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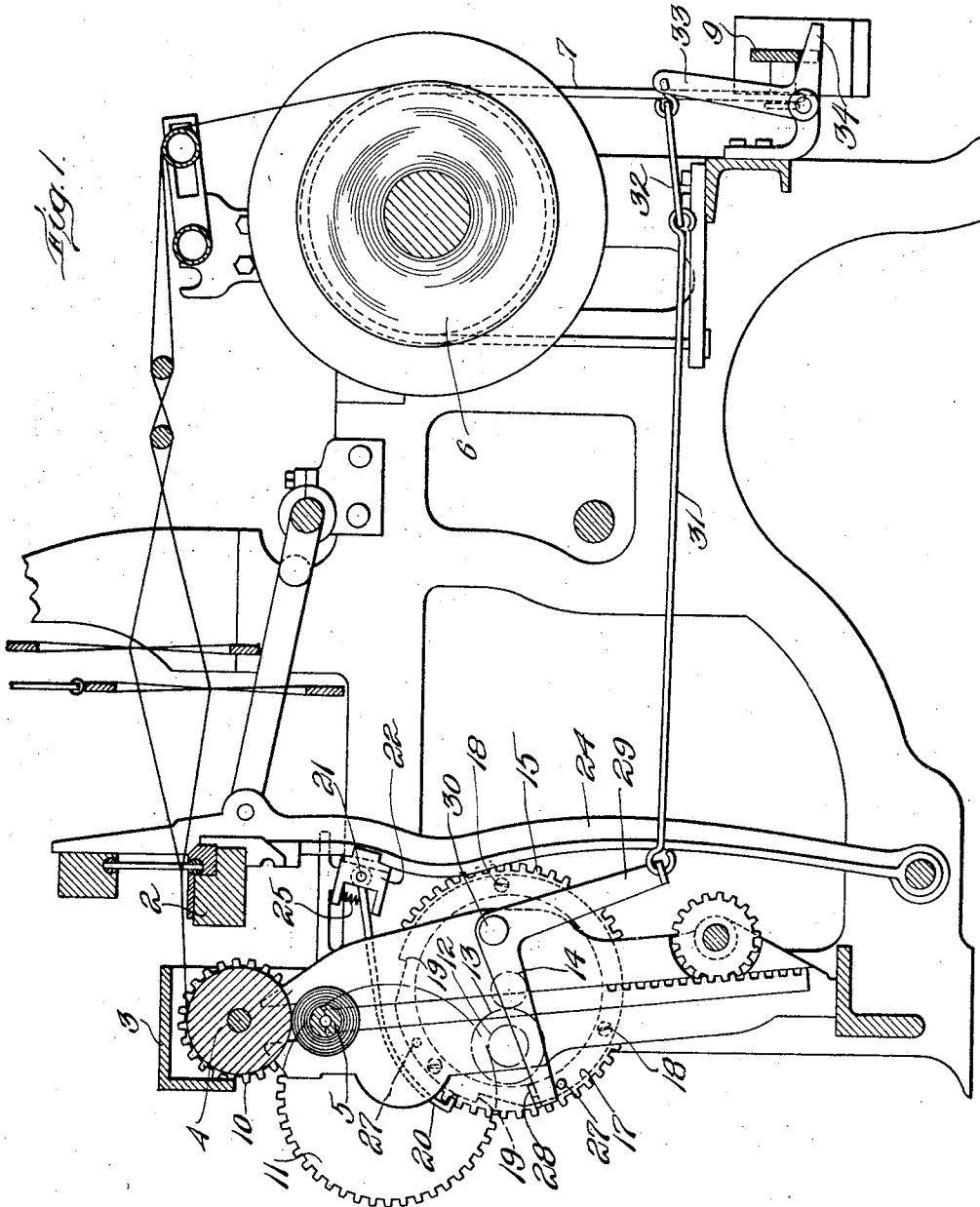
J. A. ADAMS

