Oct. 9, 1934. J. F. ROURKE 1,976,095

MAGNETIC LOOM

Filed Sept. 11, 1933 2 Sheets-Sheet 1

Fig. 2.

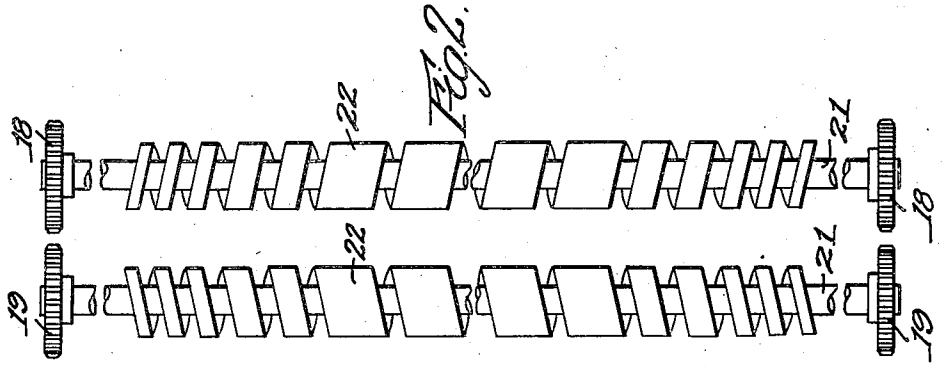
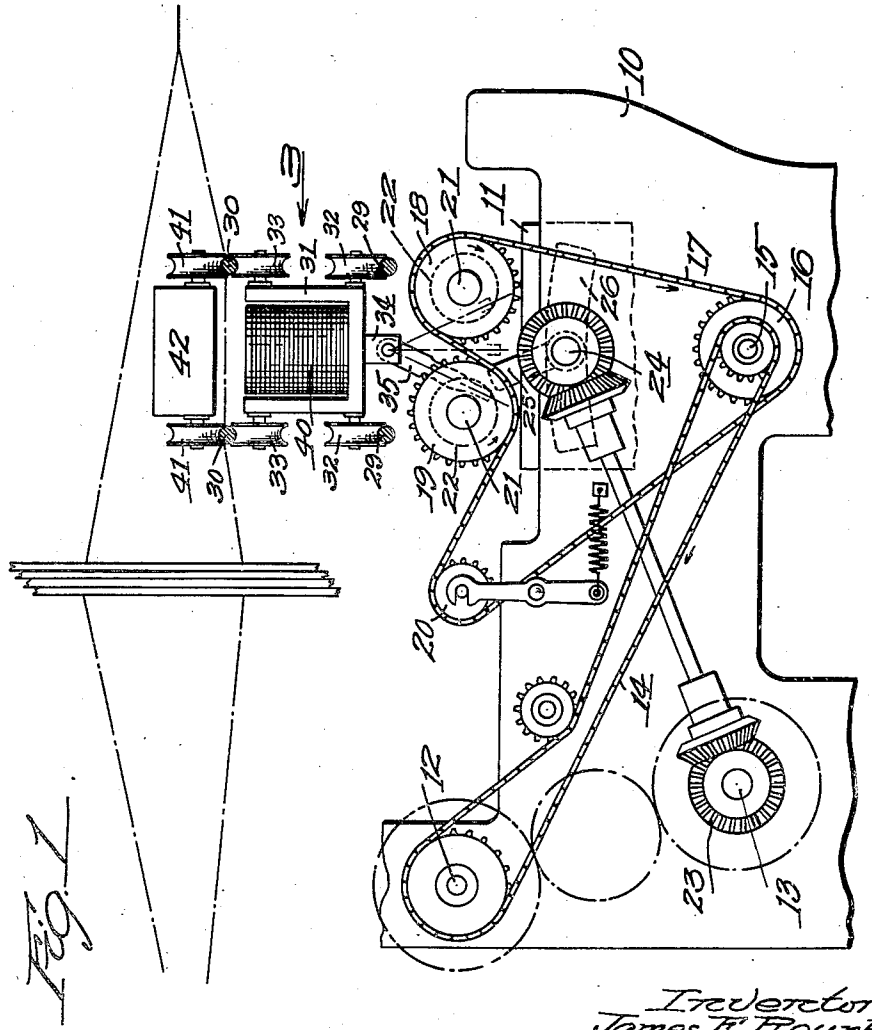


Fig. 1.



