Dec. 10, 1929. W. H. WAKEFIELD 1,739,192

LOOM TO WEAVE TERRY PILES OF VARYING HEIGHTS

Filed Dec. 12, 1927 4 Sheets-Sheet 1

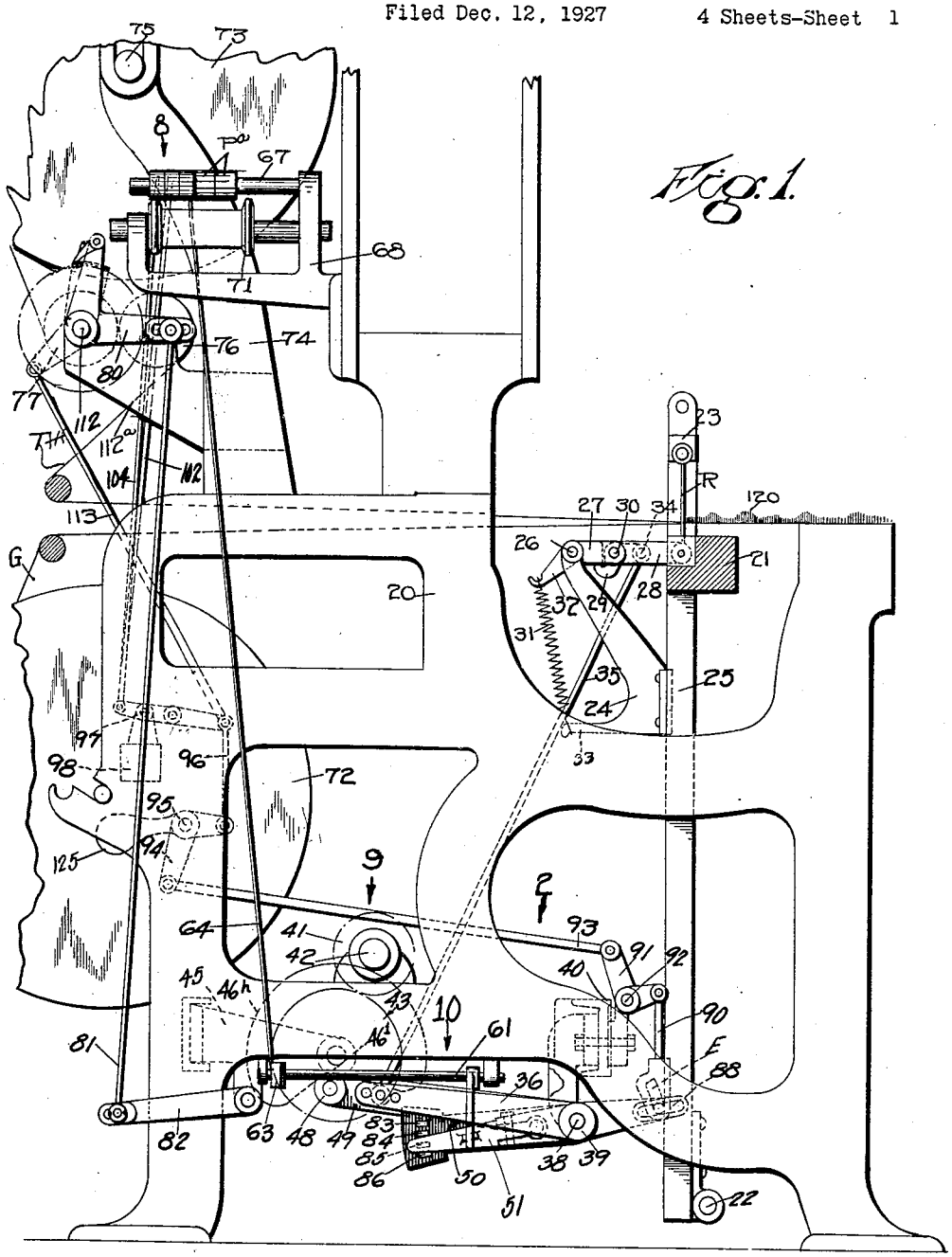


Fig. 1.

