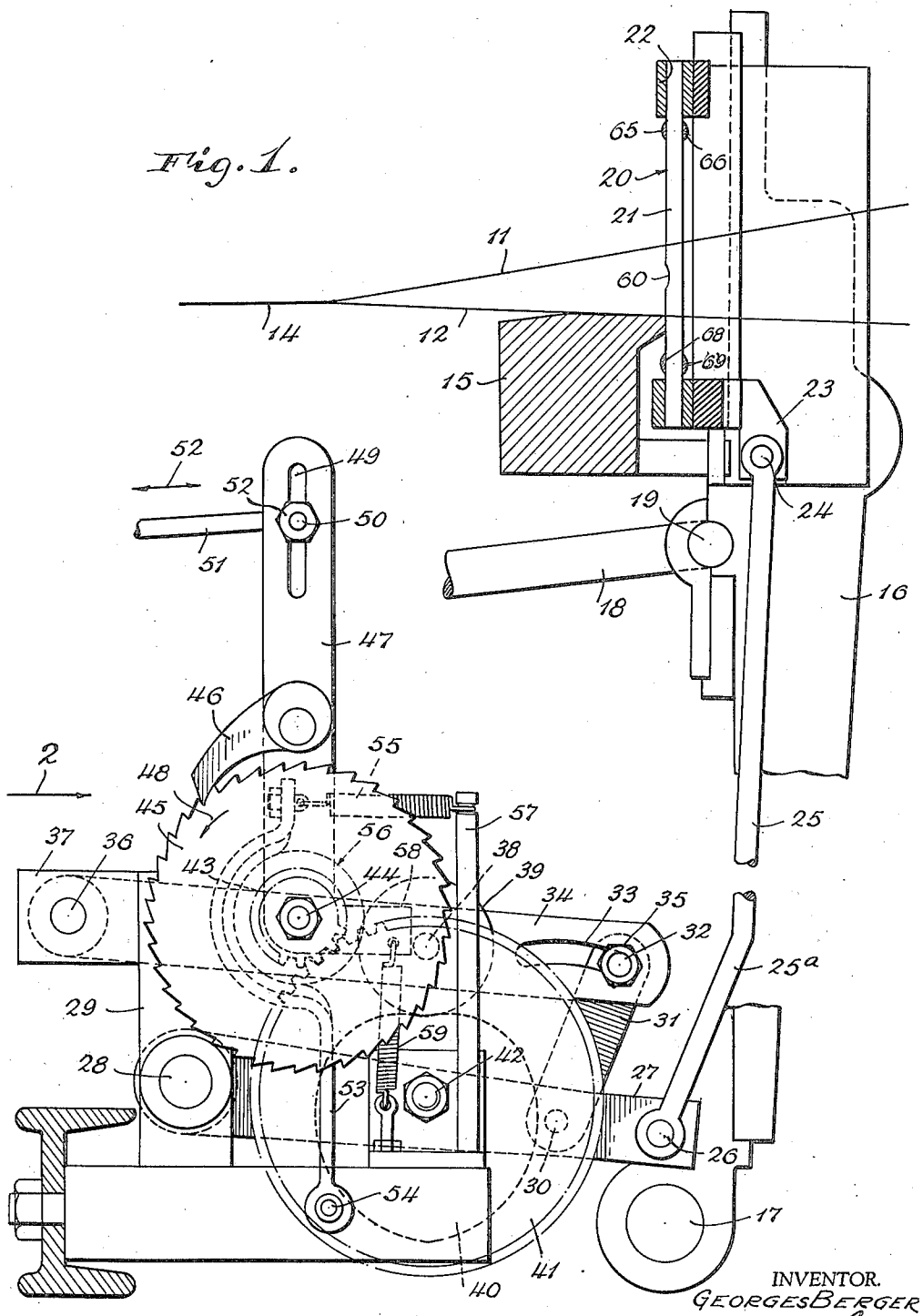
Jan. 31, 1939. G. BERGER 2,145,681

MEANS FOR PRODUCING MOIRE EFFECTS ON FABRICS

Filed June 6, 1936 4 Sheets-Sheet 1

Fig. 1.



