

Feb. 28, 1939.

L. J. SWERTFEGER

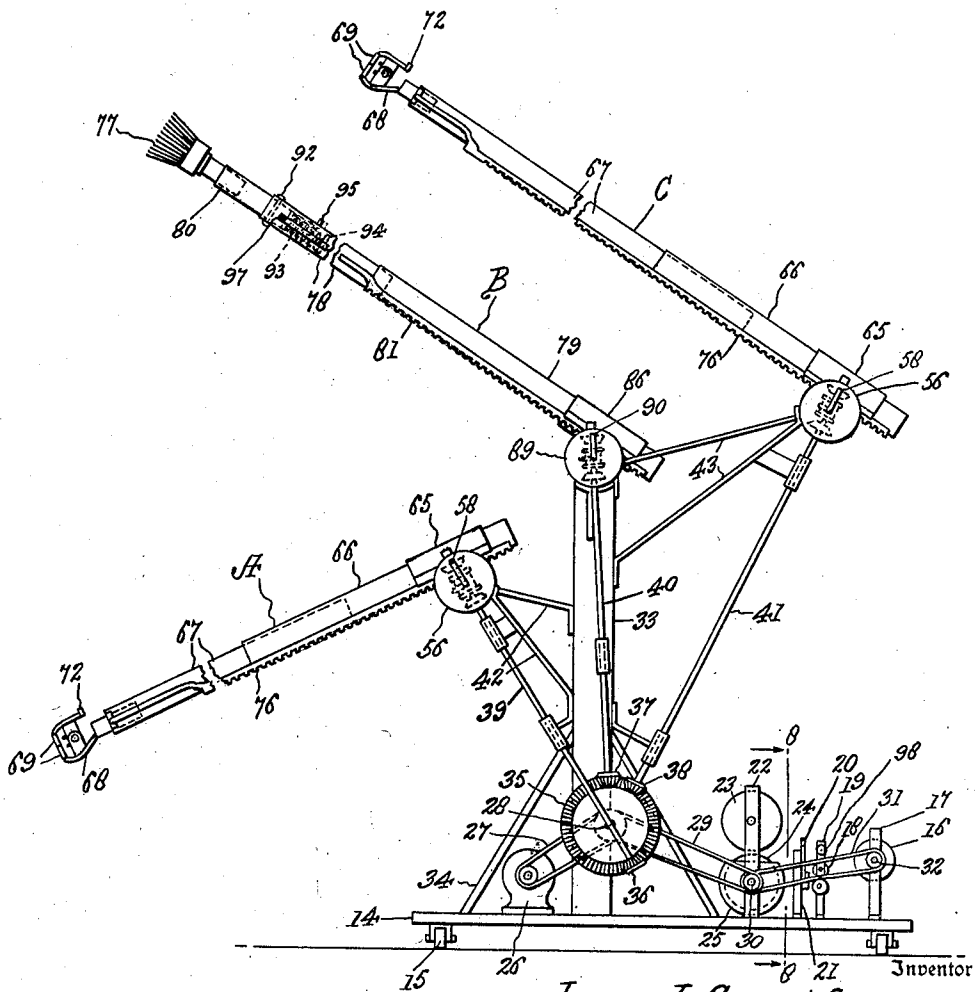
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PAPERHANGING MACHINE