INVENTOR
WALTER H. WAKEFIELD
Southgate Fay & Hawley
ATTORNEYS

Dec. 10, 1929. W. H. WAKEFIELD 1,739,192

LOOM TO WEAVE TERRY PILES OF VARYING HEIGHTS

Filed Dec. 12, 1927 4 Sheets-Sheet 2

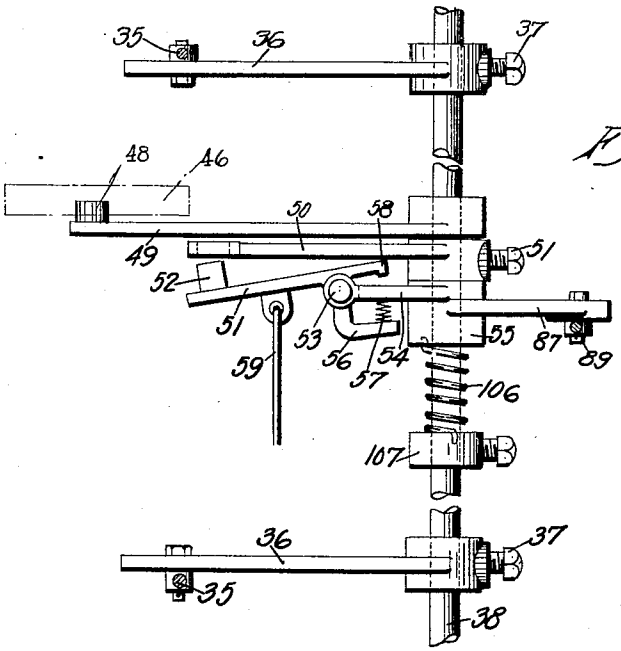


Fig. 2.

Fig. 12.

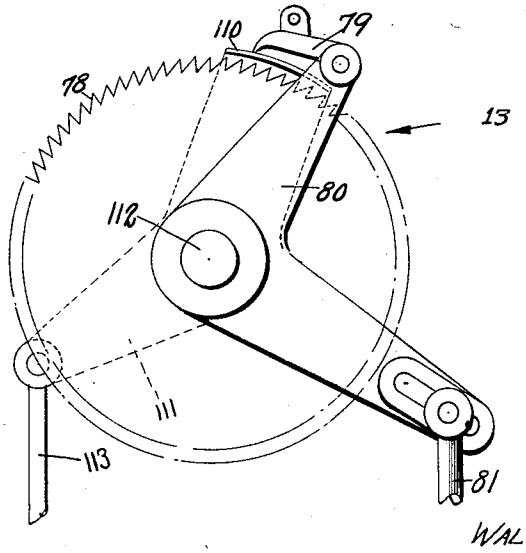
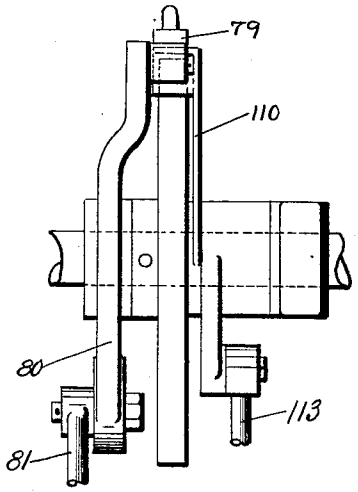


Fig. 13.



INVENTOR
WALTER H. WAKEFIELD

Southgate Fay & Hawley
ATTORNEYS

Dec. 10, 1929. W. H. WAKEFIELD 1,739,192

LOOM TO WEAVE TERRY PILES OF VARYING HEIGHTS

Filed Dec. 12, 1927 4 Sheets-Sheet 3

Fig. 6.

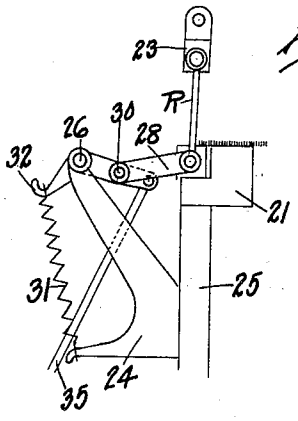


Fig. 5.

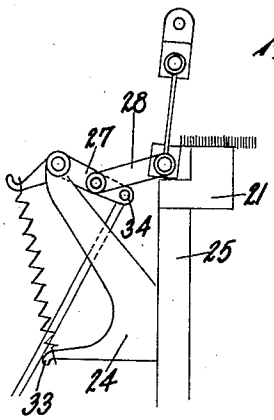


Fig. 4.

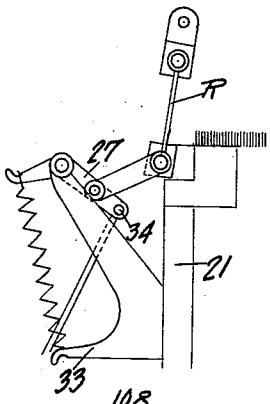


Fig. 3.

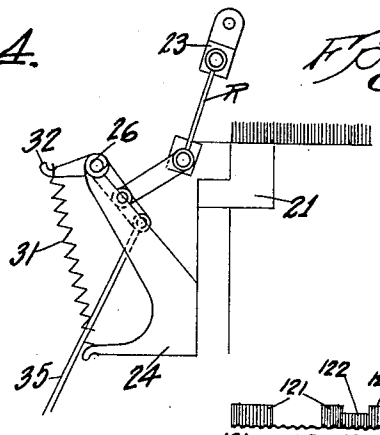


Fig. 15

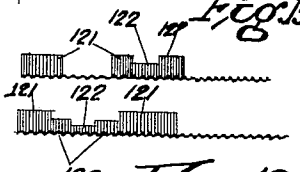


Fig. 7.

