

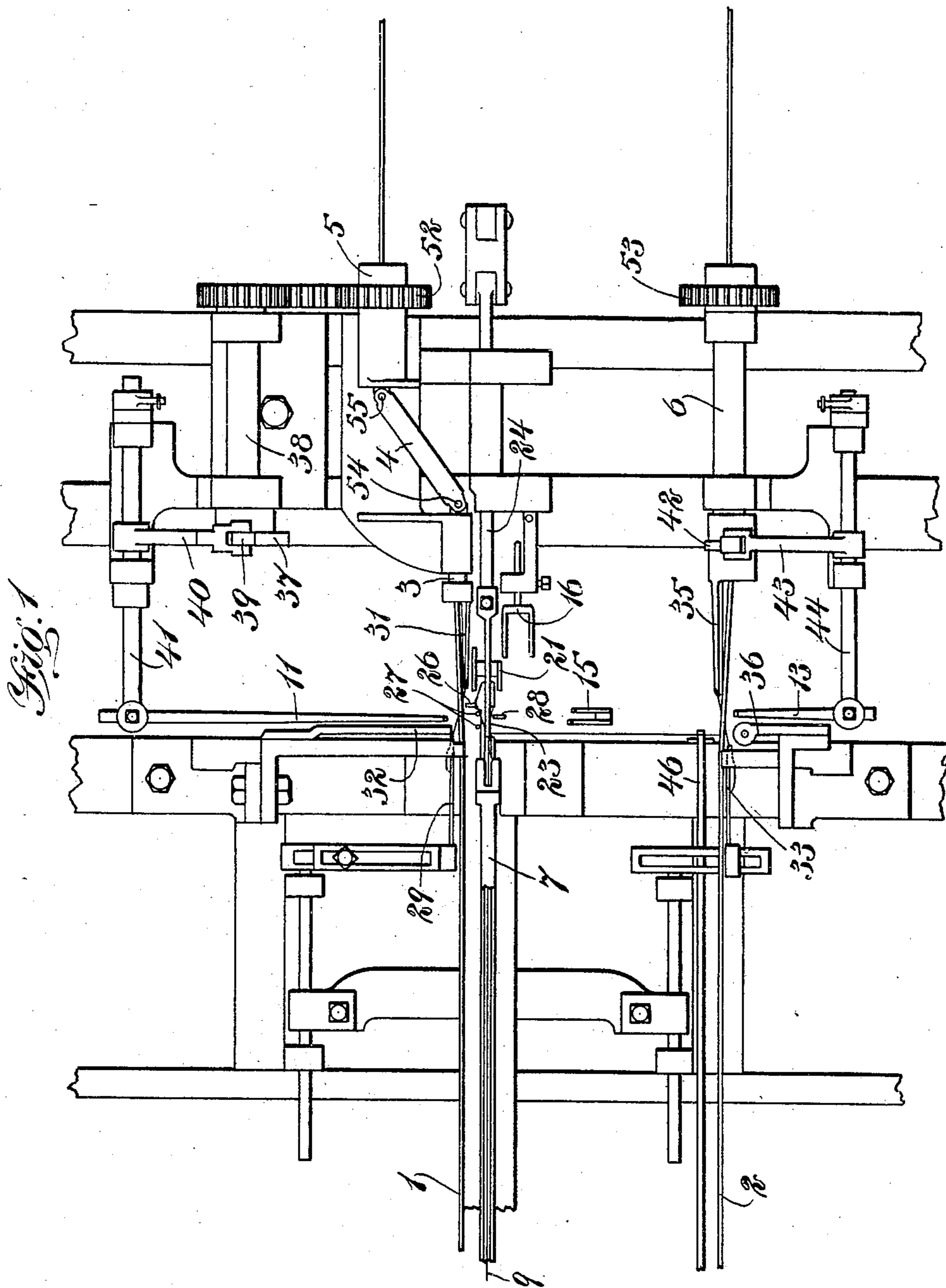
No. 862,689.