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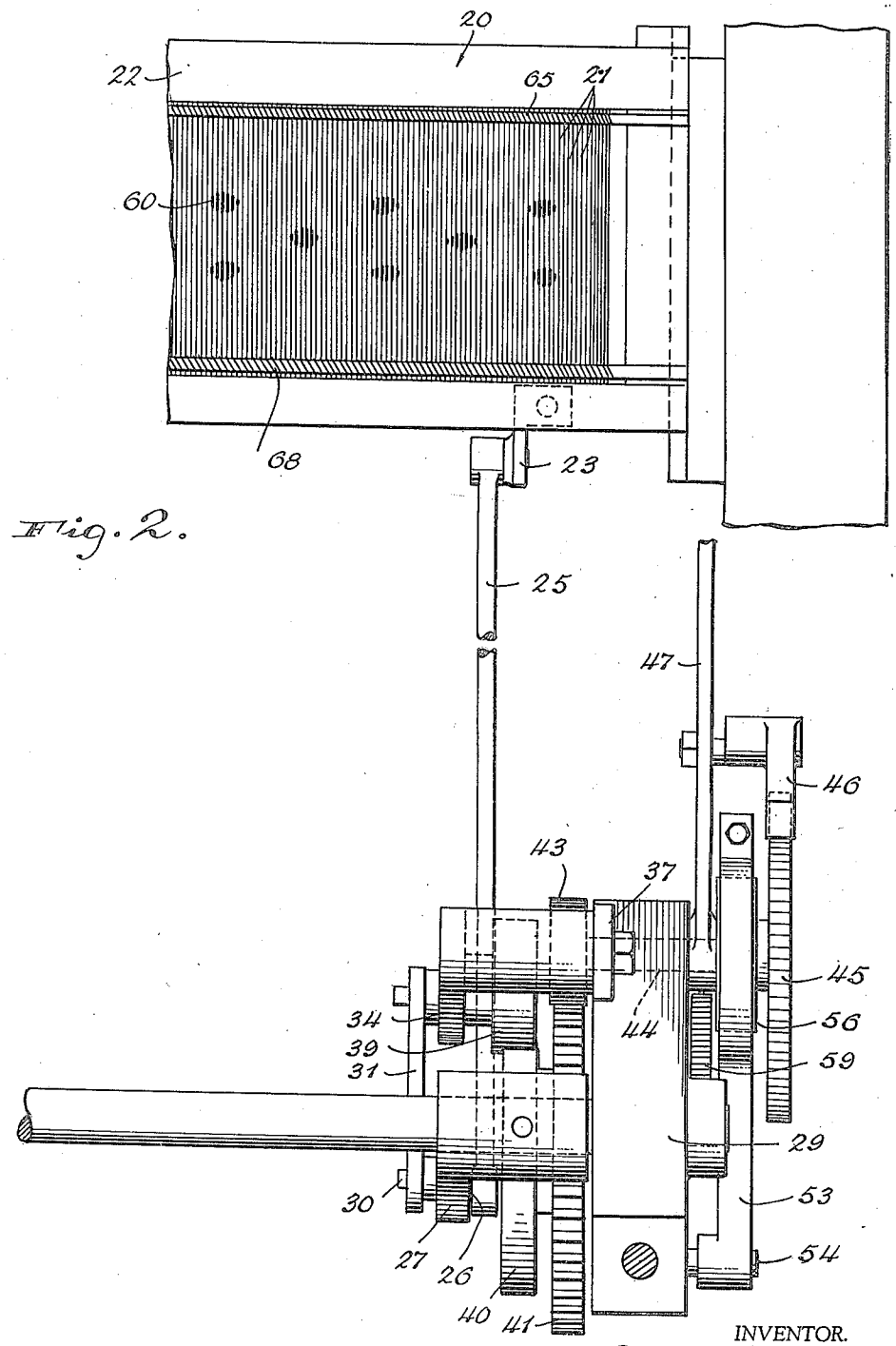

Fig. 2.