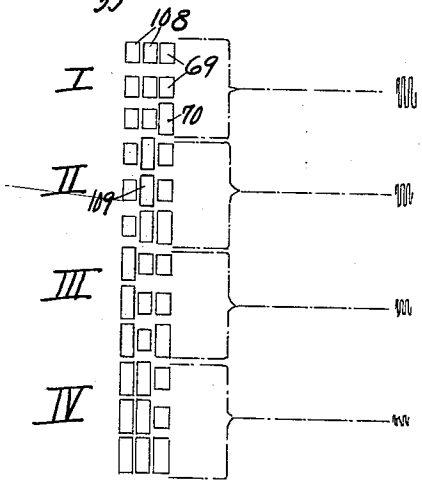


Fig. 16.

INVENTOR
WALTER H. WAKEFIELD

Southgate Fay + Hawley

ATTORNEYS

Dec. 10, 1929. W. H. WAKEFIELD 1,739,192

LOOM TO WEAVE TERRY PILES OF VARYING HEIGHTS

Filed Dec. 12, 1927 4 Sheets-Sheet 4

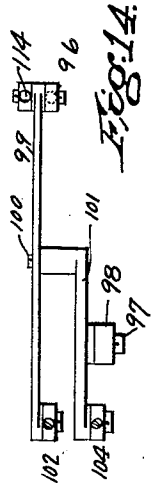


Fig. 14.

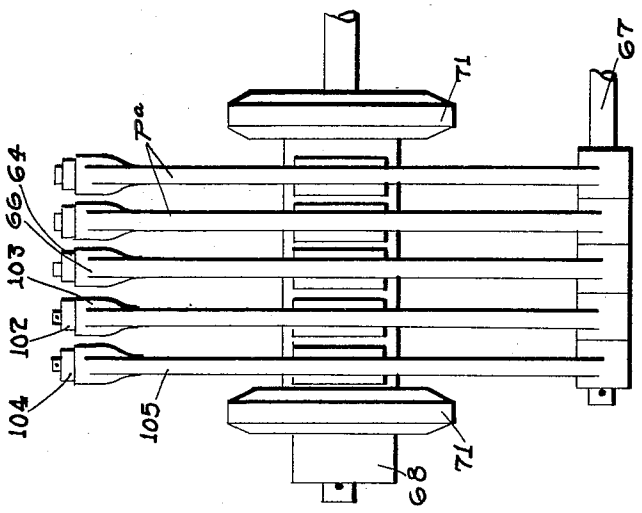


Fig. 8.

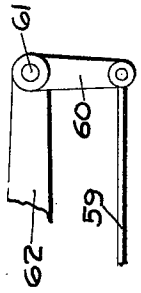


Fig. 11.

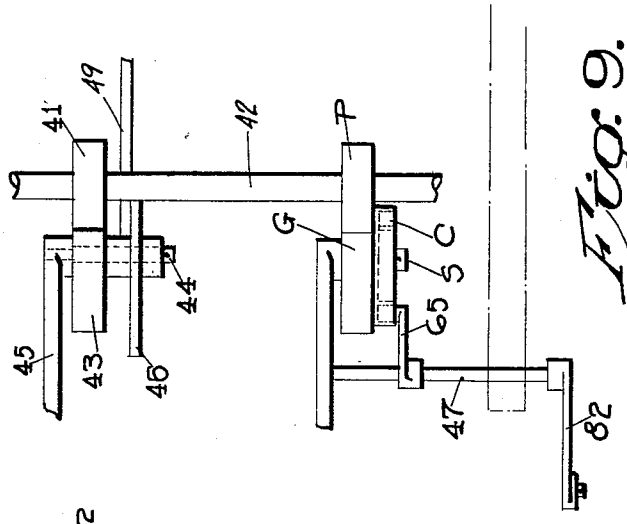


Fig. 9.

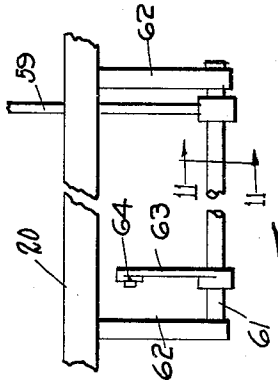


Fig. 10.

INVENTOR
WALTER H. WAKEFIELD

Cushman Darby & Cushman
ATTORNEYS

Patented Dec. 10, 1929 1,739,192

UNITED STATES PATENT OFFICE

WALTER H. WAKEFIELD, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

LOOM TO WEAVE TERRY PILES OF VARYING HEIGHTS

Application filed December 12, 1927. Serial No. 239,372.

This invention relates to improvements in terry pile fabric looms and it is the general object of the invention to render such a loom capable of forming piles of different heights.