PATENTED AUG. 6, 1907.

W. E. WINGATE.  
MACHINE FOR MAKING FALSE REEDS.

APPLICATION FILED JAN. 9, 1906.

5 SHEETS—SHEET 1.



Witnesses:  
Fred D. Sweet.  
L. E. Kennedy.

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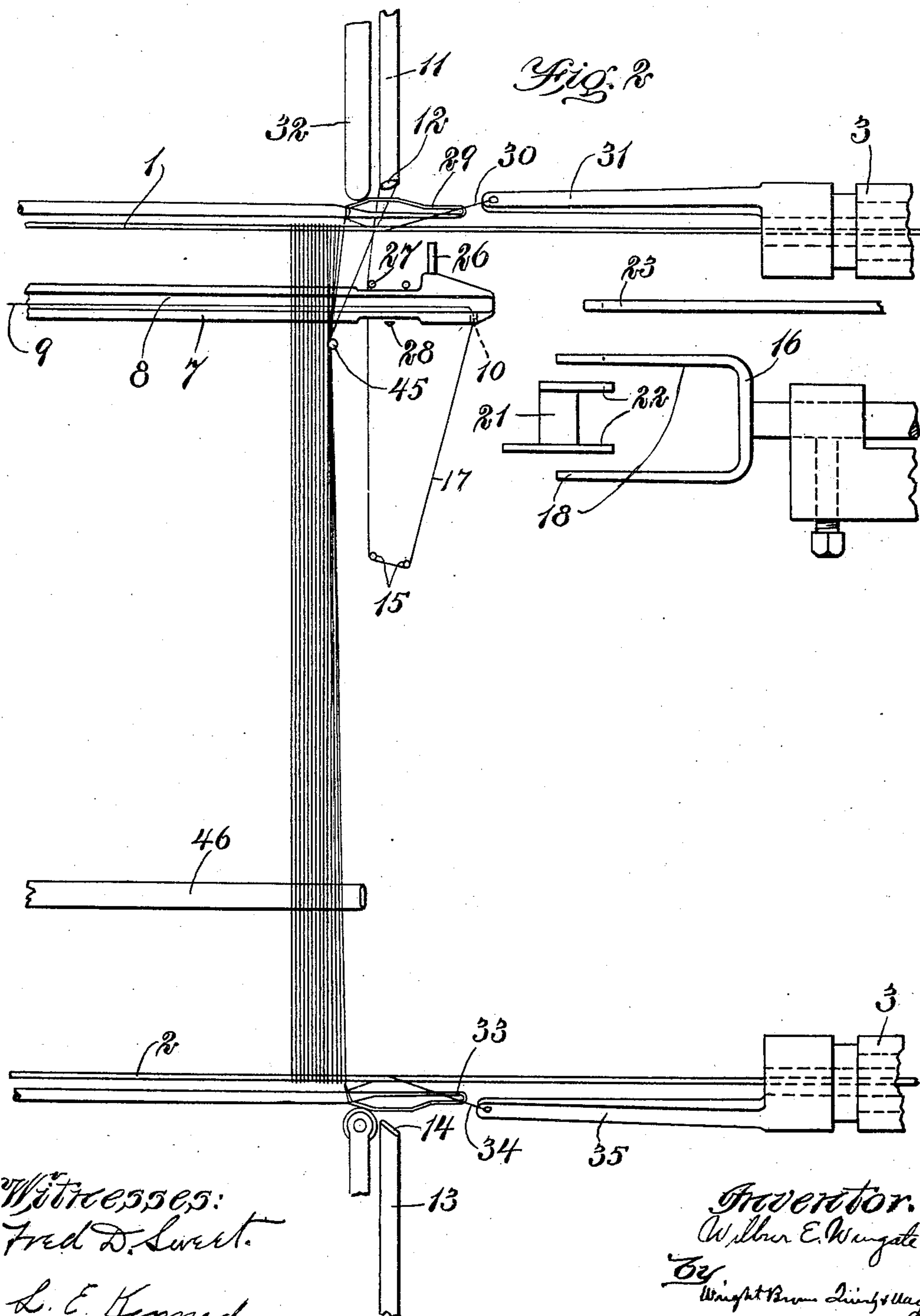