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Fig. 3.

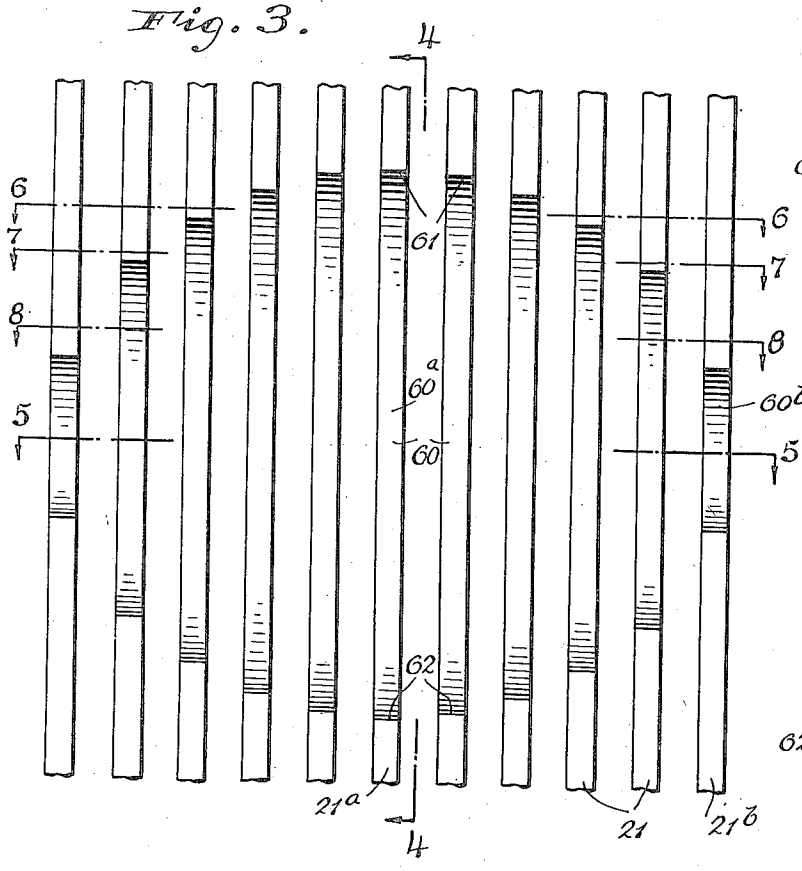

Fig. 4.

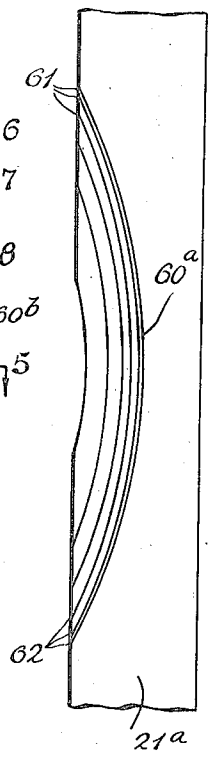

Fig. 5.

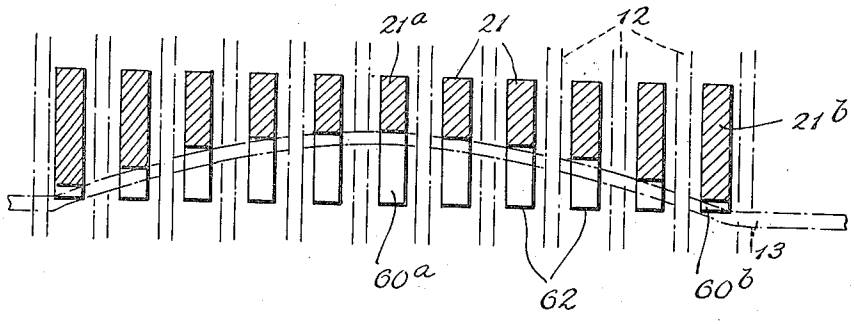

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Fig. 6.