Filed Nov. 14, 1938

5 Sheets-Sheet 1

*Fig. 1.*



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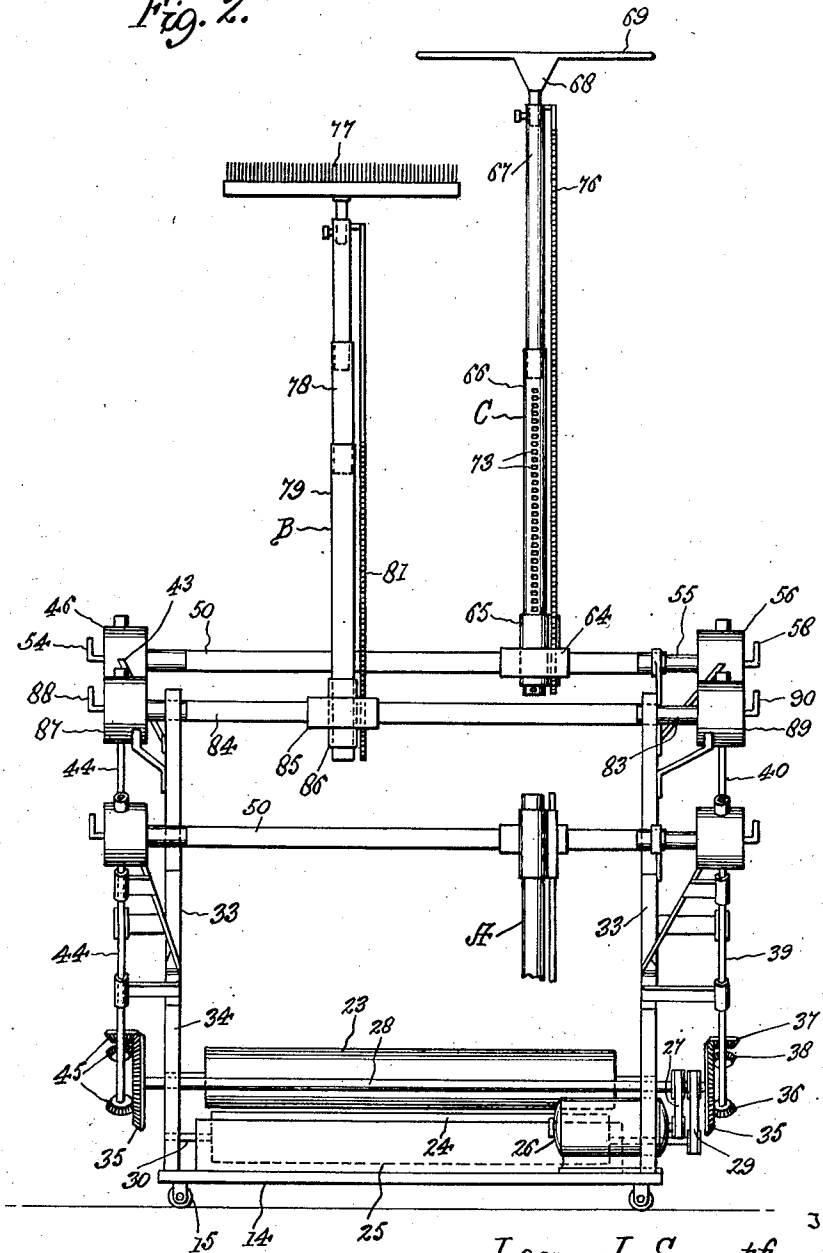
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5 Sheets-Sheet 2

Fig. 2.



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2,148,845

PAPERHANGING MACHINE

Filed Nov. 14, 1938

5 Sheets-Sheet 3

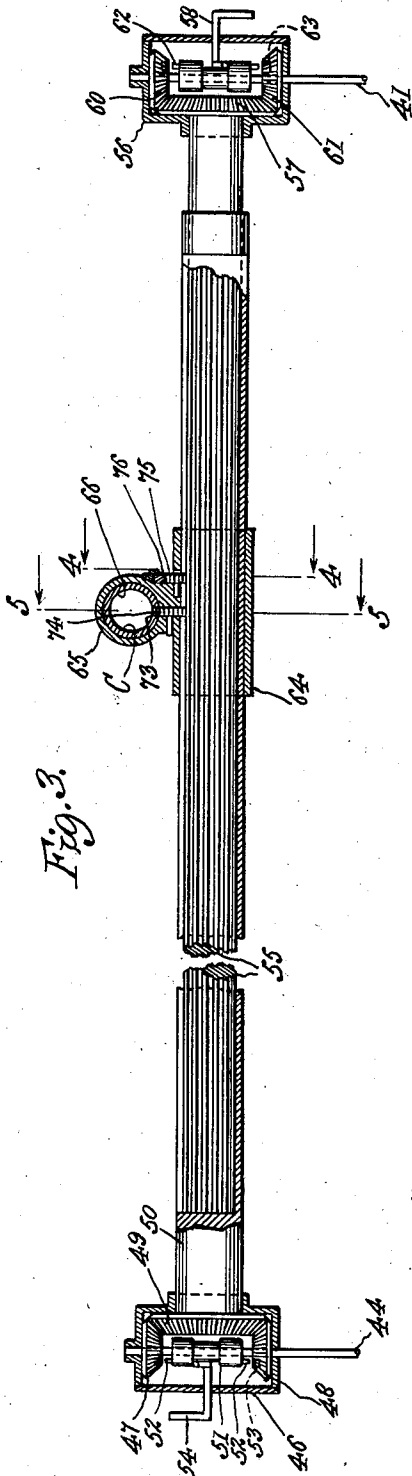


Fig. 3.