1,486,272

LOOM

Filed Dec. 5, 1922

2 Sheets-Sheet 1



Inventor:
James A. Adams
by J. H. McCready
his atty

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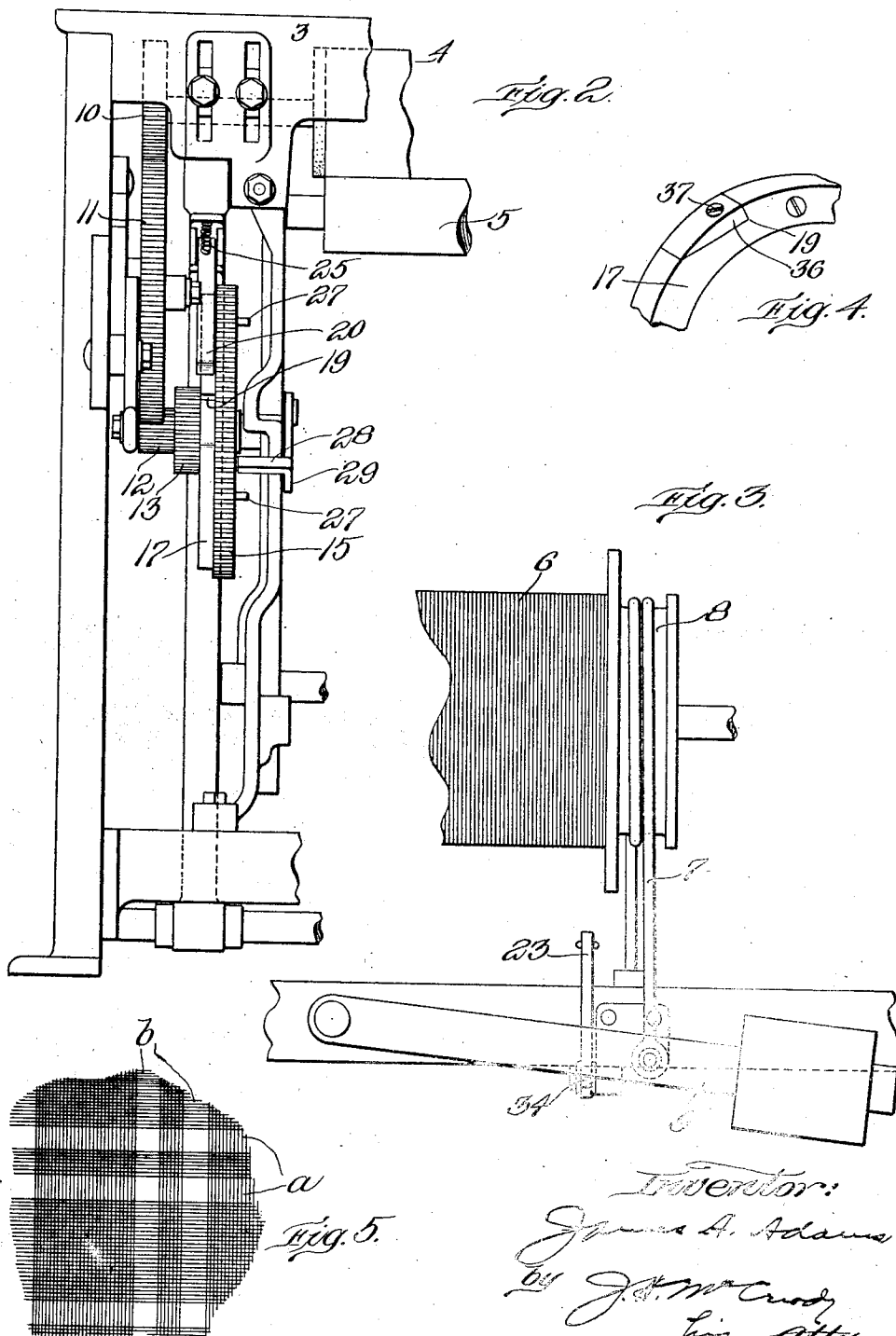
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UNITED STATES PATENT OFFICE.

JAMES A. ADAMS, OF WALTHAM, MASSACHUSETTS, ASSIGNOR TO THE BOSTON MANUFACTURING COMPANY, 1901, OF WALTHAM, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

LOOM.

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To all whom it may concern:

Be it known that I, JAMES A. ADAMS, a citizen of the United States, residing at Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Looms, of which the following is a specification.

This invention relates to looms and is especially concerned with looms designed to weave fabrics in which the density or closeness of the weave is varied in a predetermined manner in order to produce striped, barred or checked patterns.