Terry fabrics employ a relatively tight ground warp and a loose terry warp together with mechanism for permitting two or three picks to accumulate behind the fell of the cloth preparatory to the formation of a row of piles. On the pile forming beat of the lay the loose or terry warp is given an advance movement and the several picks of filling are beaten into the fell in order to cause looping of that part of the loose warp which lies between the fell and said picks. So far as I am aware looms heretofore constructed have been capable of forming piles of but one height so that the finished fabric has a flat appearance. This may be permissible in the body of a towel but it is desirable when weaving the border to introduce some variation in the height of the piles so as to provide an embossed effect and it is accordingly an important object of my invention to provide a loom with devices effective to weave piles of different heights without requiring manual setting either of the terry warp beam or the means for varying the position of the reed relatively to the fell on non-pile forming beats of the loom.

It is a further object of my invention to provide means for permitting the formation of a series of rows of piles with successive piles of different heights, this effect being controlled automatically by a pattern mechanism which moves in timed relation with the terry forming part of the loom.

The usual form of terry loom for lighter fabrics employs a reed carrying frame which is pivoted to the lay and is acted upon by a toggle mechanism to lie to the rear of the fell of the cloth when the lay is in its extreme forward position for two or three successive picks and then is moved to the fell on the following pick to produce terry piles, this movement of the reed relatively to the lay being accomplished by a straightening of the toggle. It is a more particular object of my present invention to provide mechanism for varying the degree of movement of the members of the toggle joint so that the angular position of the reed relatively to the lay may be varied according to the desired height of terry pile. The device set forth herein is accordingly shown in connection with a loom having a lay moving through a fixed range of action with the reed pivoted to the lay, but I do not wish to be limited in the broader aspects of my present invention to this particular means for beating in the terry piles. The lay and reed shown herein are merely for purposes of illustration and exemplify one set of devices by which the desired result may be achieved.

It is a more particular object of my invention to vary the degree of movement of the terry warp and the movement of the reed relatively to the fell of the cloth so that the amount of warp paid off will be in proportion to the amount required by the reed in whatever position the latter may be relatively to the fell of the cloth.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth in the claims.

In the accompanying drawings, wherein I have shown a convenient embodiment of my invention,

Fig. 1 is a side elevation of a loom having my invention applied thereto, certain parts being in section,

Fig. 2 is an enlarged top plan view of the mechanism for controlling the reed looking down in the direction of arrow 2, Fig. 1,

Figs. 3, 4, 5 and 6 are diagrammatic views of the reed and the toggle joint associated therewith in four different positions to provide terry of four different heights,

Fig. 7 is a diagrammatic view of the pattern chain which controls the height of the pile and also the amount of feed for the terry warp,

Fig. 8 is a top plan view showing the levers of the pattern mechanism which cooperate with the pattern chain, looking in the direction of arrow 8, Fig. 1,

Fig. 9 is a detailed top plan view taken in the direction of arrow 9, Fig. 1,

Fig. 10 is a detailed top plan view taken in the direction of arrow 10, Fig. 1, showing the shaft which controls the time of operation of the terry forming motion,

Fig. 11 is a vertical section on line 11—11 of Fig. 10,

Fig. 12 is an enlarged end elevation of the feeding device for the terry warp beam,

Fig. 13 is a front elevation taken in the direction of arrow 13, Fig. 12,

Fig. 14 is a top plan view of the compound levers controlled by the pattern mechanism, these levers being connected to the terry warp let-off and also to the reed controlling devices, and

Figs. 15 and 16 are vertical longitudinal sections through two different fabrics which may be formed according to my invention.

The mechanism set forth herein includes the terry forming devices parts of which are of the usual construction; the devices for varying the extent of motion of the reed to form terry piles of different heights; and the mechanism for feeding the warp from the terry beam in proportion to the demands of the particular height of pile being produced. There is also a control mechanism which causes the latter two mechanisms to operate conjointly so that the amount of warp released may be proportional to that required by the reed. This control device is shown herein as including a compound system of levers not unlike that found in the box motion for fancy looms having four or more shuttles and includes also pattern mechanism part of which controls the location of the reed. The pattern mechanism also determines the time at which the reed shall have a pile forming beat.

An old form of mechanism for producing the terry piles will be described first. Referring particularly to Figs. 1 and 2 it will be seen that I have provided a loom 20 having a lay 21 swinging about rocker shaft 22 and provided with the usual hand rail 23 pivoted thereto. A bracket 24 is secured to the lay sword 25 and projects rearwardly to afford pivotal support as at 26 for one of the links 27 of a toggle joint the other link of which is shown at 28. The forward end of the link 28 is pivotally connected to the bottom of the reed R and the rear end of said link 28 is provided with a stop device 29 which engages the arm 27 to limit upward movement of said parts. A pin 30 pivotally connects the links 27 and 28 and a spring 31 interposed between an arm 32 of the link 27 and horn 33 of the bracket 24 tends normally to hold the links in the straight line relation shown in Fig. 1.