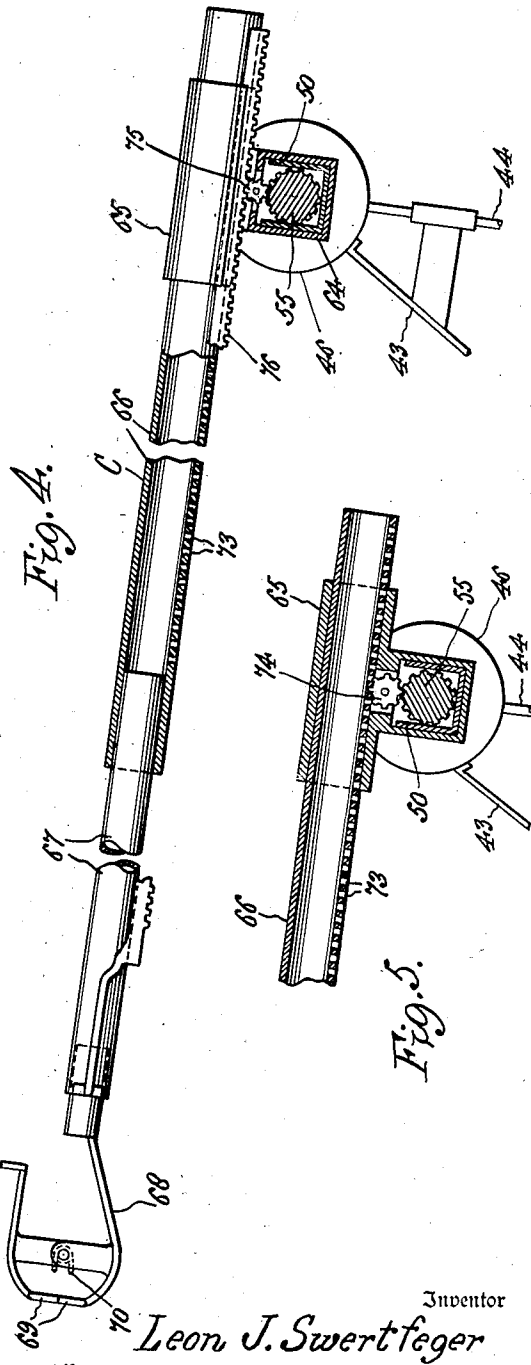


Fig. 4.

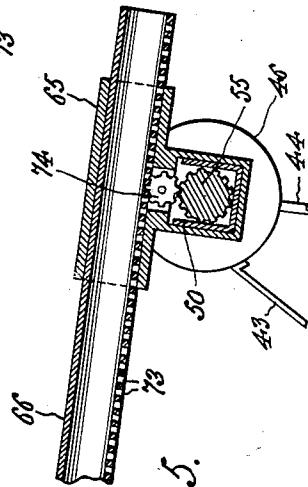


Fig. 5.

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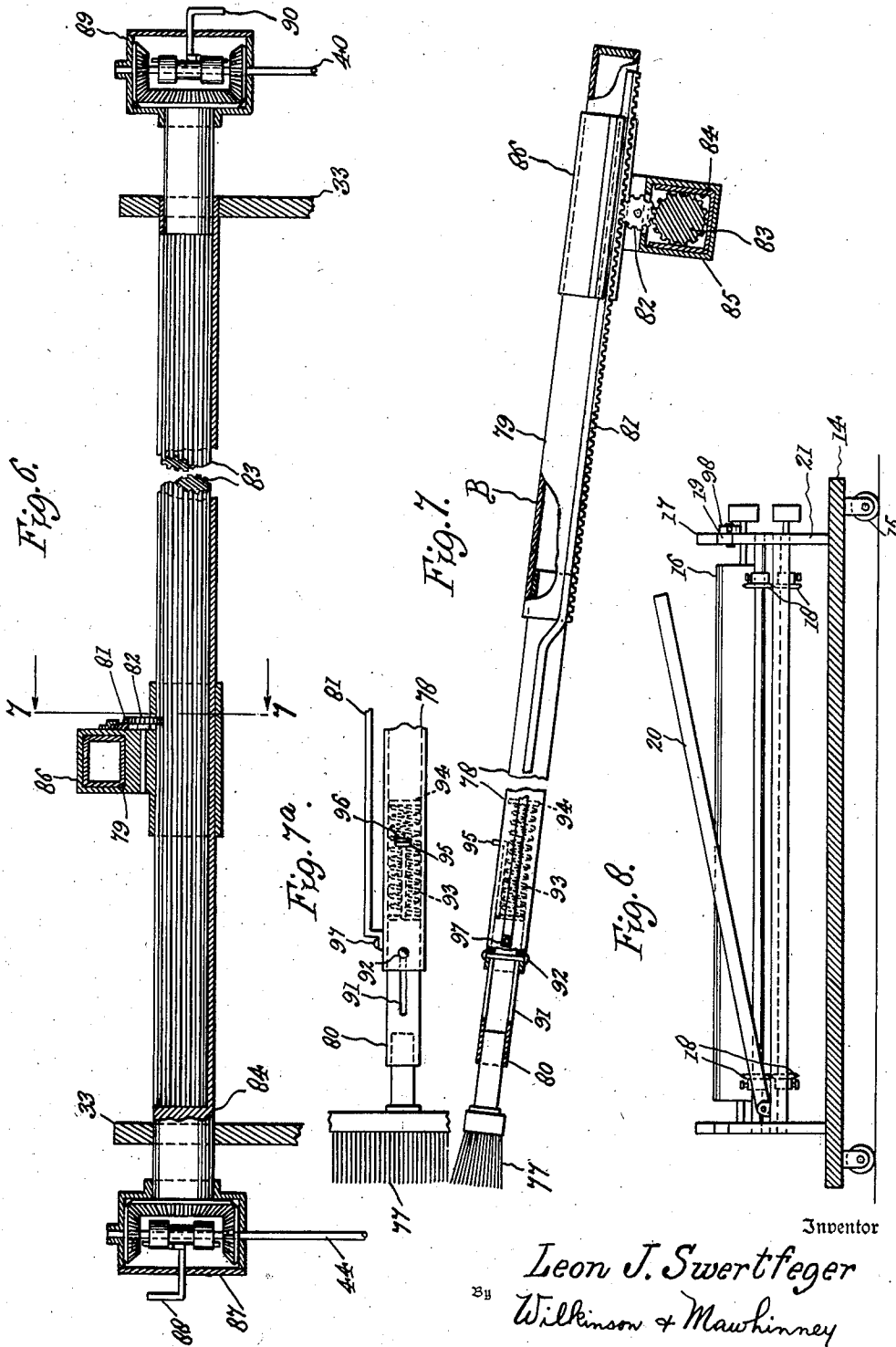
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PAPERHANGING MACHINE

