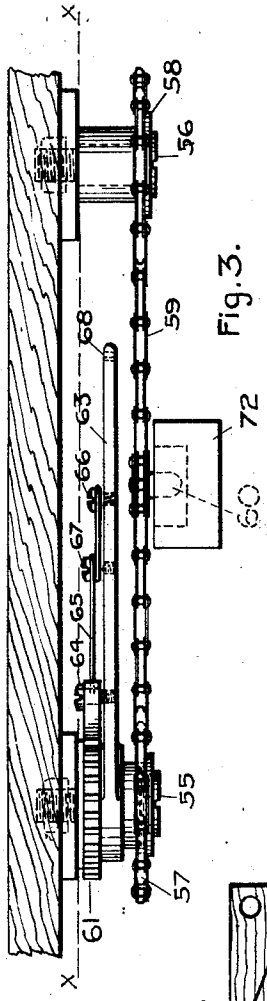


Fig. 3.

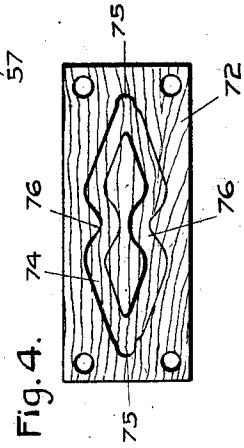
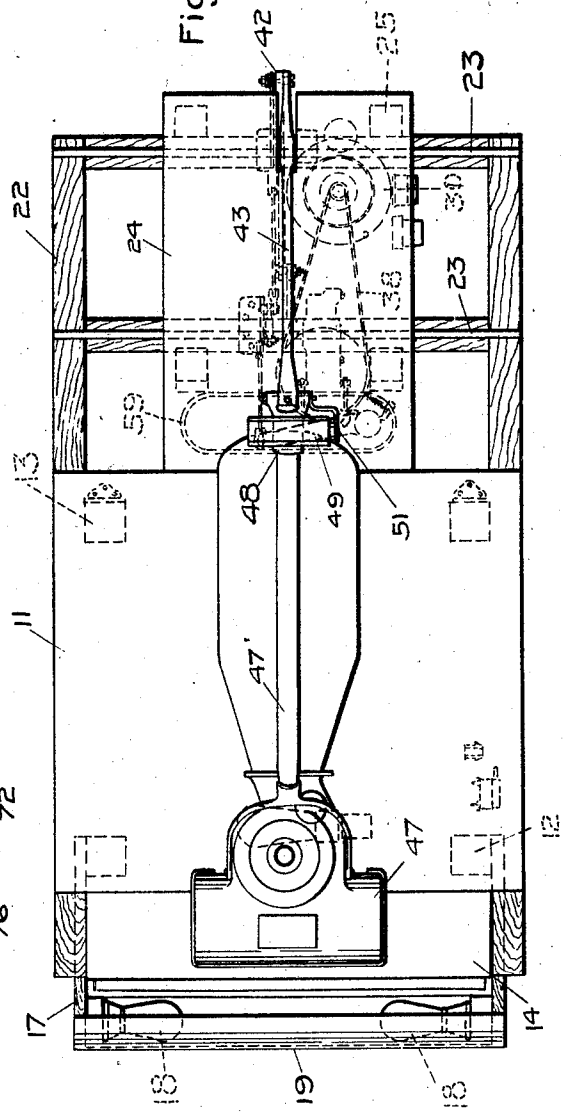


Fig. 4.

Fig. 2.