The arm 27 is extended beyond the pin 30 and is pivotally connected as at 34 with the upper end of a control rod 35 the lower end of which is pivotally connected to an arm 36 secured by set screw 37 to a shaft 38. Said shaft is free to rock in bearings 39 one of which is shown in Fig. 1 and it is to be understood that there is a toggle joint and a lever 36 for each side of the loom so that the movements of the reed may be uniform. Said bearings 39 may be secured to a girt 40 formed as part of the loom frame and shown in dotted lines in Fig. 1.

The mechanism for moving the control rod 35 includes a gear 41 secured to the bottom shaft 42 of the loom and meshing with a second gear 43 mounted loosely on a stud 44 secured to bracket 45. The bottom shaft makes a complete revolution every second pick of the loom and the ratio of the gears 41 and 43 is such that the gear 43 makes a complete revolution every third pick of the loom. It is to be understood that the description given herein is in connection with a so-called three pick terry and that the ratio between the gears 41 and 43 may be changed according to the number of picks required to produce a single row of terry.

Rotating with gear 43 on stud 44 is a cam 46 which as shown in Fig. 1 has a high dwell portion 46^h which extends for substantially two-thirds of the periphery of the cam and has a low dwell 46^l which extends for substantially the other third of the periphery of the cam. A roll 48 cooperates with the cam and is mounted on an actuating lever 49 which is loosely pivoted on the shaft 38 as shown in Fig. 2. During the operation of the loom the cam 46 will make a complete revolution every third pick of the loom and the roll 48 will be in raised position as shown in Fig. 1 to straighten the toggle during one pick and will be in lowered position to break the toggle during the other two picks of the cycle of the terry forming mechanism.

A guide arm 50 is secured by means of set screw 51 to the shaft 38 and is the means by which motion of the actuator lever 49 may be communicated to the shaft 38 to cause movement of the control rod 35. The mechanism for connecting lever 49 and guide arm 50 includes a key lever 51 having a key head 52 to pass through the guide arm 50 and lie under the lever 49. Said key lever is pivoted on a stud 53 carried by an arm 54 of a lever 55 loose on the shaft 38. Integral with the key lever is a finger 56 which receives the thrust of a compression spring 57 interposed between said finger and the arm 54. A stop boss 58 on the key lever limits movement of the latter under influence of the spring 57.

The device for controlling the position of the key head includes a pull rod 59 pivotally connected to the key lever as shown in Fig. 2 at one end and connected at the other end to an arm 60 secured to a stub shaft 61 loosely mounted in bearings 62 fastened to the loom frame. A second arm 63 secured to shaft 61 is connected to the lower end of an upwardly extending rod 64. The upper end of said rod 64 is connected to a pattern lever 66 pivoted on a stud 67 supported by a bracket 68 mounted on the loom frame. Said lever 66 is positioned to be engaged by the right hand set of pattern chain elements shown in Fig. 7. As shown there are two relatively low chain elements 69 and one high element 70 so that as the pattern cylinder 71 is given an intermittent rotary movement imparted to it each pick of the loom (by mechanism not shown) the lever 66 will be down for two picks and will be raised the third pick. It is by means of this mechanism that the key lever 51 is permitted to establish driving connections between the guide arm 50 and the actuating lever 49 every third pick of the loom. Here again it should be stated that the construction of the pattern chain is in connection with a three pick terry and said chain will be altered should the loom operate to produce a row of terry piles every fourth pick. As shown in Fig. 8 the stud 67 supports other levers P^a which control the changes of the boxes (not shown) to give variety to the pattern.

The usual form of means for supplying the terry warp will now be described.

The warp threads entering into the construction of a terry towel are derived from two independent sources, the so-called ground warps G being supplied by the usual warp beam 72 which may be provided with any approved form of let-off motion not shown and the terry warp threads T being supplied by a terry warp beam 73 supported on arms 74 one of which is shown in Fig. 1. The beam 73 is free to rotate on its axis 75 and cooperates with a pair of rolls 76 and 77, respectively, which are tightly held together and between which the terry warp T passes. Rigid with the roll 77 is a ratchet wheel 78 to cooperate with pawl 79 mounted on a bell crank lever 80. This lever is connected to a vertically reciprocating rod 81 deriving motion from lever 82. Said lever 82 is caused to operate by mechanism shown in Fig. 9, where a shaft 47 fast with lever 82 is rocked by a lever 65 driven by a cam C. Pinion P fast on the bottom shaft 42 meshes with gear G rotatable on stud S fixed to the loom frame and secured to cam C. By this mechanism the feed pawl is given a feeding movement every third pick of the loom, the lever 80 moving in a counter-clockwise direction as shown in Fig. 12 to cause advance movement of the roll 77.