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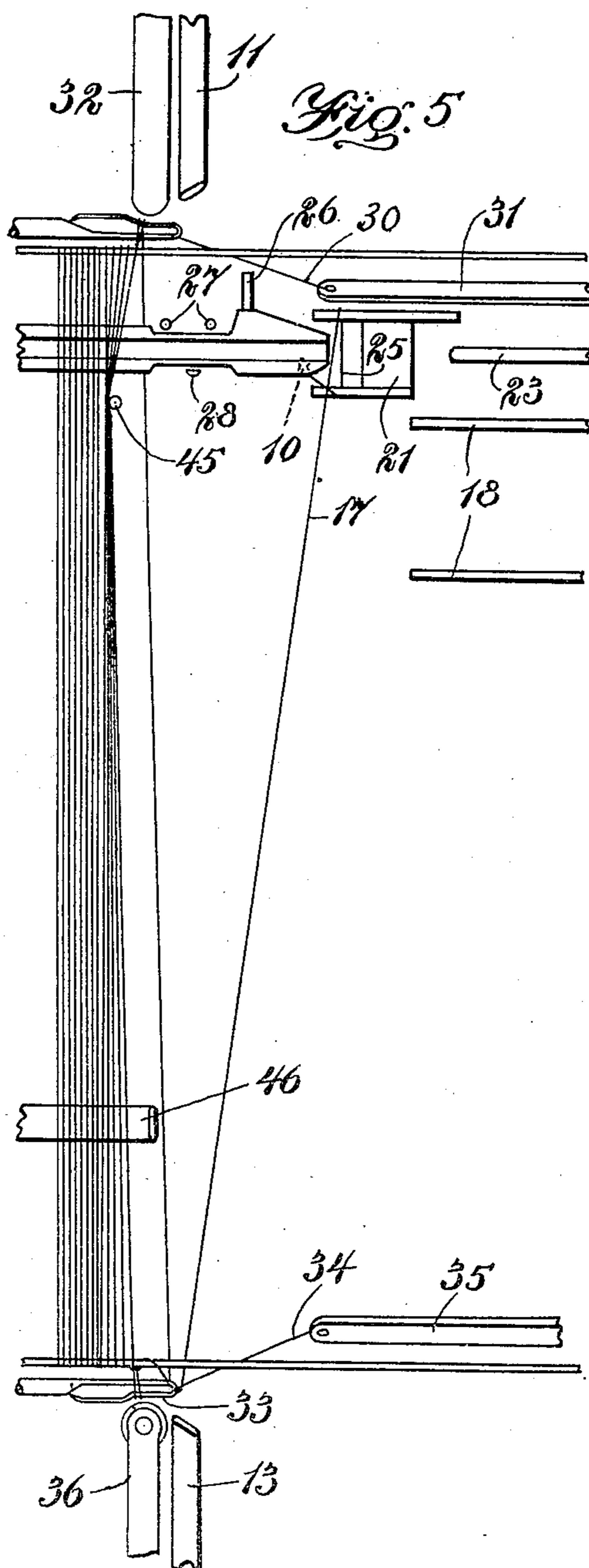
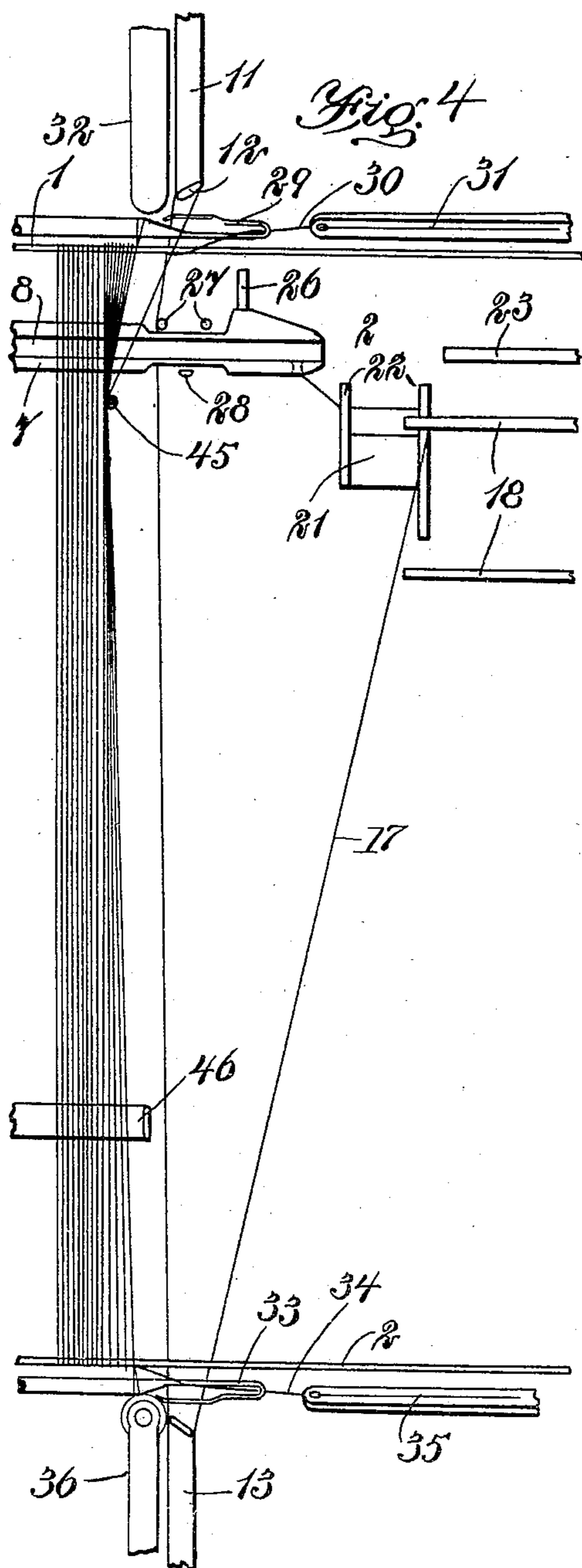