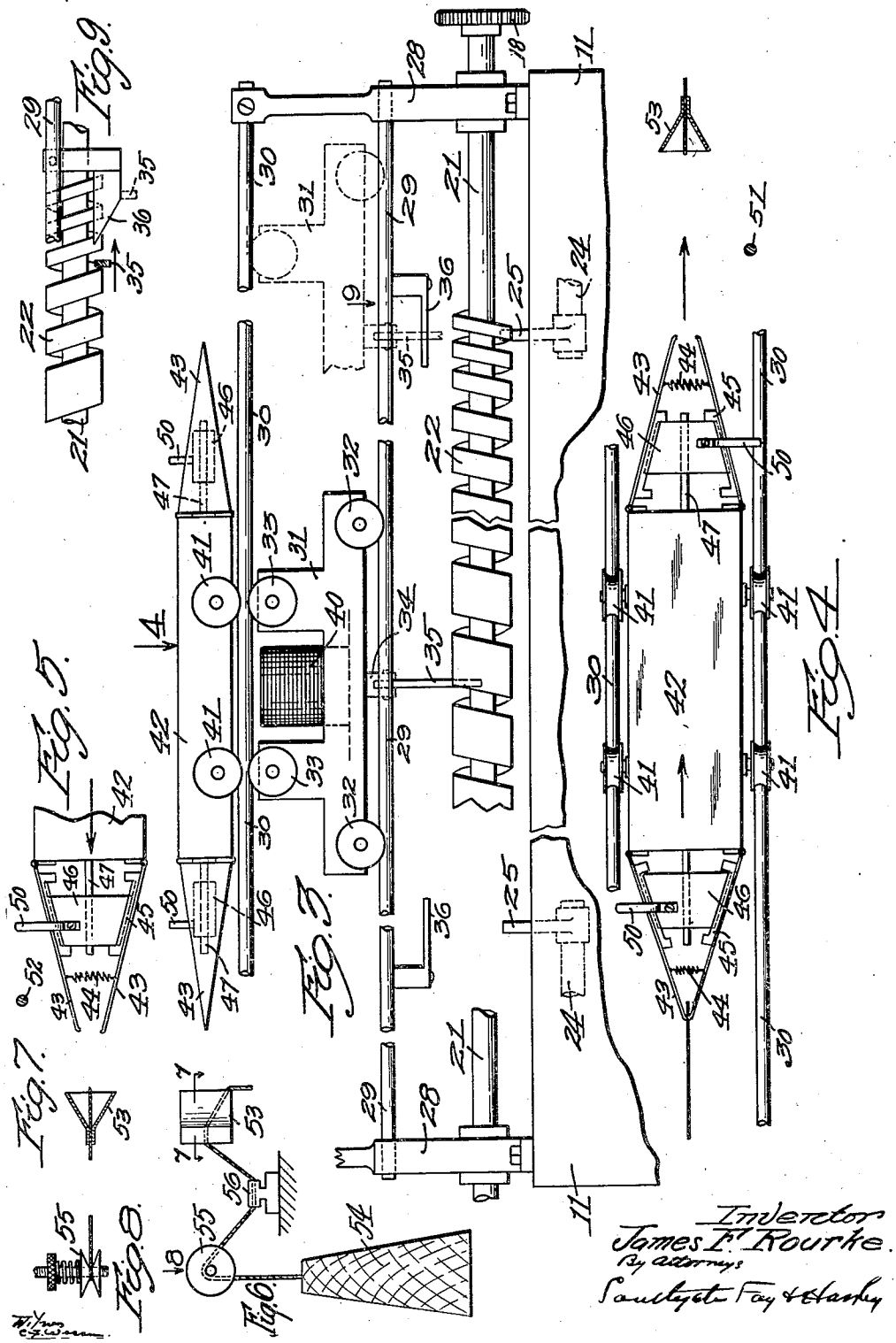
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MAGNETIC LOOM

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UNITED STATES PATENT OFFICE

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MAGNETIC LOOM

James F. Rourke, Worcester, Mass.