The mechanism thus far described is of common construction and operates in well known manner, forming no part of my present invention. As the lay beats back and forth in the loom by mechanism not shown the reed R will be behind the fell of the cloth for two picks of the loom, but on the next pick the reed will be in extreme forward position so that the picks of filling which were laid when the reed was in rear position will move forwardly to cause looping of that portion of the pile warps T lying between said picks of filling and the fell of the cloth. It is to be understood that this beating up of the piles is accompanied by an advance movement of the roll 77 so that sufficient warp from the terry beam may be provided to form the loops. The form of toggle control shown herein has gone into common use.

As previously stated the present invention has for its general object to provide means for forming terry piles of different heights, the heights of the piles to be determined automatically by a control mechanism which as shown herein is part of the pattern chain. The means for accomplishing this result includes two distinct sets of mechanism, one to vary the throw of the reed and the other to give proper angular movements to the pinch rolls 76 and 77 so that the correct amount of terry warp may be provided.

I will now describe the mechanism for varying the height of the terry piles.

Referring to Fig. 1 it will be seen that I have provided the guide arm 50 with a plurality of slots 83, 84, 85 and 86. Said slots extend through the guide arm 50 and are all designed to permit the key 52 to pass through them and lie under the actuating lever 49 to cause movement of the guide arm irrespective of which slot the key 52 has entered. Diagrammatic Figs. 3 to 6, inclusive, indicate the different positions the toggle joint and reed assume when the key 52 lies in the different slots. In Fig. 3 it is assumed that the key 52 has passed through the slot 83 and that for this reason the guide arm 50 and levers 36 will receive their maximum motion. Because of the large motion of lever 36 the control rods 35 will be moved down to the lowest position they ever assume and the reed R will lie at its maximum distance behind the fell of the cloth when the lay is in its extreme forward position on non-pile forming beats of the lay. As previously stated, it is to be understood that the guide arm will be held down for two picks so that the reed will be in rear position for two picks and that the actuator lever 49 will move upwardly as the cam 46 continues to rotate to permit spring 31 to straighten the toggle joint formed by the links 27 and 28.

In Figs. 4, 5 and 6 it is assumed that the key 52 is located in the slots 84, 85 and 86, respectively, the position of the reed and con-

sequently the height of the pile formed being dependent upon which of the slots in the guide arm is occupied by the key 52.

It is necessary of course to have some mechanism for determining which of the slots will receive the key 52 and this is accomplished by moving the key lever by mechanism controlled from the pattern chain. Said control mechanism includes an arm 87 cast integral with the lever 55 and having a slot 88 which receives stud 89 to be located at the properly adjusted distance from shaft 38. Said stud is attached to the lower end of link 90 the upper end of which is attached to a bell crank lever 91 moving about a fixed stud 92. Link 93 connects said bell crank lever 91 to a second bell crank lever 94 pivoted on a fixed stud 95 and this second bell crank lever in turn is attached to an upwardly extending link 96 shown in dotted lines in Figs. 1 and 14.

The present disclosure sets forth means for weaving four different heights of terry pile to be controlled by a pattern chain having two spaces to cooperate with two levers about to be described. In order to bring about this result there is provided a system of compound levers mounted on stud 97 and fixed in a stand 98 secured to the loom frame as shown in Figs. 1 and 14. The rod 96 is connected to the right hand end of a relatively long lever 99 pivoted as at 100 to a relatively short lever 101 mounted for free movement on the stud 97. The lever 99 is connected by means of link 102 to pattern lever 103 (see Fig. 8) while lever 101 is connected by link 104 to pattern lever 105. Said levers cooperate with the middle and left hand chain elements indicated diagrammatically in Fig. 7. A torsion spring 106 having one end extending into lever 55 and having the other end received by a collar 107 secured in adjusted angular position on shaft 38 tends normally to lift the key lever and to depress link 90 and through intermediate mechanism to exert a downward pressure on links 102 and 104 so that their corresponding levers will be held down against the pattern chain elements thereunder.

Referring to Fig. 7 I have shown diagrammatically enough of the pattern chain to control four successive cycles of the terry forming mechanism, the first cycle indicated by I having low chain elements 108 for levers 103 and 105. Throughout the cycle represented by I the left ends of both levers as viewed in Fig. 14 will be down and therefore the link 96 will be in its highest position and the key 52 will be positioned to enter slot 83 to produce terry as indicated diagrammatically in Fig. 3. The connections between link 96 and key lever 51 are such that both the link and lever move up together and also down together.

In the second cycle represented by II a high chain element 109 will appear under lever 103 while low element 108 will be under lever 105. This results in lowering the right end of lever 99 to cause lowering of link 96, link 104 being still down. Lowering of link 96 one degree is accompanied by lowering key 52 to cause it to register with the slot 84 to form the next to the highest height of pile and result in a movement of the toggle and reed to the position indicated in Fig. 4.