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5 Sheets-Sheet 4



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2,148,845

PAPERHANGING MACHINE

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5 Sheets-Sheet 5

Fig. 9.

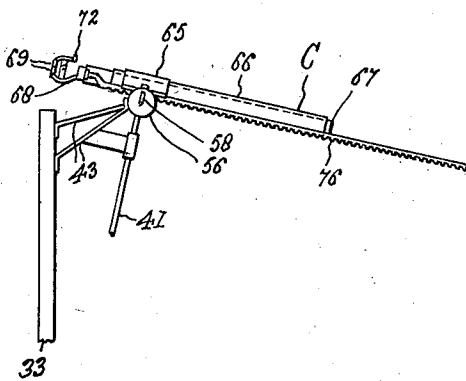


Fig. 10.

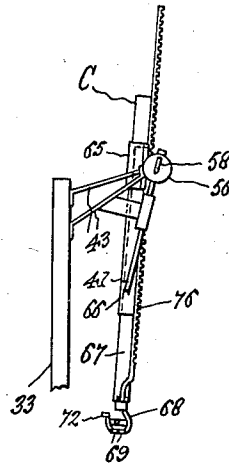


Fig. 11.

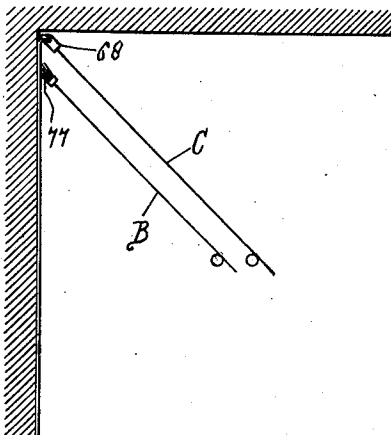
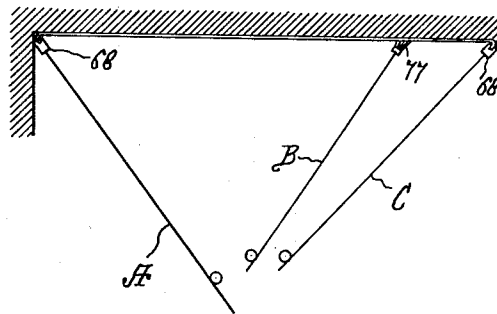


Fig. 12.



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## UNITED STATES PATENT OFFICE

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## PAPERHANGING MACHINE

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Application November 14, 1938, Serial No. 240,364

15 Claims. (Cl. 216—5)

The present invention relates to improvements in paper hanging machines and has for an object to provide an improved machine of this nature which will more efficiently and economically hang and apply the paper to both walls and ceilings.

Another object of the invention resides in providing an improved paper hanging machine which will mechanically and successively carry out the operations of conveying the paper to the place of application, whether it be upon the wall or the ceiling, holding the paper in its position of application, and brushing or pressing the paper firmly upon the wall or ceiling whereby to finally apply the same.

A further object of the invention is to provide an improved paper hanging machine in which the operations described in the foregoing paragraph may be manually controlled with a minimum of effort and with a high degree of accuracy.

A still further object of the invention is to provide an improved paper hanging machine in which the parts will be grouped into relatively small compass for ease in transportation and to occupy confined spaces, the parts being so coordinated and relatively arranged that the same may be operated centrally from a power unit of small capacity.

A still further object of the invention is to provide for a magazine roll of the wall paper upon the machine in positioning relatively to other agencies whereby the paper may be trimmed at its edges if desired, cut off into appropriate lengths and applied with adhesive, all prior to being transferred to the conveying and applicator appliances.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views.

Figure 1 is a side elevation of an improved paper hanging machine constructed in accordance with the present invention.

Figure 2 is an end view of the same with parts broken away.

Figure 3 is a longitudinal section, taken on an enlarged scale, through one of the shafts.

Figure 4 is a cross-section taken on the line 4—4 of Figure 3.

Figure 5 is a similar view taken on the line 5—5 of Figure 3.

Figure 6 is a longitudinal sectional view taken through another of the shafts of the machine.

Figure 7 is a cross-section taken on the line 7—7 in Figure 6.

Figure 7<sup>a</sup> is a fragmentary top plan view of the outer left hand portion of Figure 7.