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12 Claims. (Cl. 139—134)

This invention relates to a loom in which the means for carrying the filling across the lay is magnetic so that the magnetic lines of force can pass through the warp without hindrance and constitute the only means for moving the filling carrying member.

The principal objects of this invention are to provide improved and simplified means for moving the carriage carrying the magnet or magnets back and forth in the loom and, more specifically, to provide a double screw, one for carrying the carriage in one direction and the other for carrying it in the other; to provide means by which the carriage is slowed up at each end of the stroke to avoid too rapid starting and stopping; to provide effective means for positively controlling the operation at each end of the stroke for disconnecting the carriage from its screw and putting it in neutral and then, after slight dwell, connecting it again with the other screw for the return stroke; to provide the last-named means in the form of a rotating member connected with the loom motion so as to be positively timed with respect thereto; to provide an improved leader for carrying the filling having jaws which are automatically opened and closed at the proper time, and to provide simple and effective means for holding the filling in such position as to be sure to be taken up by the leader.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a view of the end of a loom frame with parts in section, showing a preferred embodiment of this invention;

Fig. 2 is a plan of a pair of screws used for operating the means for introducing the filling;

Fig. 3 is a view taken in the direction of the arrow 3 in Fig. 1 and constituting a front elevation of the features of this invention;

Fig. 4 is a plan as indicated by the arrow 4 of Fig. 3 of the leader which takes the place of the shuttle in an ordinary loom;

Fig. 5 is a similar view of the end of this leader showing it at the end of the stroke with the jaws open to receive the filling;

Fig. 6 is an elevation showing the way in which the filling is taken from a large spool or bobbin and illustrating it in the position where it is at rest and before the filling is gripped by the leader;

Fig. 7 is a sectional view on the line 7—7 of Fig. 6;

Fig. 8 is a fragmentary plan as indicated by the arrow 8 in Fig. 6, and

Fig. 9 is a plan of a device for throwing the operating mechanism into neutral at the end of the stroke.

This invention can be applied to ordinary looms and is applicable to box looms very readily although that application is not shown herein.

The loom is shown as provided with a frame 10 and the usual lay 11 which moves back and forth for the ordinary purposes and is operated by any usual mechanism. It is without a picker stick and instead of a shuttle, a leader is employed. The operating mechanism for the lay is not shown but a lay shaft 12 is provided geared to a shaft 13 which is in the position ordinarily occupied by the picker motion shaft. It is also connected by a chain 14 or belt with a shaft 15 having a pulley or sprocket 16 thereon. On this pulley or sprocket is a belt or chain 17 which runs over a sprocket 18 and under a second sprocket 19 to drive them in opposite directions. A tension sprocket 20 is shown as employed for the obvious purpose. These two sprockets 18 and 19 are located on shafts 21 which carry screws 22. These screws are rotated in opposite directions and the screws are made right and left-hand respectively. These screws are arranged throughout the center of the same pitch throughout the main part thereof but at each end the pitch is quickened so as to provide a gradual reduction in the motion as will appear.

On the shaft 13 is a gear 23 which, through suitable gearing, rotates a shaft 24 constantly. On this shaft 24 is an arm 25 which rotates with the shaft for a purpose to be described later. The frame is provided with an arcuate slot 26 or other space through which the shaft 24 passes. These parts are all duplicated on the other end of the loom.

The lay motion is not shown, as any ordinary mechanism can be used for this purpose and that does not constitute a part of this invention. The shafts 21 are carried by and movable with the lay at all times.

Also mounted on the lay is a frame 28 on which the shafts 21 are directly mounted and which is provided with a pair of rails 29 and a pair of rails 30 above them. These rails or tracks are shown in the form of round rods but can be made in any form. On the rails 29 runs a carriage 31. This carriage 31 is provided with flanged rollers 32 on both sides to reduce the friction. It is also provided with upper rollers 33 engaging the lower side of the upper rail 30 so as to provide a rigid support for this carriage without much friction.