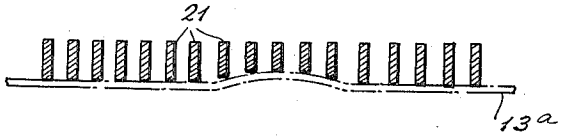


Fig. 7.

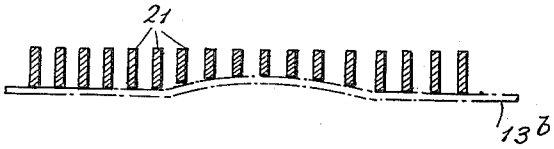


Fig. 8.

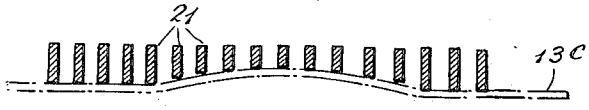


Fig. 9.

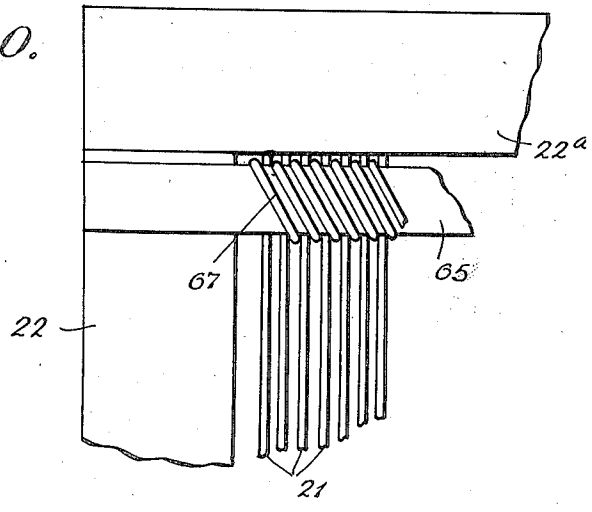
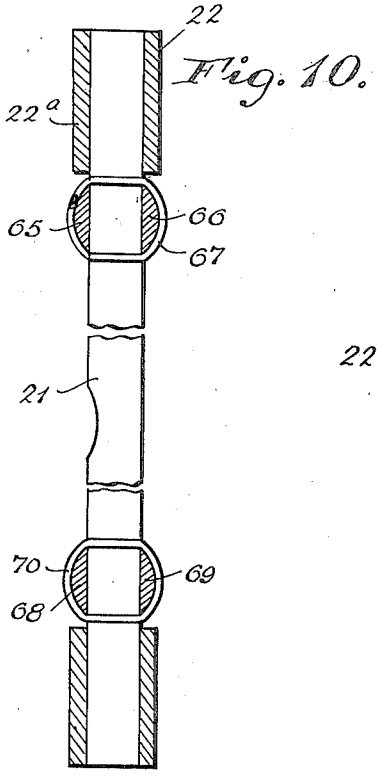


Fig. 10.



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Patented Jan. 31, 1939 2,145,681

UNITED STATES PATENT OFFICE

2,145,681

MEANS FOR PRODUCING MOIRE EFFECTS ON FABRICS

Georges Berger, New York, N. Y.

Application June 6, 1936, Serial No. 83,890

1 Claim. (Cl. 139—192)

This invention relates to means for producing moire effects on fabrics.

Moire effects may be produced on a fabric after the latter has been woven by passing the fabric between two rollers provided with grooves and ridges which shift the relative positions of the weft threads and thereby produce a moire effect.

Similar moire effects may be produced by shifting the weft threads of the fabric in the course of the weaving.

The present invention refers to devices which produce moire effects on fabrics in the course of the weaving process, and one of the objects of this invention is the provision of a comparatively simple and inexpensive means, through the use of which it is possible to produce a fabric having permanent and effective moire effects.