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DISPLAY DEVICE

Filed June 19, 1922 3 Sheets-Sheet 3

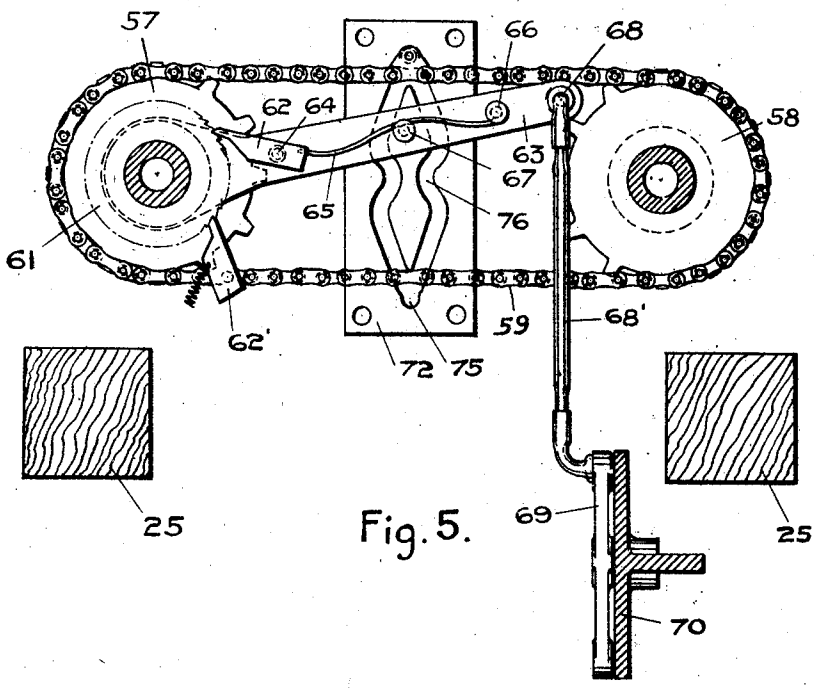


Fig. 5.

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Patented May 26, 1925. 1,538,899

UNITED STATES PATENT OFFICE.

RAYMOND M. LANGLEY AND PHILIP G. GRAF, OF CHICAGO, ILLINOIS, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE HOOVER COMPANY, OF NORTH CANTON, OHIO, A CORPORATION OF OHIO.

DISPLAY DEVICE.

Application filed June 19, 1922. Serial No. 569,345.

To all whom it may concern:

Be it known that we, RAYMOND M. LANGLEY and PHILIP G. GRAF, citizens of the United States, and residents of Chicago, county of Cook, State of Illinois, have invented certain new and useful Improvements in Display Devices, of which the following is a specification.

This invention relates in general to display-devices and in particular to a device adapted to display and demonstrate suction-cleaners, and has for an object, the provision of means whereby the action of suction-cleaners and their effects on floor coverings can be studied and examined under conditions closely approximating normal.

Another object of this invention is to provide a device for demonstrating suction-cleaners so designed that the path of the machine over the floor covering is automatically changed after each to-and-fro movement.

The invention is illustrated in the accompanying sheets of drawings in which like reference characters refer to the same parts.

In these drawings:

Figure 1 is a side-elevation of a demonstrating device for suction-cleaners embodying our invention;

Figure 2 is a plan view of the same with parts shown in dotted lines;

Figure 3 is a detail view of part of the operating mechanism; and

Figure 4 is a detail view of the cam forming part of the operating mechanism.

Figure 5 is a sectional view taken on line *x*—*x* of Figure 3 showing the mechanism for operating the movable platform.

The various novel features of the invention will be apparent from the following description and drawings and will be particularly pointed out in the appended claims.

In the embodiment of our invention illustrated in the drawings, the display-device comprises generally a stationary table or platform and a second table or platform having the same height and which is capable of movement relative to the first table. It, of course, will be understood that either one of the tables could be movable. The stationary table is formed with a top 10 which forms a support for a section of floor-covering 11 and is supported by front and rear members 12 and 13 respectively. Forward of the section of floor-covering at the point where the suction-cleaner reverses its direction at the end of the forward stroke, the top 10 is apertured and has embedded therein a plate of glass or other transparent substance 14, the top surface of which is flush with the upper surface of the floor covering.

In order that the underside of the machine being demonstrated may be conveniently observed when it is at the end of its forward stroke and resting upon the plate of glass 14, a mirror 15 is pivotally mounted on pins 16 supported by brackets 17 extending forwardly from the front legs 12 of the stationary table 10. To provide proper illumination, a lamp 18 is mounted upon each of the brackets, which also support a combined shield and reflector 19. These lamps are adapted to be connected with any convenient source of power and are controlled by a switch 20 mounted on the side of the table.

To the rear of the stationary table and secured to the legs thereof by means of hinges 21 is a platform 22 provided with parallel tracks 23. This platform is adapted to be folded into a vertical position against the legs 13 in order to make the device portable. Further, the two tables are so proportioned that one may be nested within the other, thus allowing the device to be packed in a minimum amount of space.