In the weaving of such fabrics the body of the fabric usually is woven very closely and the striped, barred, or checked effect is produced by weaving loose or open sections between the more closely woven portions of the goods. Sometimes this effect is produced by weaving at intervals one or more picks of wool or silk waste, the material so introduced being burned out chemically in the finishing process. The usual methods of weaving fabrics of this character require the use of a dobby, extra shuttle boxes, a special pattern mechanism, or else necessitate the running of the loom idly while the loose portions are being woven. The present invention has for its chief object to simplify the mechanisms for weaving such fabrics and to increase the rate of production of goods of this character from a given loom without increasing its normal running speed. It is also an object of the invention to devise a simple mechanism which can readily be applied to plain looms to enable them to produce fabrics of the character above mentioned.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a vertical, longitudinal, cross sectional view of a loom showing the more important elements with which the present invention is concerned;

Fig. 2 is a front view of the takeup mechanism of the loom as modified by the present invention;

Fig. 3 is a rear elevation showing the

warp beam and the tension mechanism which acts on one end of the beam;

Fig. 4 is a perspective view of a portion of a ratchet wheel which preferably is used in the machine shown in Figs. 1 and 2; and

Fig. 5 is a plan view of a small section of fabric of the general character with which the present invention is concerned.

The invention is herein shown for purposes of illustration applied to the well known Draper loom, although it will be understood that it can be used with equal advantage on looms of other makes. The loom shown comprises a lay 2, breast beam 3, sand roll 4, and cloth beam 5, all constructed, arranged and operating in the usual manner. The supply of warp thread is mounted on the beam 6 at the rear of the loom, and the rotation of this beam for the purpose of letting off the warp as required by the weaving operation is yieldingly resisted by the usual brake chain, or cord 7 running over a brake surface 8 at the end of the drum and connected to a weighted lever 9. This tension or brake arrangement is duplicated at the opposite end of the beam 6.

The sand roll and cloth beam are driven in the usual manner through a train of gearing including a gear 10 fast on the shaft of the sand roll, and another gear 11 driving the gear 10 and meshing with a pinion 12 which rotates with the change gear 13. This gear is driven by a pinion 14 which rotates with a gear 15 through which the takeup motion is transmitted from the usual driving mechanism, not shown.

In the normal operation of the loom as so far described, the cloth beam is rotated slowly as the weaving progresses, and a fabric of substantially uniform density is produced. For the purpose of forming the open stripes such, for instance, as those shown in Fig. 5, the cloth beam and sand roll are, according to the present invention, given a quick additional takeup movement while the loom otherwise continues to operate in its normal manner.

In the construction shown a ratchet wheel 17 is secured to the side of the gear 15 by means of bolts or screws 18, and a plurality of teeth 19 are formed in its peripheral edge at the proper points. Cooperating with this ratchet wheel is a pawl 20 which is pivoted

to the lay at 21, Fig. 1. This pivotal connection is made by means of a bracket 22, bolted to one of the arms 24 which supports the lay, and the outer end of the pawl is held in contact with the edge of the ratchet wheel 17 by a coiled spring 25 interposed between one arm of the bracket 22 and the upper side of the pawl. This arrangement is clearly shown in Fig. 1. In the particular loom shown the gear 15 is arranged to make one revolution for each change of pattern in the weave.

During the weaving operation the pawl 20 is, for the greater part of the time, riding backward and forward on the smooth faces that separate the adjacent teeth 19—19 of the ratchet wheel 17. As this wheel is slowly rotated by the gear 15, one of the teeth 19, at the proper time, comes within the range of movement of the pawl; whereupon, as the lay moves backward, the pawl gives the ratchet wheel a quick rotative movement in a clockwise direction, Fig. 1. This motion is transmitted through the train of gearing to the sand roll 4 and cloth beam 5, thus giving them a quick additional takeup movement of considerable extent. This draws a length of warp from the beam, and at about the time this drawing movement is being completed, the pick occurs. The lay then makes its forward or beat-up stroke and the normal operation of the loom continues uninterruptedly. This results, as will be evident to those skilled in this art, in the formation of an open space or stripe, such as that indicated at *a*, Fig. 5, extending across the fabric from one selvage edge to the other. By arranging the warp threads in a manner that will readily be understood by those familiar with weaving, corresponding spaces or stripes *b*, Fig. 5, are made longitudinally of the web. In the ratchet wheel shown the teeth are arranged to produce two such transverse stripes in the goods in each pattern section.