Another object is the provision of a loom comprising a reed of such form that moire effects are produced in a fabric woven upon the loom, and that the breaking of the weft threads shifted by said reed to create the moire effects is effectively prevented.

A further object is the provision of a loom having a lay supporting a reed which is reciprocable relatively to the reed, said reed being provided with means producing permanent and effective moire effects upon the fabric manufactured by the loom.

The above and other objects of the present invention may be realized through the provision of a reed, the teeth of which are provided with cut-out portions formed upon that surface of the reed which contacts the weft threads, and constituting a moire pattern, said reed being carried by the lay and being vertically reciprocable relatively thereto so that the entire pattern is reproduced upon the fabric in the course of its weaving.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings showing by way of example a preferred embodiment of the inventive idea.

In the drawings:—

Figure 1 is partly a side elevation of and partly a section through a reed and a device for reciprocating the same, said reed and said device constituting a part of a loom structure;

Figure 2 shows the same device in elevation, looking in the direction of the arrow 2 shown in Figure 1;

Figure 3 shows the teeth of a reed on a greatly enlarged scale;

Figure 4 is a vertical section along the line 4—4 of Figure 3 looking in the direction of the arrows;

Figure 5 is a horizontal section along the line 5—5 of Figure 3;

Figures 6, 7, and 8 are horizontal sections along the lines 6—6, 7—7 and 8—8, respectively, of Figure 3, on a smaller scale and illustrating an additional number of teeth of the reed.

Figure 9 shows on an enlarged scale a portion of the reed frame;

Figure 10 is a vertical section through portions of the reed frame, on an enlarged scale.

The warp threads 11 and 12 shown in Figure 1, form the fabric 14 jointly with the weft threads 13 shown in Figure 5.

The weft threads are passed through the shed by means of a shuttle which is not shown in the drawings, and which is carried by the lay 15 (Figure 1) supported by the lay sword 16 mounted upon the pivot 17. The lay 15 and the lay sword 16 are moved back and forth around the pivot 17 by a mechanism of the usual type which is not shown in the drawings and which actuates the lay arm 18 connected by the pin 19 with the lay sword 16.

The reed 20 which is carried by the lay 15 comprises a plurality of teeth 21 which will be described in greater detail hereinafter, and which are carried by the reed frame 22.

The lower portion of the reed frame 22 comprises a downwardly-projecting extension piece 23 which carries a pivot or pin 24. The upper end of the vertical connecting rod 25 is mounted upon the pin 24. The lower end 25a of the connecting rod 25 is somewhat bent in relation to the main portion of the latter and is mounted upon a pivot 26 which is carried by one end of the lever 27. The opposite end of the lever 27 is carried by a pivot 28 which is supported by the frame 29 of the loom.

The lever 27 carries a pin 30 situated intermediate its ends. One end of the link 31 is mounted upon the pin 30. The opposite end of the link 31 carries a bolt 32 which extends through an arcuate opening 33 formed in the lever 34, and carries a nut 35.

The position of the link 31 relatively to the lever 34 may be conveniently adjusted by means of the nut 35 and the bolt 32.

The opposite end of the lever 34 is carried by a pin 36 supported by the hub 37.

A pin or axle 38 is carried by the lever 34 and is situated intermediate its ends. The axle 38 carries a rotatable roller 39.

The roller 39 is in contact with a cam 40. Ob-

viously, any suitable pattern wheel may be used in lieu of the cam 40.

The cam is firmly connected and rotatable with a gear wheel 41 which is rotatably mounted upon a shaft 42 carried by the frame 29. The teeth of the gear wheel 41 mesh with the teeth of a pinion 43, which is firmly connected with a shaft 44. Another gear wheel 45 is also firmly connected with the shaft 44 so that rotation of the gear wheel 45 is transmitted to the pinion 43.

A pawl 46 is in engagement with the teeth of the wheel 45. The pawl 46 is carried by a vertical lever 47, the lower end of which is rotatably mounted upon the shaft 44.