Figure 8 is a vertical section taken on an enlarged scale through the platform and trimming devices substantially on the line 8—8 in Figure 1.

Figure 9 is a fragmentary side view of one of the arms in a retracted position.

Figure 10 is a similar view showing a progressive phase in the swinging movement of the arm down to a position to receive the paper.

Figure 11 is a diagrammatic view showing one method of application of the wall paper to a wall, and

Figure 12 is also a diagrammatic view showing the use of an apparatus for applying paper to a ceiling.

Referring more particularly to the drawings, 14 designates a platform mounted upon casters or rollers 15 and carrying in common the various devices which contribute to this machine.

The paper or rather the roll of paper is indicated at 16, the same being detachably carried in supports 17 erected at a suitable point upon the platform 14 whereby the paper uncoiling from such roll 16 may be readily directed through the trimmer knives 18 which are appropriately journaled or mounted in a frame or suitable support 19. These trimmer knives act on the side edges of the paper, they being spaced apart in pairs as indicated in Figure 8.

From the trimmer knives the paper passes to the transverse shearing knife 20 also shown in Figures 1 and 8, such knife being mounted in a supporting frame 21 also carried by the platform 14.

On the platform and adjacent the shearing knife 20 is the paste applying device carried by a frame or supporting structure 22 and consisting generally of two opposed rollers 23 and 24, the latter of which rolls around in a trough containing a body of paper hanger's paste.

These various devices, or such of them as are driven, for instance the rolls 23 and 24 and the paper roll 16, may be operated from the same source of power, which in this instance, for purposes of example, may be an electric motor also mounted upon the platform 14 and having a belt connection 27 to a main power shaft 28. As shown in Figures 1 and 2 the shaft 28 has a belt connection 29 to the shaft 30 of the lower

roller 24, and the latter shaft 30 has a belt connection 31 to the roller 16 or its shaft 32.

The main shaft 28 is journaled in uprights 33 mounted on the platform 14 and braced by the diagonal braces 34 or other suitable form of braces.

The shaft 28 carries at its outer end portions bevel gear wheels 35.

As shown in Figure 1 three bevel pinions 36, 37 and 38 are disposed in mesh with the gear wheel 35 at one side of the apparatus. These bevel pinions 36, 37 and 38 are upon the convergent end respectively of shafts 39, 40 and 41. These shafts converge towards the shaft 28 as a center. The shafts are journaled in appropriate bearings on the uprights 33 and on supporting arms 42 and 43 which are mounted on the uprights and diverge upwardly therefrom.

The shafts 39, 40 and 41 at one side of the machine are for the purpose of sliding the paper carrying and the brush arms as hereinafter described. On the opposite side of the machine are three similar shafts 44 for accomplishing the rotary movement of the arms. The shafts 44 have bevel pinions 45 which mesh with the bevel gear wheel 35 at that side of the machine.

Three arms are ordinarily used in the machine, these arms being designated broadly A, B and C. Of these arms, two namely A and C, are paper carrying arms having clips at their outer ends for grasping the edge of the wallpaper; while the intermediate arm B is a brush arm and carries a brush at its outer end. The arms A and C are substantially identical except for their position, the same being carried by the divergent arms 41 and 42. A description of one of these arms will suffice for both. Figures 3, 4 and 5 show one such arm which we will call the arm C. At the left end of Figure 3 there is shown one of the shafts 44 extending up through a gear box 46. Within the gear box are opposed bevel pinions 47 and 48 in mesh at diametrically opposite points with a bevel gear wheel 49 fast upon one end of a shaft 50. The bevel pinions 47 and 48 are loose upon the shaft 44 and are selectively locked to rotate with the shaft 44 by means of a sliding collar 51 having pins 52 for interlocking sockets 53 in the bevel pinions 47 and 48. A lever or hand piece 54 serves to throw the sliding collar 51 toward and from the pinions 47 and 48. When the lever 54 is thrown to one side the pin 52 at that side will enter socket 53 of the adjacent bevel pinion 47 or 48 whereby the shaft 50 will be driven in one direction. By reversing the movement of the lever 54 the other bevel pinion will be connected with the drive shaft 44 and the shaft 50 will be turned in the opposite sense or direction.

The shaft 50 has rounded trunnions at its ends for the purposes of its mounting in the supports of the machine but throughout the major portion of its length it is preferably substantially square as shown in cross-section in Figure 4 with its upper side open for a purpose later described. Within the hollow square portion of shaft 50 is rotatably mounted a broad gear wheel 55. This broad gear wheel 55 extends through the right hand end of shaft 50, as shown in Figure 3, and enters a gear box 56 similar to the gear box at the left hand end of the shaft. This gear box contains a bevel pinion 57 fast on broad gear wheel 55. Bevel pinion 57 is adapted to be driven in one or the other direction accordingly as a shifting lever 58 is thrown in the one or the other direction. This shifting lever is connected with a sliding collar in the gear box, which collar is

driven by a shaft 41 and thereby drives the bevel pinions 60 and 61 whenever the pins 62 of the collar engage the sockets 63 of the bevel pinions 60 or 61. Thus the rotation of the broad gear wheel 55 is quite independent of the rotation of shaft 50 in which it is mounted.