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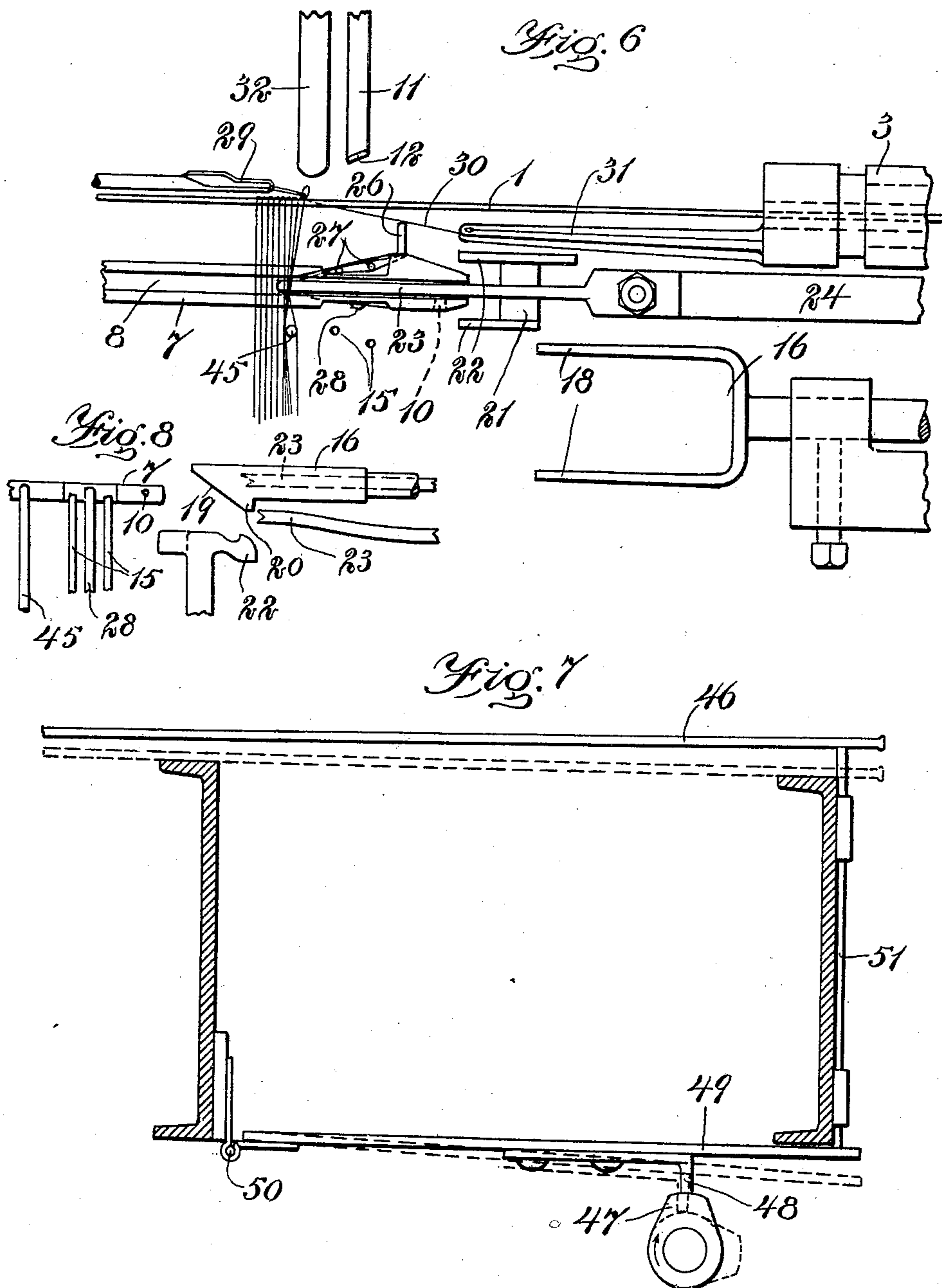
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5 SHEETS—SHEET 5.