The carriage is operated by the screws and for

that purpose the carriage is provided with a projection 34 at the center and at the bottom in which is pivoted an operating arm 35. It will be obvious that when this operating arm is set into the screw thread of one of the screws 22, which, as stated, is rotated constantly, it will be started up slowly and quickly accelerated to the desired speed and then moved the length of the loom and finally slowed down, when it can be disengaged from the threads into neutral position. This carries the carriage across. Then the arm 35 can be swung into the other screw after a dwell and the carriage will be carried back again and released.

The means for taking the arm 35 from the neutral position indicated in Fig. 1 to the position shown in full lines in that figure is the rotating arm 25. It will be remembered that this arm is geared with respect to the screws and therefore the gearing can be designed so that this arm will come around at the proper time to engage the arm 35, as shown in Fig. 1, and force it into the screw threads of one of the screws. It may be stated at this point that the arm 25 on the other end is geared up to rotate in the opposite direction so, when it operates, it swings the arm 35 into the other screw at the other end of the stroke.

When the arm and carriage have moved to the opposite end of the stroke, the arm 35 encounters a stationary cam 36 and is pushed by that cam from the full line position in Fig. 9, where it is in engagement with the screw, to the dotted line position which is in the neutral position, shown at the center of Fig. 1. This disengages the arm 35 from the screw. The cam 36 at one end is mounted on one of the rods 39 and the cam 36 at the other end is mounted on the other rod 29 to have the corresponding effect at the opposite end of the stroke. This, of course, leaves the arm 35 hanging down straight in position to be operated by the arm 25 as stated.

On the carriage 31 one or more electromagnets 40 are rigidly supported. This may be a permanent or a coil magnet and the latter is supplied with electric energy in any desired way. On the top of the two rods 30 are mounted four wheels 41 which support a leader 42, formed of steel preferably, or iron, and designed to take the place of a shuttle. The magnetic lines of force pass through the yarn without any reduction in their energy and in exactly the same way as if the yarn were not there. When the carriage moves along the tracks the leader moves with it.

This leader is provided at each end with a pair of pivoted jaws 43. They are normally yieldingly held together by a spring 44. They are provided with converging tracks 45 between which is mounted a sliding wedge 46 guides on a central rod 47 which supports and pierces it and which is supported by the main body of the leader. This leader being of steel or iron is attracted by the magnet and when the carriage moves in either direction it will have to move with it but not positively. When moved to either end of the loom the projecting end of an arm 50 engages a stop 52 which forces the wedge back into the position shown in Fig. 4 to allow the jaws to close. This occurs at a time when the jaws, of course, are substantially at the end of their stroke and just before the cam 36 has moved the arm 35 into the dotted line or neutral position shown in Fig. 9. These jaws come into a V-shaped guide 53 fixedly mounted on the lay.

The filling is wound on a large spool 54, one being located at each end of the loom, and in the case of a box loom, several of them being located at each end. The filling passes over an ordinary spring-pressed tension wheel 55 and under a guide 56 through a passage in the end of the guide 53 and is normally left with its end cut off and hanging down as shown in Fig. 6.

When the jaws 43 come into the guide 53 they are open. These jaws grip the filling thread and as they are now starting back, they carry the filling thread across the loom. At each end of the loom is provided a thread cutting device which is not shown herein, but is well understood in this art, and can be operated automatically at the proper time to cut off the thread and therefore leave it in the cloth.

Before the thread is cut off, the arm 50 engages another stop 51 and opens the jaws to release the thread. They stay open on the back stroke. At the same time the other arm 25 comes around and throws the arm 35 from the neutral position into the other screw where the process is repeated.

Although I have illustrated and described only one form of the invention, I am aware of the fact that modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to the details of construction herein shown and described, but what I claim is:

1. In a loom, the combination with a movable lay, of a pair of screws mounted thereon, means for turning said screws constantly, a carriage movable from one end of the lay to the other, and a member movably mounted on the carriage and adapted to engage either of said screws for moving the carriage along the lay.

2. In a loom, the combination with a movable lay, of a pair of right and left-hand screws carried thereby, means for rotating the screws in opposite directions, a carriage movable along the lay from one end to the other, and means connected with said carriage and projecting between the screws for engaging either screw to move the carriage in either direction.