It is desirable, particularly where two stripes occur closely adjacent to each other, to relieve the tension on the warp beam while the quick takeup movement above described is being made. For this purpose pins 27—27, which may consist simply of threaded studs, are secured in the side of the gear 15 and are arranged to engage the end 28 of a bell crank lever 29 which is fulcrumed on the machine frame at 30, Fig. 1, and is connected by means of links 31 and 32 with the upright arm 33 of another bell crank lever mounted at the rear of the loom. This lever has a horizontal arm 34 which is positioned under the weighted lever 9 of the tension mechanism for the warp beam. Each pin 27 is so spaced with reference to the adjacent tooth 19 that as soon as the takeup movement produced by the pawl 20 is started, the pin 27 will engage the end

28 of the lever 29 and swing this lever in a clockwise direction, Fig. 1, this movement being transmitted through the connections just described to lift the weighted lever 19, and thereby relieve the tension or drag exerted on the rotative movement of the warp beam 6. Due to the difference in location of the centers about which the lever 29 and pin 27 move, these parts are automatically disengaged after the desired movement of the lever has been effected.

It will now be appreciated that this invention provides a very simple mechanism by means of which the striped or open work effect above described may be conveniently produced. The parts that must be added to a plain loom for this purpose are very simple, are economical to manufacture, and can be quickly applied to the loom. Furthermore, these parts are strong and sturdy in construction so that there is little danger of their becoming broken and their depreciation due to wear is reduced to a minimum. It will also be observed that the operation of this mechanism is initiated through the normal operation of the takeup mechanism. That is, the additional takeup movement occurs at times depending upon the position of the teeth 19 and the rotation of the gear 15. The necessity of controlling this operation from a dobby or special pattern mechanism thus is avoided. A particularly important advantage of this invention is that it permits the manufacture of fabrics of the character above mentioned on any common or so-called "plain" loom, such as that shown, without the use of dobby or jacquard motions, extra shuttle boxes, or without the necessity of weaving in fibres which later are burned out by chemical action in order to produce the desired pattern.

For the purpose of facilitating the change from one pattern to another, the ratchet wheel 17 preferably has a series of notches or teeth cut therein, such for instance, as six or eight, and the notches forming those teeth which are not to be used are closed by metal blocks, one of which is shown at 38, Fig. 4, each block being held in place by a screw 37. The gear 15 also has a series of holes drilled and tapped therein at the proper intervals so that any desired number of pins 27 may be used. Consequently, in changing from one pattern to another, it is simply necessary to remove the blocks 36 from the notches which must be used to make the new pattern, fill up the notches formerly used with these blocks and rearrange the pins 27 in the required manner. These operations obviously can be performed very quickly.

While I have herein shown and described the best embodiment of my invention that I have so far devised, it will be appreciated

that this embodiment may be modified in many particulars without departing from the spirit or scope of the invention.

In the foregoing description and in the appended claims, the cloth roll has been referred to as the part which is moved to effect the takeup operation. It will be understood, however, that any equivalent arrangement may be employed.

Having thus described my invention, what I desire to claim as new is:

1. In a loom, the combination with a lay, a cloth beam and means for giving said cloth beam a takeup movement, of mechanism operated by the movement of the lay to give said beam a quick additional takeup movement while the loom continues its normal operation.

2. In a loom, the combination with a lay, a cloth beam and means for giving said cloth beam a takeup movement, of mechanism for giving said beam a quick additional takeup movement while the lay swings backward and the loom continues its normal operation.

3. In a plain loom, the combination with a lay, a cloth beam and means for giving said cloth beam a takeup movement, of mechanism arranged to operate through said means to give said beam a quick additional takeup movement while the lay swings backward and the loom continues its normal operation.

4. In a loom, the combination with a cloth beam and means for giving it a takeup movement, of mechanism for giving said beam a quick additional takeup movement while the loom continues to operate uninterruptedly, said mechanism being under the control of said means.

5. In a loom, the combination with a cloth beam and means for giving it a takeup movement, of mechanism for giving said beam a quick additional takeup movement while the loom continues to operate uninterruptedly, said mechanism being associated with said means to cause the normal operation of said means to initiate the action of said mechanism.