Slidably mounted on the square part of shaft 50 is a square sleeve 64. This square sleeve will not rotate on the shaft 50 or relatively to the shaft 50. The square sleeve 64 forms part of a casing of which a round sleeve 65 also forms a part. The sleeves may be of any desired cross-sectional form but the square cross-section of the sleeve 64 and shaft 50 is convenient as causing rotation of the sleeve with the shaft but allowing the sleeve 64 to be moved axially along the shaft.

The upper sleeve 65 carries slidably therein the arm C. As a matter of fact the arm C is preferably made in two sections 66 and 67 of which the outer section 67 slides telescopically within the inner larger section 66. The outer section carries the clip 68 having movable jaws 69 kept closed by the spring 70 which is associated with the pivot about which the two jaws 69 are adapted to move in opening and closing. One of the jaws has a hood 72 to which a cord might be affixed which cord extends down to the platform 14 for the purpose of pulling upon the string and upon the jaws 69 when it is desired to release the paper when the clip is in a high position out of reach of the paper hanger.

The arm section 66 is provided with teeth 73 meshing with a pinion 74 carried by the sleeves. This pinion meshes with the teeth of the broad gear wheel 55. As indicated in Figure 3, the teeth of pinion 74 will slide along the teeth of the broad gear wheel 55 when the sleeve 65 is slid axially along shaft 50. Thus the broad gear wheel 55 will drive the pinion 74 no matter what the position of sleeve 64 is upon shaft 50.

In a similar way another pinion 75 carried by the sleeves at the side thereof meshes with the teeth of broad gear wheel 55 and with the teeth of a rack bar 76 carried by the outer arm section 67 and extending alongside the round upper sleeve 65. The ratio of gear wheel 74 and 75 is preferably different.

It will be understood that the rotation of shaft 50 in either direction as controlled by the shifting lever 54 will cause the arm C to rotate with shaft 50 in one or the other direction, and the arm C may be slid through the upper sleeve 65 in one or the other direction by operation of the opposite shifting lever 58. This shifting lever 58 causes the broad pinion 55 to rotate in one or the other direction. The broad gear wheel imparts similar motion to pinions 74 and 75. When pinion 74 is driven clock-wise in Figure 5 the arm 66 is moved to the right and so moving the outer arm section 67 is telescoped within the arm section 66, the gear ratio being such that the rack bar 76 is moved more rapidly than arm section 66. Thus the clip 68 may be moved toward or from the wall or the ceiling. It may be pointed toward the wall or ceiling or to an appropriate place thereon by rotation of the shaft 50.

Referring more particularly to Figures 6 and 7, a somewhat similar construction is shown with reference to the brush arm B.

The brush itself is indicated at 77 and it is carried within the outermost arm portion 80 having the elongated slots 91 as shown. This arm portion 80 is mounted within the arm section 78 and is attached thereto by a pin 92 passing through

through the slots 91 which permits movement of the outermost arm 80 inwardly and outwardly relative to the arm section 78. A coil spring 93 is housed within the arm section 78 having the inner end of the spring abut the plate or member 94 which is secured to the arm section 78, and having the outer end of the spring contact with the inner end of the outermost arm portion 80. This coil spring 93 is normally expanded when the pin 92 engages the ends of the slots 91 in the outermost arm 80 as shown in Figure 7, but when pressure is placed upon the outside of the brush 77 the slots 91 permit the outermost arm to move inwardly upon the pin and compress the coil spring. One end of a flexible strip 95 of steel tape is attached to the outer end of the coil spring 93, and its other end extends through the slot 95 in the arm section 78 to a greater or lesser length according to the contraction or expansion of the coil spring 93 and serves as a signal for the operator regarding the amount of pressure exerted upon said spring.

A rack bar 81 is attached at one end to the arm section 78 by a rivet 97 and its other end extends rearwardly to mesh with a pinion 82. The pinion in turn meshes with a broad gear wheel 83 which allows the pinion 82 to be moved axially along the broad gear wheel 83. The broad gear wheel 83 is journaled to rotate within a square or other form of hollow shaft 84 having an open side through which the pinion 82 may engage the teeth of the broad gear wheel 83. A square or other formed sleeve 85 is slidable on shaft 84 but rotates with the shaft to adjust the position of the sleeve along the shaft.

The sleeve 85 carries an upper sleeve 86 which may also be square or of other desired form and which slidably receives the arm section 79. The shaft 84 is journaled in the uprights 33 and has round trunnion end portions for this purpose. The shaft 84 is rotated from the shaft 44 by means of the gearing in the gear box 87 at one end of the shaft. As this gearing has already been described in connection with Figure 3 it is thought that no further description of the same is necessary. A gear shift lever 88 controls the direction of rotation of shaft 84.

At the right hand end of shaft 84 is another gear box 89 containing gear shift mechanism in all respects identical with the gear shift mechanism shown at the right hand end of Figure 3 so that no further description thereof is needed. This gear shift mechanism provides for rotating the broad gear wheel 83 in one or the other direction accordingly as the lever 90 is shifted to one or the other side.