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# UNITED STATES PATENT OFFICE.

WILBUR E. WINGATE, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO EMMONS LOOM HARNESS COMPANY, OF LAWRENCE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

## MACHINE FOR MAKING FALSE REEDS.

No. 862,689.

Specification of Letters Patent.

Patented Aug. 6, 1907.

Application filed January 9, 1906. Serial No. 295,245.

*To all whom it may concern:*

Be it known that I, WILBUR E. WINGATE, of Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making False Reeds, of which the following is a specification.

The object of the present invention is to provide a machine capable of making a false reed by passing double lengths of thread back and forth between two cords forming the sides of the reed, and tying or knitting the loops of the lateral threads to the cords. In a co-pending application Serial No. 271,434, filed July 27, 1905, I have described a machine of this character which knits loops of thread about one of the side cords by the use of a locking thread, and forms a knotted loop in the thread which is passed around an eye needle, being afterwards removed from the eye needle and drawn tight about the cord forming the other side of the reed.

In the present invention I provide two sets of instrumentalities for feeding locking threads and for knitting the threads of the reed to the side cords, and dispense with the necessity of forming knotted loops about an eye needle and afterwards slipping such loops off the eye needle upon the cord.

The features embraced in the present invention consist of the construction of machine permitting knitting instrumentalities to be located and operated adjacent each of the cords, in the means which permits and causes loops of thread to be drawn from the supply toward each of the braiding instrumentalities, in the offset cord, and locking-thread guide, and in the novel mechanism for operating a lease-rod or thread separator.

Of the accompanying drawings,—Figure 1 represents in plan view a portion of a machine embodying the principles of the present invention. Figs. 2, 3, 4, 5 and 6 represent fragmentary plan views of the machine, showing a partially completed false reed and the instrumentalities for knitting the transverse threads to the cords, the several views showing such instrumentalities in successive stages. Fig. 7 represents a longitudinal sectional view of a portion of the machine, showing a lease-rod and mechanism for oscillating it. Fig. 8 represents an elevation of certain of the instrumentalities for drawing off and forming loops or bights of thread.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, 1 2 represent the cords which form the sides of a false reed and to which are secured the transverse threads of the reed. These cords are held in a straightened condition parallel to each other, being secured at the left of Fig. 1, to a carriage (not shown) by which they and the completed portions

of the false reed are fed gradually to the left as the work progresses. The cord 1 is fed through a guide consisting of the members 3 4 and 5 which are out of line with each other for a purpose hereinafter described, and the cord 2 is drawn through a single guide 6. Both of these cords are supplied from suitable sources at the right, which are not shown in the drawings.

Between the cords is a thread supply which is a needle bar or thread rod 7 having a longitudinal channel 8 through which a thread 9 is fed and in one side adjacent its end an eye 10 through which the thread may be drawn.

Adjacent the cord 1 and on the outer side thereof, that is on the side opposite the thread rod, is a member 11, which I term a spoon having a hook 12 on its end. Similarly arranged with respect to the other cord 2, is a spoon 13 having a hook 14. In starting the reed, the end of thread 9 is secured to one of the cords and a loop or bight of thread is drawn from the rod 7 by a fork 15 which has two or more prongs. This fork travels back and forth toward and from cord 2 and extends sufficiently far to deposit the thread upon the hook 14 of spoon 13. While the loop is being carried toward and engaged with the hooked spoon 13, a pull-back 16 is advanced and is engaged over the length 17 of thread forming one side of the loop. The pull-back has two parallel bars 18 with inclined faces 19 and hooks 20 (Fig. 8). The inclined faces pass over the thread and the hooks engage it so that it is drawn away from the thread bar when the pull-back is retracted.

When the length 17 of thread has been carried beyond the end of the bar 7, (Fig. 3) a jack or loop-maker 21 rises between the arms of the pull-back and engages the thread. This jack has laterally extending hooked arms 22 which pass over the portion of thread held between the arms 18 of the pull-back. The jack has an up-and-down motion and a semi-rotary motion. As it descends, it removes the thread from the pull-back and it is then turned in left-hand rotation so as to reverse the direction in which its projections 22 extend, and also to carry the jack into line with and adjacent to the end of the thread bar 7 Figs. 4 and 5. This movement of the jack forms a complete turn or loop in the thread, which loop is held by the jack directly opposite the end of the thread bar, as seen in Figs. 5. While the turn of thread is so held, a pair of plungers 23 carried by a reciprocating slide 24 are advanced toward the thread bar. One of these plungers is above and the other is below the bar, and as they are advanced from the position of Fig. 5, to that in Fig. 6, they engage the lengths 17 and 25 of thread, slipping the turn over the thread bar so that the thread is then wound about the bar, extending from the eye 10 first beneath and then above the bar. On the side of the bar opposite the eye is a projecting pin or finger 26. This finger

engages a portion of the thread and arrests it so that as the plungers advance they draw out lengths of thread which extend, one above the other between the pin 26 and ends of the plungers 23 and take a direction approximating that of the thread rod. Close to the thread rod lie the prongs of a fork 27, and the stretch of thread engaged by the lower plunger passes over the upper ends of the prongs. At the conclusion of the plunger movement, fork 27 is moved upward to take the stretch of thread, then toward the spoon 11, and is lowered, depositing the loop which passes around the prongs of the fork upon the hook 12. Meanwhile the loop carried by fork 15 to spoon 13 has been knit about cord 2 and secured thereto and the forks 15 have been retracted to the thread bar to form and carry the second loop to the spoon. This brings the parts back to the position shown in Fig. 2, and the cycle is repeated. The loop which is engaged by spoon 11 is knitted to the cord 1, while a loop is engaged with spoon 13.