3. In a loom, the combination with a movable lay, of a pair of screws mounted thereon, means for turning said screws constantly, a carriage movable from one end of the lay to the other, a filling leading means movable with and by the carriage, a member movably mounted on the carriage and adapted to engage either of said screws for moving the carriage along the lay, and means on the lay for throwing said member out of engagement with its screw into neutral position when the carriage reaches the end of its stroke.

4. In a loom, the combination with a movable lay, of a pair of screws mounted thereon, means for turning said screws constantly, a carriage movable from one end of the lay to the other, an arm movably mounted on the carriage and adapted to engage either of said screws for moving the carriage along the lay, and means mounted independently of the lay for engaging said arm and moving it into one of the screw threads when the carriage reaches the end of its stroke.

5. In a loom, the combination of a movable lay, of a pair of screws mounted thereon, means for turning said screws constantly, a carriage movable from one end of the lay to the other, an arm movably mounted on the carriage and adapted to engage either of said screws for moving the carriage along the lay, means for moving said arm

out of the threads of the screw which it engages and into neutral position, and means for moving the arm into the thread of the other screw when the carriage reaches the end of the stroke.

6. In a loom, the combination with a movable lay, of a pair of screws mounted thereon, means for turning said screws constantly, a carriage movable from one end of the lay to the other, an arm movably mounted on the carriage and adapted to engage either of said screws for moving the carriage along the lay, a shaft mounted on the frame of the loom, means for constantly rotating said shaft and an arm on said shaft in position to engage the arm on the carriage and swing it from neutral position into the threads of one of the screws when the carriage reaches the end of its stroke.

7. In a loom, the combination with a movable lay, of a pair of screws mounted thereon, means for turning said screws constantly, a carriage movable from one end of the lay to the other, an arm movably mounted on the carriage and adapted to engage either of said screws for moving the carriage along the lay, the threads of said screws being gradually spaced nearer together toward the end of the screw to provide for a gradual start and a gradual stop of the carriage.

8. The combination with a frame and a lay, of a pair of tracks carried by the lay, a carriage supported by said tracks, a magnet on the carriage, a second pair of tracks on the lay, a leader on the second pair of tracks adapted to be moved by the carriage through the lines of force from said magnet, said leader being adapted to move the filling across the lay, a pair of right and left-hand screws, means for rotating said screws in opposite directions, and an arm connected with the carriage and projecting into a position between the screws—whereby when the arm is in engagement with the threads of one screw, the carriage and leader will be moved across the lay in one direction and when in engagement with the other screw will be moved across the lay in the other direction.

9. In a loom, the combination with a movable lay, of two pairs of tracks extending along the lay from one end to the other, a carriage having wheels thereon for supporting it from the lower track, a filling leader having means at each end for gripping the filling and carrying it across the shed and movable on the upper track, said leader having a magnetizable body, and a magnet carried by the carriage for attracting the leader through the warp and thereby causing the leader to travel with the carriage.

10. In a loom, the combination with a movable lay, of two pairs of tracks, one above the other, extending along the lay from one end to the other, a carriage having wheels thereon for supporting it from the lower track and having wheels near the top thereof for engaging the upper track to steady the carriage, a filling leader having means at each end for gripping the filling and carrying it across the shed and movable on the upper track, said leader having a magnetizable body, and a magnet carried by the carriage for attracting the leader through the warp and thereby causing the leader to travel with the carriage.

11. In a loom, the combination with a movable lay, of two pairs of tracks extending along the lay, a carriage supported on the lower track, a leader having means at each end for gripping the filling, and carrying it across the shed and movable on the upper track, and a magnet carried by the carriage for attracting the leader through the warp and thereby causing the leader to travel with the carriage, the lower half of the warp forming the shed passing over the upper tracks so that the wheels of the leader will move over that part of the shed in the process of weaving.

12. In a loom, the combination with the lay and a pair of tracks located thereon, of a leader running on said tracks, means below the leader for magnetically attracting it and moving it across the loom, said leader having at each end a movable pair of jaws for gripping the filling at each end of the stroke so as to carry it across, and means for releasing the jaws from the filling when it has been moved across.

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