In the operation of the device, the upper paper carrying arm C is first shifted to the position shown in Figure 9. This is accomplished by throwing the lever 58 shown at the right hand of Figure 3 in one direction whereby to cause pinion 74 in Figure 5 to rotate in a clock-wise direction. This is attended by the arm C moving to the right in Figure 4. As large section 66 moves to the right, small outer section 67 will be moved faster in the same direction and thus caused to enter the tube or large section 66. When the condition of the parts as shown in Figure 9 is arrived at, the lever 58 is thrown into neutral discontinuing further rotational movement of the broad gear wheel 55.

It is then desired to move the arm C to the position shown in Figure 10. This is accomplished by rotating the shaft 50 in a counter-clockwise direction. This is accomplished by

throwing the lever 54 at the left hand end of Figure 3 in the appropriate direction. When the parts have arrived in the position shown in Figure 10, the lever 54 is shifted back to neutral. Then the opposite lever 58 may be shifted so as to project the clip 68 downwardly toward the paste applying rollers 23 and 24 so as to receive the end of the paper roll therefrom, the jaws 69 being open for this purpose. To accomplish this downward projection of the clip 68, the lever 58 is thrown in the direction opposite to that first described in order to cause the pins to rotate in an opposite sense and therefore project the arm sections 66 and 67. When an appropriate downward point has been reached the lever 58 is again thrown into neutral. After the paper has been firmly grasped by the clip 68, the lever 58 is again so shifted as to cause the movement of the arm upwardly until the sections 66 and 67 are finally collapsed; whereupon the lever 58 is again shifted into neutral, and the opposite lever 54 is so shifted as to cause the shaft 50 to rotate the arm back from the position shown in Figure 10 to that shown in Figure 9.

As the paper is pulled out it may be trimmed along its edges by the trimmer knives 18. When a suitable length for covering a wall or ceiling is drawn out from the roll of paper 16, the knife 20 may be brought down to sever the paper stripped from the roll. The arm C may then carry the upper edge portion of the paper out to a high point upon the wall as to the angle between the ceiling and wall which position is indicated in Figure 12. During this time the brush arm B may be offset, as indicated in Figure 2, to one side of the path of movement of the paper up to and against the wall; but after the paper is in a suspended position against the wall, being held thereto by the arm C as indicated in Figure 12, the brush arm B is shifted axially along its shaft 84 until it is in position to wipe up and down against the paper upon the wall. To cause the brush 77 to advance against the paper, the lever 90 at the right of Figure 6 is first thrown in an appropriate direction to cause the gear wheel 82 to move in an anticlock-wise direction. When the brush has been moved up against the suspended paper strip, the brush shaft 84 is rotated as by throwing the lever 88 at the left end of Figure 6 in the appropriate direction. The brush 77 thereupon wipes down the wall and presses the paper firmly thereagainst, smoothing out the paper during its descent. As the brush will tend to travel in a true arc about the shaft 84 as a center, and the flat vertical wall precludes any arcuate movement at the outer end of the brush end B, the brush is permitted to move relatively by operating the lever 90 to cause the reverse gear to actuate. This action will permit a slow and gradual shortening of the arm B without affecting the continued downwardly swinging movement of the arm. The positioning of the coil spring 80 as shown and explained will at all times keep the brush 77 up to its work and maintain the necessary pressure of the brush 77 upon the paper.

On referring to Figure 12, it is here diagrammatically shown how both arms A and C hold a strip of paper at opposite ends up against the ceiling. This strip of paper has been received from the paste applying rolls and it is ready to be firmly pressed against the ceiling by action of the brush arm B. Inasmuch as this brush arm B occupies an intermediate position between the paper car-



rying arms A and C, the brush arm B may be swung back and forth by the selective engagement of the lever 88 at the left end of Figure 6, while the arms A, B and C are shown as composed of two sections they may be composed of any desired number of sections.

A suitable measuring device 98, as shown in Figures 1 and 8 is readily attached to the support 19 for the purpose of measuring the desired length of wall paper as the same is unwound from the roll 16 during the operation of the device. Arms A and C are constructed to carry in their outermost sections the clips 68 having the movable jaws 69 which can be varied in shape or design as well as other types of clips for the purpose of more efficiently working on borders and in corners.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

25 What is claimed is:

1. In a paper hanging machine, an arm, a support upon which the arm is rotatably and slidably mounted, means on said arm for grasping the paper, means for rotating said arm, and means for slidably moving the same.

2. In a paper hanging machine, a support, an arm rotatably and slidably carried by said support, means for rotating and sliding said arm, means on the arm for grasping the paper, said arm being in several relatively movable sections, and means for moving the sections relatively to one another on said sliding movement of the arm.