When the plungers 23 are in the position shown in Fig. 6, the thread extends from eye 10 around the thread rod 7 and across the end of the lower plunger and lies close beside the thread rod, and while in this position an opener 28 rises close to the thread bar and between the latter and thread. The opener is then removed away from the thread bar, opening out a bight of thread which can then be entered by the fork 15 and still further opened. Meanwhile the plungers withdraw to their normal retracted position, shown in Fig. 2.

The knitting instrumentalities by which the transverse threads are secured to the cords are substantially duplicates of each other and are similar to the corresponding instrumentalities described in the application above referred to. Adjacent the cord 1 is a knitting needle 29 constructed as a hook which reciprocates parallel to the cord, and around the cord is wound a locking or knitting thread 30 which is passed around by means of a finger 31 connected to the end of the guide member 3 and caused to rotate therewith. While the loop of thread is engaged with spoon 11 and needle 29 is in its forward position, as shown in Fig. 3, the finger 31 carries the locking thread 30 around the cord and the needle shank into such position that it will enter the hook when the needle is retracted. The loop is also so held that the hook will enter the same, passing between the upper and lower sides thereof, and then, in retracting, will pass outside one of the sides of the loop. During the retraction of the needle a stop 32 is engaged by a projecting cam portion of the hook, which causes the point of the hook to be pressed close to the shank and thus to pass beneath the portion of the previously-formed loop and a turn of the locking thread which are passed around the needle shank. Thus the hook which carries the loop to be formed and a turn of the locking thread carries these loops through the corresponding loops previously formed. The latter are released from the needle and tightened about the cord, thereby tying the newly-formed loops. These are still in engagement with and surrounding the needle shank when the latter once more advances. They are released when new loops formed in the same manner are drawn through them and thus loops are successively formed and carried through previous loops, whereby the doubled lengths of the thread 9 are securely fastened to the cord. A similar needle 33, locking thread

34, guide finger 35 and stop 36 are provided adjacent the cord 2 which secure the threads of the reed to said cord in substantially the same manner.

The hooked end of spoon 11 is raised and lowered first to pick the loop from fork 27 and then to release the loop after the needle has passed through it by means of a cam 37 on a rotating shaft 38. The cam engages a trundle roll 39 on an arm 40 carried by a rock-shaft 41 to which the spoon 11 is connected. Thus the spoon is oscillated in a vertical plane and its hooked end is raised and lowered. A similar cam 42 carried upon the rotating thread guide 6 oscillates an arm 43 on rock-shaft 44 which carries and oscillates spoon 13.

Adjacent the thread bar 7 is provided a pin or finger 45 which presses back the lengths of transverse thread already secured to the cords and holds them separated from the length being secured. This finger also prevents the length of thread which is engaged with the upper plunger 23 from being tangled among the threads of the reed. After a loop has been deposited on spoon 11, finger 45 is lowered to allow the thread at the right of it (Fig. 6) to be released. It is then moved to the right and raised so as to be at the right of the last loop of thread, and is then moved to the left. It will be seen that this finger has an up-and-down and back-and-forth lateral movement, whereby the threads are successively gathered in with those locked to the reed.