Resting on the platform 22 and movable thereon is a table consisting of a top portion 24 and supporting legs 25, each of which has attached thereto a flanged-wheel 26 adapted to travel on the tracks 23. Mounted on the legs 25 at the sides of the movable table are cross-pieces 27 upon which rest the members 28 and 29 forming a supporting platform for an electric motor 30 which is provided with a vertical-shaft 31. This shaft carries a pulley 32 and a centrifugal governor 33 which co-acts with a fixed plate 34 to regulate the speed of the motor.

Supported between the forward legs of the movable table is a worm-reduction gearing 35, the details of which form no part of this invention.

To the vertical shaft 36 of the reduction gearing is secured a pulley 37 over which

is trained a belt 38 connecting with the pulley 32.

Fixed to the worm-wheel shaft 39 of the reduction gearing is a crank-arm 40 to the outer end of which is pivotally connected a link 41 the other end of which is pivotally connected to a pin 42 mounted in the end of the rocker-arm 43 which is pivotally mounted at 44 in brackets 45 supported by the movable table and extending through a slot formed in the top 24. To provide clearance for the dust-bag of the suction-cleaner being operated when it is at the end of its backward travel, the rocker-arm is bent as at 46.

On the end of the handle 47′ of the suction-cleaner 47 being operated, a bifurcated casting 48 is mounted which forms a support for a counting mechanism 49 and a pin 50 which pivotally connects the handle 47 with the rocker-arm 43. In order to actuate the counter mechanism each time a stroke is made by the cleaner being tested, a bracket 51 formed with a cam-groove 52 is mounted on the end of the rocker-arm. Co-acting with this cam-groove is a pin 53 secured to the free end of the actuating lever 54 of the counting mechanism.

In order to closely simulate the conditions and operations of actual cleaning the movable table is given a slight lateral movement at the end of each rearward stroke of the cleaner at which time the cleaner is resting upon the movable table and is accordingly moved with it. The cleaner therefore, moves on a slightly different path over the floor-covering upon each reciprocation.

This lateral movement of the movable top is provided by the following mechanism:

To the under side of the top 24 of the movable table are secured two spaced depending stud-shafts 55 and 56 on which are rotatably mounted the sprocket-wheels 57 and 58, respectively, over which is trained the endless sprocket-chain 59. Secured to the sprocket-chain at one point along its length is a cam-follower 60.

Keyed to the hub of the sprocket-wheel 57 is a ratchet-wheel 61 which is actuated by a pawl 62 pivotally mounted on a lever 63 by means of the screw 64 and is prevented from retrograde movement by a spring-pressed pawl 62′. This pawl is normally maintained in engagement with the ratchet-wheel by means of a spring 65, one end of which is secured to the lever 63 by the screw 66 and the intermediate portion anchored by means of a screw 67. The lever 63 is fulcrumed at one end on the hub of the sprocket-wheel 57 and is pivotally connected at the other end 68 to a link 68′ which in turn is pivotally connected to a lever 69 fulcrumed in a bracket 70 secured to the table-top. The lever 69 in turn is pivotally connected to a link 71, the other end of which is provided with an elongated slot 72 which receives the pin 42. This slot is of such a length that the pin 42 does not impart any motion to the link 71 until the suction cleaner is at the end of its rearward stroke and is resting on the movable top.

To co-act with the cam-follower 60 and thus give a lateral movement to the movable table, a cam-block 72 is mounted on brackets 73 extending rearwardly from the legs 13 of the stationary table. In the cam-block is formed a cam-groove 74 approximately diamond-shaped which receives the cam follower 60.

To prevent the cam-follower when it is situated on that part of the chain which forms a tangent between the two sprocket-wheels, from climbing up the mechanical face of the cam-groove, pockets 75, 75 are placed at each end of the major axis which present faces normal to the direction of travel of the cam-follower. At the ends of its minor axis the cam-groove is formed with inwardly-bent portions 76, 76, which receive the cam-follower when it is positioned on the circumference of one or the other sprocket-wheels. By this arrangement the dwell that would otherwise occur at this point is eliminated and a uniform step-by-step motion is given to the movable table throughout its excursion of travel.