Any suitable resilient means not shown in the drawings may be connected with the pawl 46 to enable the pawl to turn the wheel 45 to the extent of one tooth when the lever 47 is swung in the direction of the arrow 48 and to enable the pawl 46 to move over the adjacent tooth in the course of the return movement of the lever 47.

The lever 47 is provided with an extension piece 58 which is connected by a spring 59 to the frame.

The upper end of the lever 47 has a vertical slot 49, through which extends a bolt 50 which is connected with the rod 51. A nut 52 is screwed upon the bolt 50.

The rod 51 is reciprocated in the directions of the arrow 52 by a jacquard mechanism which is not shown in the drawings.

The device is provided with a brake 53 which is pivotally mounted at 54 on the frame of the loom and which is pressed by a spring 55 against the brake drum 56. The spring 55 it attached to a rod 57 connected to the frame of the loom.

The rod 51 is reciprocated in the direction of the arrow 52 and causes an oscillation of the lever 47 around the shaft 44. The pawl 46 will move along with the lever 47 and will turn the wheel 45 in the direction of the arrow 48. In the course of the return movement of the lever 47 the pawl 46 slides over a tooth of the wheel 45 so that the gear wheel 45 is rotated in one direction by the oscillating movement of the lever 47.

The pinion 43 rotates along with the gear wheel 45 and drives the gear wheel 41 which is rotated along with the cam 40. The roller 39 is maintained in engagement with the cam 40 by the link 31.

As shown in Figure 1, the shape of the cam 40 is such that the roller 39 is caused to move downwardly and upwardly when following the surface of the cam 40, thereby causing an oscillation of the lever 34 around its pivot 36. The lever 34 is moved along with the link 31, so that the reciprocatory movement of the lever 34 is transmitted by the link 31 to the lever 27 and the connecting rod 25 which is connected with the frame 22 of the reed. Consequently, in the described construction, the jacquard mechanism or the pattern mechanism actuating the rod 51 is used for reciprocating step by step the reed 20 in a vertical direction.

The moire effect of a fabric manufactured by the loom shown in Figures 1 and 2 is produced by cut-out portions 60 provided upon the teeth 21 of the reed. These cut-out portions are illustrated on a larger scale in Figures 3 to 8 of the drawings.

As shown in Figures 3 and 4, each of the teeth 21 has a cut-out portion 60 of different dimensions, the cut-out portion 60*b* of the tooth 21*b* being considerably smaller than the width of the cut-out portion 60*a* of the tooth 21*a*. In actual practice the length of the tooth 21*a* may be about four and a half inches. Then the length of the greatest cut-out portion 60*a* may be about three-eighths of an inch and its depth about one eighth of an inch. The teeth situated between the teeth 21*a* and 21*b* have cut-out portions of different dimensions, the length and depth of these cut-out portions being smaller than that of the portion 60*a* and greater than that of the portion 60*b*. The cut-out portions of the teeth 21, when these teeth are placed one next to the other upon the frame 22, form geometrical figures such as an ellipse or any other figure which reproduced in the fabric.

Figure 3 shows the cut-out portions of the teeth 21 of the reed 20 as they appear in front elevation, while Figure 4 shows some of these teeth as they would appear when examined from the side. The bottom of each cut-out portion has the form of an arc, the arc of each tooth being different from the arc of the adjacent tooth.

An important feature of the teeth 21 is that the edges 61 and 62 of each of their cut-out portions 60 extend at right angles to the side surfaces of the teeth. Practical experience has shown that in such case there is less danger that the weft thread 13, when pressed against the teeth 21 will be damaged or cut by the edges 61 and 62.

The gradual bending of the weft threads which results in the moire effect is illustrated diagrammatically in Figures 6 to 8. As has been described already, the reed is moved step by step upwardly and downwardly by the mechanism shown in Figures 1 and 2. The filler is shot across the shed when the reed 20 is at a standstill in the interval between two movements.