3. In a paper hanging machine, a support, an arm slidably and rotatably carried by said support, means for rotating the arm about the support, sliding means for causing sliding movement of the arm with respect to said support, means carried by the arm for grasping the paper, said arm being made in relatively slidable sections, and means for sliding the sections with respect to one another to collapse the sections when the arm is slid in one direction by said sliding means and to expand the sections when the arm is slid in the other direction by said sliding means.

4. In a paper hanging machine, a support, a shaft rotatably mounted in said support, means for selectively rotating said shaft in either direction, an arm carried by said shaft and rotatable therewith, means on said arm for grasping the paper, means for slidably holding said arm on said shaft, and means housed within said shaft for causing sliding movement of said arm in either direction.

5. In a paper hanging machine, a support, a shaft journaled for rotation in said support and having an opening therein, means for rotating said shaft selectively in either direction, a sleeve non-rotatably but slidably mounted upon said shaft, a second sleeve mounted on the first sleeve with its axis at substantially right angles thereto, an arm slidably mounted through said second sleeve and having teeth thereon, a broad gear wheel mounted in said shaft and exposed through the opening therein, a pinion meshing with said broad gear wheel and slidable axially thereof and meshing with the teeth of said arm, and means for rotating said broad pinion in either direction.

6. In a paper hanging machine, a support, a

hollow shaft having an open side rotatably mounted in said support, means for selectively rotating said shaft in either direction, a broad pinion journaled to rotate within said hollow shaft, means for selectively rotating said broad pinion in opposite directions independent of the movement of said shaft, a sleeve non-rotatable but axially slidable on said shaft, a second sleeve carried by the first sleeve with its axis disposed angularly to the axis of the first sleeve, an arm slidably in the second sleeve and having teeth thereon, a pinion carried by one of the sleeves for meshing with said broad pinion and with the teeth of said arm, said arm having a relatively movable section, a rack bar carried by said section, and a pinion carried by one of the sleeves and meshing with said broad gear wheel and with the rack bar, and means carried by said arm to grasp the paper.

7. In a paper hanging machine, a brush, an arm for carrying said brush, a support to which said brush is slidably and rotatably connected, means for rotating said brush about its point of connection on said support, and means for sliding said brush and its arm with respect to said point of connection on the support.

8. In a paper hanging machine, a brush, an arm for supporting said brush, a support for the arm, means for rotatably and slidably holding said brush with respect to said support, means for causing the rotation of the arm and brush about the support, means for causing sliding movement of the brush with respect to the support, said arm composed of a plurality of sections and resilient means interposed between the sections biasing the sections to an outer extended position.

9. In a paper hanging machine, a brush, an arm carrying the brush and composed of a plurality of sections movable relatively to one another, a support for the arm, means for mounting the arm to slide axially of itself on said support, said means including means for causing the contraction of the sections of the arm when the arm is slid in one direction and the expansion of such sections when the arm is slid in the other direction, and means for causing rotary movement of the arm and brush about said support.

10. In a paper hanging machine, a brush, an arm for carrying said brush including a plurality of relatively movable sections, resilient means interposed between adjacent sections, a rack bar carried by the section adjacent the outermost section carrying the brush, means for slidably supporting said arm, a pinion carried by said supporting means and meshing with said rack bar, a broad gear wheel meshing with said pinion and permitting said pinion to slide axially of said gear wheel together with the arm, means for selectively driving said broad gear wheel in either direction, and means for causing swinging movement of the arm in either direction.

11. In a paper hanging machine, a support, a hollow shaft on the support, means for selectively driving said hollow shaft in either direction, a broad gear wheel journaled from independent rotation in said hollow shaft and exposed through one side of the hollow shaft, means for selectively rotating said broad gear wheel in either direction, a casing including two sleeves with their axes substantially perpendicular to one another, one of said sleeves being slidable axially on said shaft but non-rotatably secured thereto, an arm slidably mounted in the other sleeve and composed of sections movable rela-

5 tively to one another, resilient means interposed between said sections, a rack bar on the section adjacent the outermost section, a pinion carried by said casing in mesh with said rack bar and in  
10 slidable mesh with said broad gear wheel and a brush on said arm.

12. In a paper hanging machine, a pair of rotatable and slidable arms, means on the arms for grasping the paper, and a brush between said  
15 arms rotatably and slidably mounted.

13. In a paper hanging machine, central and divergent supports, a brush arm rotatably and slidably mounted on the central support, paper supporting arms slidably and rotatably mounted  
20 on the divergent supports, one at one side of said brush and the other at the other side of the brush, and means for independently and controllably rotating and sliding said several arms.

14. In a paper hanging machine, a source of

paper, trimming and cutting means for the paper associated with said source, paste applying means for receiving the paper from said cutting means, and a paper carrying arm slidably and rotatably  
25 mounted above said paste applying means adapted in one position to extend down close to said paste applying means for receiving the paper therefrom.

15. In a paper hanging machine, central and divergent supports, rotatable and slidable arms  
30 mounted on said supports, a brush and paper holding means carried by said arms, and means for selectively rotating and sliding said arms comprising convergent shafts, pinions on the convergent ends of said shafts, pinions for en-  
35 gaging in common said gear wheels, and means for driving said gear wheels.

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