In the third cycle represented by III the levers 103 and 105 reverse their positions with the result that the link 96 moves to the next to its lowest position so that key 52 will be opposite slot 85 and the parts which control the reed will be in the position indicated in Fig. 5 to form the next to the lowest height of pile.

In the fourth cycle indicated by IV there will be a high element 109 under each of the levers 103 and 105 so that link 96 will be in its lowest position to cause key 52 to register with slot 86 and the toggle joint will be in the position shown in Fig. 6.

By reason of the mechanism controlled through link 96 the key 52 may be moved to any one of four positions relatively to the guide arm to render the key effective to transmit four degrees of motion from the actuating lever 49 to the control rods 35 with the result that the reed will occupy four different positions behind the fell of the cloth when the lay is in its extreme forward position on non-pile forming beats of the lay. A slot E in the bottom of link 90 permits the key lever to move down without straining the set of connections between it and the compound levers. The compound levers, while believed to be new in their use as set forth herein, are not new as a means to secure four different positions from two pattern levers, such an arrangement being shown in patent to Ryon No. 1,205,792.

As previously stated it is necessary to provide an amount of terry warp which shall be proportional to the demands of the reed in whatever position it may be located and to accomplish this result I have provided means for causing angular movements of different degrees on the part of the pinch let-off roll 77. As shown more particularly in Figs. 1, 12 and 13 I have provided a shield 110 on which the pawl 79 may rest and I form said shield as part of a lever 111 movable about a shaft 112 supported on bracket 112a and on which the roll 77 is mounted. Said lever 111 is connected to the upper end of a rod 113 the lower end of which is connected to the stud 114 carried by the lever 99 and to which the upper end of link 96 is attached. Movements of the lever 99 therefore not only control the location of the key 52 but also position the shield 110 to give the latter a series of different positions to expose varying numbers of the teeth 78 to the action of pawl

79, depending upon the height of pile to be formed. The lever 82 has a stroke sufficient to move the pawl 79 over a space corresponding to the highest pile and it is to be understood that the shield will be so placed during the weaving of piles of different heights that teeth corresponding to one degree will be exposed to the pawl 79 when the parts are in the position shown in Fig. 6 and teeth corresponding to the second, third and fourth degrees will be exposed to the action of said pawl when the toggle is in the positions shown respectively in Figs. 5, 4 and 3. Counterweight 125 rigid with lever 94 positions the shield even though stud 89 may move up in slot E as lever 51 moves down.

As shown in Fig. 7 the pattern chain has been so built as to form a fabric the piles of which are of different heights and in such order as to produce the wavy effect indicated at 120 in Fig. 1. As shown in Fig. 15 a pair of sections of high piles 121 may be separated by an area of relatively low piles 122 so as to produce an embossed effect, while in Fig. 16 the high sections 121 are separated from the low sections 122 by one or another of the intermediate stages 123 to be produced when the parts are in the position indicated in Figs. 4 or 5. The possibilities of the mechanism of course are not limited to the particular arrangement of pile set forth herein.

I have shown herein a toggle joint for varying the position of the reed but I do not wish to be limited to this particular method of varying the range of movement of the reed when the latter moves forwardly on a non-pile forming beat of the lay, as it is within the scope of my present invention to provide mechanism which will cause the reed to be located in a plurality of different positions behind the fell of the cloth. I have also shown a pattern mechanism with the associated compound levers to control the height of the pile but I do not wish to be limited to the form of control mechanism shown. The invention is more especially useful in the weaving of borders for terry towel looms, the weaver being able by designing the control mechanism to produce a variety of novelty effects for the borders of towels or other fabrics having areas of terry piles formed therewith. It is common practice to form terry first on one side of the fabric and then on the other and I consider my present invention to be applicable to this manner of disposing of the terry piles.

From the foregoing it will be seen that I have provided means whereby a loom may weave a terry towel having piles of varying heights, the mechanism including a variable feed for the terry warp which is controlled jointly with devices for varying the range of movement of the reed.

Having thus described my invention it will be apparent that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In a terry fabric loom having a lay and a reed thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, a regularly moving actuator independent of the lay and having a given movement which is the same for each terry forming cycle of the loom, and a device operatively connected to the reed and having provision for engaging the acutator at different points in the movement of the latter to give the reed a plurality of ranges of movement.

2. In a terry fabric loom having a lay and a reed thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, a regularly moving actuator independent of the lay and having a given movement which is the same for each terry pile forming cycle of the loom, a device operatively connected to the reed and capable of movement to give the reed a plurality of positions relatively to the fell of the cloth on non-pile forming beats of the loom when the lay is in its foremost position, and a connecting element operatively related to the device to be connected to the actuating member at a plurality of different points in the movement of said actuating member to give the reed a plurality of ranges of movement relatively to the fell of the cloth.