When the weft thread 13*a* (Figure 6) is situated opposite that portion of the reed which is indicated by the line 6—6 of Figure 3, the weft thread 13*a* pressed against the reed, acquires only a slight curvature, as indicated diagrammatically in Figure 6. When the reed is somewhat raised in relation to the lay 15, the weft thread 13*b* (Figure 7) will assume the position indicated diagrammatically by the line 7—7 in Figure 3, and when the weft thread 13*b* is pressed against the cut-out portions 60 of the teeth 21 it will be curved somewhat more than the preceding weft thread, as indicated in Figure 7. When the reed is raised still higher, so that the weft thread 13*a* (Figure 8) will assume the position indicated by the line 8—8 in Figure 3, the curvature of the weft thread 13*c* will be still greater, as indicated in Figure 8. The maximum curvature of the thread obtainable through the use of the cut-out portion 60 provided in the teeth 21 is shown in Figure 5 of the drawings.

As the reed moves still further the curvature of the subsequent weft threads will be gradually diminished until the reed reaches a position, in which all of the lower edges 62 of the cut-out portions 60 are situated above the weft thread. Then the weft threads will extend in a straight line across the shed and no moire effects will be produced upon the fabric.

The reed 20 should be reciprocated to such an extent that in its highest position all of the lower edges 62 are situated above the weft thread, while in its lowest position all of the upper edges 61 of the cut-out portions 60 are situated below the weft threads. Then a complete moire design will be reproduced upon the fabric.

A preferred device for spacing the teeth 21 of the reed upon the reed frame 22 is illustrated on

a larger scale in Figures 9 and 10. Two bars 65 and 66 are placed over the teeth 21 adjacent the upper portion 22a of the frame 22. A wire 67 is wound around the bars 65 and 66 in such manner that it serves as a distancing member separating the teeth 21 one from the other and maintaining them in their proper relation upon the frame 22. Similar bars 68 and 69 are situated at the lower end of the frame and carry a wire 70 which is wound around the bars 68 and 69. The bars 65, 66, 68 and 69 are firmly connected with the frame 22, as shown in Figure 10, the teeth 21 may extend through the entire frame and be permanently connected therewith by soldering or the like.

After a fabric has been manufactured by the described means it is passed through heated calender rollers in the usual manner. It is possible to provide moire effects only upon one half of the fabric, then to fold that half over the other half which has no moire effects, and pass the folded fabric through the heated calendar rollers. The moire effect of the first half will then be reproduced upon the other half of the fabric.

What is claimed is:

A device for vertically reciprocating a reed, particularly a reed adapted to produce moire effects upon fabrics, said device comprising a substantially vertical lever, a shaft rotatably supporting the lower end of said lever, reciprocating means adjustably connected with the upper end of said lever to oscillate the same, a gear wheel firmly connected with said shaft, means carried by said lever and engaging said gear wheel to rotate the latter in one direction in the course of the oscillation of said lever, another gear wheel firmly connected with said shaft, a third gear wheel meshing with the second-mentioned gear wheel, a substantially horizontal lever connected with said shaft, means pivotally supporting one end of said horizontal lever, another shaft rotatably supporting the third-mentioned gear wheel, a cam firmly connected with the third-mentioned gear wheel, a roller rotatably mounted in said horizontal lever and engaging said cam, another substantially horizontal lever, the second-mentioned shaft being connected with the second-mentioned horizontal lever, means pivotally supporting one end of the second-mentioned horizontal lever, means adjustably connecting the opposite end of the first-mentioned horizontal lever with the unpivoted end of the second-mentioned horizontal lever, whereby the oscillations of said vertical lever cause oscillations of said two horizontal levers, and a substantially vertical connecting rod having a lower end connected with said unpivoted end of the second-mentioned horizontal lever and having an upper end adapted to be connected to said reed, whereby the oscillations of the second-mentioned horizontal lever are transformed into a vertical reciprocatory motion of said connecting rod.

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