The forward part of the top of the movable table is covered with a section 77 of resilient and sound-deadening material such as rubber, upon which the suction-cleaner rests at the end of its rearward travel during which time the lateral movement takes place.

In the operation of the device a section of carpet is secured to the top of the stationary-table and a suction-cleaner placed thereon with its handle connected to the rocker-arm 43. The lights are then turned on and the mirror 15 adjusted so that observers standing in front of the machine can see the reflection of the lower side of the machine through the glass-plate 14.

When the motor circuit is closed the suction-cleaner is reciprocated by the rocker-arm 43 and the transmission-mechanism connecting it with the motor. At the end of each forward stroke of the cleaner, there is a momentary dwell which takes place upon the glass-plate and allows an opportunity for observers to watch the action of the moving parts within the suction-nozzle.

During the rearward travel the cleaner passes from the section of floor-covering to the section of rubber on the movable table where the end of the stroke occurs. During that part of the stroke that takes place on

the movable table the pin 42 reaches the end of the slot 72 and causes the table moving mechanism to operate. This movement of the table causes the cleaner carried by it to be transported laterally and thus causes the next to-and-fro stroke of the cleaner to be made over a different path on the floor-covering.

We claim:

1. A display-device comprising a stationary platform, a movable platform provided with a mechanism adapted to reciprocate a suction-cleaner, and means to shift the movable platform relative to the stationary platform.

2. A display-device comprising a stationary platform, a movable platform, means to reciprocate a machine being displayed over a path partly on each of said platforms, and means to move one platform relative to the other.

3. A display-device comprising a stationary platform, a movable platform, means to reciprocate a machine being displayed over a path partly on each of said platforms, and means to move one platform relative to the other while the machine being displayed rests solely upon one of the platforms.

4. A display-device for suction-cleaners comprising a mechanism adapted to reciprocate the cleaner along a series of parallel paths and to shift the machine laterally when it is at the end of a reciprocation.

5. A mechanical device for operating suction-cleaners comprising a support for floor coverings, means to impart a to-and-fro movement to the suction cleaner over the floor covering, and means for shifting the path of the suction-cleaner over the floor covering at the end of each to-and-fro movement.

6. A display-device comprising a stationary platform, a movable platform, means to reciprocate a machine being displayed over a path partly on each of said platforms, and means to move one platform relative to the other, one of said platforms being provided with a transparent section upon which the machine being displayed rests at the end of each reciprocation.

7. A display-device comprising a stationary platform, a movable platform, means to reciprocate a machine being displayed over a path partly on each of said platforms, and means to move one platform relative to the other, one of said platforms being provided with a transparent section upon which the machine being displayed rests at the end of each reciprocation, and with an adjustable mirror adapted to reflect the image of the machine being displayed when it rests upon said transparent section.

8. A display-device comprising a stationary platform, a movable platform, means to reciprocate a machine being displayed, means to observe the underside of the machine at one end of the reciprocation, and means to shift said machine laterally at the other end of its travel.

9. A display-device comprising a stationary platform, a movable platform, means to reciprocate a machine being displayed, means to observe the underside of the machine at one end of the reciprocation, and means actuated by said reciprocating mechanism to shift said machine laterally at the other end of its travel.

10. A display-device for suction-cleaners or the like comprising a supporting structure, means to reciprocate the suction-cleaner over a path on said supporting structure, one end of said path being composed of transparent material, the mid-section of fabric floor-covering and the other end of sound-deadening material.

11. A display-device for suction-cleaners or the like, comprising a supporting structure, a section of floor covering carried by said supporting structure, and means adapted to reciprocate a suction-cleaner over a path which lies across said section of floor-covering and extends a substantial distance on each side thereof.

12. A display-device comprising a stationary platform, a movable platform provided with a mechanism adapted to reciprocate a suction-cleaner, and means to shift the movable platform relative to the stationary platform, said means comprising a cam member carried by the stationary platform, a cam follower carried by the movable platform, and means to give a step-by-step motion to the cam follower at the end of each reciprocation.

Signed this 29th day of May A. D. 1922.

RAYMOND M. LANGLEY.
PHILIP G. GRAF.