3. In a terry fabric loom having a lay and a reed thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, an actuator member independent of the lay and having a given movement which is the same for each terry pile forming cycle of the loom, a device operatively connected to the reed to cause the latter to assume a plurality of positions relatively to the fell of the cloth on non-pile forming beats of the loom, a connecting element operatively connected to and causing movement of the device, and control means to cause said element to be operatively related to the actuating member at a plurality of different points in the movement of said actuating member.

4. In a terry fabric loom having a lay and a reed thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, an actuator member independent of the lay and having a given movement which is the same for each terry pile forming cycle of the loom, a device operatively connected to the reed to cause the latter to assume a plurality of positions relatively to the fell of the cloth on non-pile forming beats of the loom, a connecting element operatively connected to and causing movement of the device, and control mechanism to cause said element to be operatively related to the actuating

member at a plurality of different points in the movement of said actuating member.

5. In a terry fabric loom having a lay and a reed pivoted thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, a pair of members pivoted together to form a toggle joint, one of said members being connected to the lay and the other of said members being connected to the reed, and means to cause said members to assume a plurality of different angular positions relatively to each other on non-pile forming beats of the loom when the lay is in its foremost position, whereby the reed will be caused to assume a plurality of different positions behind the fell of the cloth on non-pile forming beats of the loom when the lay is in its extreme forward position.

6. In a terry fabric loom having a lay and a reed pivoted thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, a pair of members pivoted together to form a toggle joint, one of said members being connected to the reed and the other member being pivoted relatively to and supported by the lay, control mechanism, and devices under control of the mechanism effective to give said members a plurality of different angular positions on non-pile forming beats of the loom when the lay is in its foremost position.

7. In a terry fabric loom having a lay and a reed thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, a source of terry warp supply, means to give the reed a plurality of ranges of movement relatively to the fell of the cloth, and positively operated mechanism connected to the terry warp supply and acting in timed relation with the last named means to cause a feed of the terry warp proportional to the distance the reed is behind the fell of the cloth on non-pile forming beats of the loom.

8. In a terry fabric loom having a lay and a reed thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, a source of terry warp supply, means to give the reed a plurality of positions relatively to the fell of the cloth on non-pile forming beats of the loom when the lay is in the foremost position it assumes on non-pile forming beats of the loom, and positively operated mechanism connected to the terry warp supply and acting in timed relation with the last named means to cause a feeding movement of the terry warp supply means proportional to the distance the reed is behind the fell of the cloth on any non-pile forming beat of the loom.

9. In a terry fabric loom having a lay and a reed thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, a source of terry warp supply, means to give the reed a plurality of ranges of movement on non-pile forming beats of the loom to cause said reed to assume a plurality of different positions behind the fell of the cloth, and mechanism to cause a positive feeding movement of the terry supply warp which changes with the changing ranges of movement of the reed, whereby the amount of warp supplied by the terry warp supply will be proportional to the distance the reed is behind the fell of the clutch on non-pile forming beats of the loom.

10. In a terry fabric loom having a lay and a reed thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, a source of terry warp supply, control mechanism, means to give the reed a plurality of different positions relatively to the fell of the cloth when the lay is in its extreme forward position on non-pile forming beats of the loom, a device to cause positive and predetermined feeding movement of the terry warp supply to cause the warp supply to feed off varying amounts of terry warp, and connections between the control mechanism and the last named means and also the device to cause the feeding of an amount of terry warp on any one terry pile forming cycle of the loom which shall be proportional to the distance the reed lies behind the fell of the cloth during that cycle when the lay is in its extreme forward position.

11. In a terry fabric loom having a lay and a reed thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, a source of terry warp supply, a reed to be moved to a plurality of positions behind the fell of the cloth when the lay is in its extreme forward position on a non-pile forming beat of the loom, a terry warp supply means, and a control mechanism to control the last named means and the warp supply simultaneously to cause the amount of terry warp feed of the supply means to be proportional to the distance between the reed and the fell of the cloth.

12. In a terry fabric loom having a lay and a reed thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, a source of terry warp supply, a terry warp supply means, a positively operated device independent of the lay to cause said warp supply to feed off varying amounts of terry pile warp on different beats of the loom, and means to incorporate the varying amounts of warp paid off into the fabric to provide terry piles of varying heights.

13. In a terry fabric loom having a lay and a reed thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, a source of terry warp supply, control mechanism, a terry warp supply means controlled by the control mechanism to cause the terry warp supply to feed off varying amounts of terry warp, and devices

under control of the control mechanism to cause the varying amounts of pile to be incorporated into the fabric to produce terry piles of varying heights.

14. In a terry fabric loom having a lay and a reed thereon with means to move the reed to the fell of the cloth on pile forming beats of the loom, a source of terry warp supply, and positively operated means independent of the lay to pay off varying amounts of warp on different beats of the loom and incorporate the same into the fabric to provide terry piles of different heights.

In testimony whereof I have hereunto affixed my signature.

WALTER H. WAKEFIELD.