6. In a loom, the combination with a takeup mechanism including a cloth beam and a train of gears through which the takeup movement is imparted to said beam, of a ratchet wheel secured to one of the gears of said train and rotating therewith, said ratchet wheel having teeth in its edge separated by smooth faces, a pawl riding on the edge of said wheel, and means for reciprocating said pawl, whereby said pawl is operative upon engaging a tooth of said wheel to impart a quick takeup movement to said roll.

7. In a loom, the combination with a lay and a takeup mechanism including a cloth beam and a train of gears through which

the takeup movement is imparted to said beam, of a ratchet wheel secured to one of the gears of said train, a pawl connected with the lay to be reciprocated thereby and cooperating with said ratchet wheel to move the wheel and thereby to impart a quick additional takeup movement to said roll.

8. In a loom, the combination with a lay and a takeup mechanism including a cloth beam and a train of gears through which the takeup movement is imparted to said beam, of a ratchet wheel secured to one of the gears of said train and having teeth in its edge separated by smooth faces, and a pawl riding on the edge of said wheel and connected with the lay to be reciprocated thereby.

9. In a loom, the combination with a cloth beam, means for giving said cloth beam a takeup movement, a warp beam and a tension mechanism for resisting the rotative movement of said warp beam, of mechanism for giving said cloth beam a quick additional takeup movement while the loom continues to operate uninterruptedly, said mechanism being under the control of said means, and means for reducing the tension on said warp beam while said additional takeup movement takes place.

10. In a loom, the combination with a cloth beam, means for giving said cloth beam a takeup movement, a warp beam and a tension mechanism for resisting the rotative movement of said warp beam, said means including a train of gears, of a ratchet wheel rotating with one of the gears of said train, a pawl cooperating with said ratchet wheel to move the wheel and thereby to impart a quick additional takeup movement to said cloth beam, and additional means operated by said movement of said ratchet wheel to reduce the tension on said warp beam while said additional takeup movement takes place.

11. In a loom, the combination with a takeup mechanism including a cloth beam and means for operating it to take up the woven web, of means for giving said cloth beam an additional takeup movement comprising a ratchet wheel having a series of notches therein, means whereby said notches may be opened or closed, as desired, a pawl cooperating with said ratchet wheel to give it an intermittent rotative movement, and means for operating said pawl.

12. In a loom, the combination with a takeup mechanism including a cloth beam and means for operating it to take up the woven web, of means for giving said cloth beam an additional takeup movement comprising a ratchet wheel having a series of notches therein, removable blocks closing some of said notches, whereby certain only of said notches may be used as desired, a pawl cooperating with said wheel to engage

the open notches and impart an intermittent rotative movement to said wheel, and means for operating said pawl.

13. In a loom, the combination with a cloth beam, means for giving said cloth beam a takeup movement, a warp beam and a tension mechanism for resisting the rotative movement of said warp beam, of mechanism for giving said cloth beam a quick additional takeup movement while the loom continues to operate uninterruptedly, the latter mechanism including a ratchet wheel, a plurality of pins projecting from said wheel, and connections leading to said tension mechanism and arranged to be operated by said pins to reduce the tension on said warp beam while said additional takeup movement takes place.

14. In a loom, the combination with a cloth beam, means for giving said cloth beam a takeup movement, a warp beam and a tension mechanism for resisting the rotative movement of said warp beam, said means including a train of gears, of a ratchet wheel rotating with one of the gears of said train, a pawl cooperating with said ratchet wheel to move the wheel and thereby to impart a quick additional takeup movement to said cloth beam, means for

operating said pawl, a lever having a part located adjacent to said wheel, connections between said lever and said tension mechanism for causing a movement of said lever to reduce the tension on said warp beam, and a part rotating with said ratchet wheel and arranged to engage said lever to produce said reduction in tension.

15. In a loom, the combination of a takeup mechanism including a cloth beam and means for operating it to take up the woven web, means for giving said cloth beam an additional takeup movement comprising a ratchet wheel having a series of notches therein, removable blocks closing some of said notches, a pawl cooperating with said wheel to engage the open notches and impart an intermittent rotative movement to said wheel, means for operating said pawl, a warp beam, a tension mechanism for resisting the rotative movement of said warp beam, a series of pins removably positioned in said ratchet wheel and projecting laterally therefrom, and means arranged to be operated by said pins for acting on said tension mechanism to reduce its resistance to the rotation of said warp beam.

JAMES A. ADAMS.