From the foregoing description of the manner in which a turn of thread is taken about the thread bar 7, it will be seen that the threads forming the two sides or stretches of every loop are on opposite sides of the bar 7. Thus this bar separates the cross threads of the reed into an upper and lower parallel series and keeps the reed open. When it is desired to have the threads crossed between the side cords, there is provided a lease-rod 46 which is oscillated in a vertical plane to elevate the stretch of thread extending above the thread-bar and raise it above that stretch which extends beneath the thread bar. The lease-rod is operated in this manner by means of a cam 47 which bears against a projection 48 on a bar 49 pivoted at 50 to one of the transverse frames of the machine. Mounted in guides in another transverse frame or girder of the machine is an endwise movable rod 51 which is engaged at one end with the bar 49 and at the other with the lease-rod. Thereby motion is communicated to the lease-rod and the latter is oscillated up and down.

The guides through which the cords 1 and 2 pass serve also as guides for the locking threads 30 and 34 and are rotated to carry said locking threads about the cords. The guide 3 is rotated from a suitable source of power by means of a gear wheel 52 and the guide 6 by a gear 53. In order to provide room for the operating mechanism of plungers 23, it is necessary to offset a portion of the guide and therefore the guide is made in three parts as hereinbefore described, the parts 3 and 5 being parallel but out of alinement and connected together by an inclined portion 4. The ends of the latter portion are connected respectively to the parts 3 and 5 by universal joints 54 and 55 so that rotation of all is possible. The members 3 4 5 and parts of the joints 54 and 55 have passages to receive the cord 1 and thread 30 and as they rotate wind thread 30 about the cord.

The mechanisms which operate the fork 15, the loop

maker 21, the plungers 23, the fork 27 and the finger 45, are similar to those ordinarily used in machines for making loom harness and therefore are not particularly illustrated or described in the present application.

5 I claim:—

1. A machine of the character described comprising means for holding the parallel cords forming the sides of a false reed, a thread bar between the cords for supplying a single thread, means for forming loops or bights from the same thread on opposite sides of the bar and for carrying such loops to points adjacent the respective cords, and instrumentalities for securing the loops to the cords.

2. A machine of the character described comprising means for holding the parallel cords forming the sides of a false reed, a thread bar between the cords for supplying a single thread, a hooked member adjacent each cord, means for forming loops or bights from the same thread upon opposite sides of said bar and engaging them with the respective hooked members, and instrumentalities for securing the loops to the cords.

3. A machine of the character described comprising means for holding the parallel cords forming the sides of a false reed, a thread bar between the cords for supplying a single thread, a hooked member adjacent each cord, means for forming loops or bights from the same thread upon opposite sides of said bar and engaging them with the respective hooked members, and instrumentalities for securing the loops to the cords including means for carrying a locking thread around each of the cords, and a knitting needle beside each cord for carrying the loops through portions of the locking thread.

4. A machine of the character described comprising means for holding the parallel cords forming the sides of a false reed, a thread bar between the cords for supplying a single thread, a hooked member adjacent each cord, means for forming loops or bights from the same thread on opposite sides of said bar and engaging them with the respective hooked members, instrumentalities for securing the loops to the cords, and means for oscillating the hooked members to free them from the loops.

5. A machine of the character described comprising means for holding the parallel cords forming the sides of a false reed, a thread bar between the cords having a longitudinal channel and a lateral eye for supplying thread, separating means for carrying a bight of thread from one side of the bar, means for passing a turn of the thread around the bar and extending a part of the turn lengthwise of the bar, separating means on the opposite side of the bar from the first separating means for carrying a loop of the same thread therefrom, means adjacent each of the cords for engaging the said loops, and knitting mechanism for securing the loops to the cords.

6. A machine of the character described comprising means for holding the parallel cords forming the sides of a false reed, a thread bar between the cords for supplying thread having a longitudinal channel and an outlet for supplying thread, means for carrying a bight or loop of the thread toward one of the cords, knitting instrumentalities for securing the loop to the cord, rotary means for engaging a length of the looped thread and making a turn therein, reciprocating means above and below the thread bar for passing the turn of thread thereover, a stop on the bar for arresting a part of the thread, and instrumentalities for drawing a bight of thread from the portion surrounding the bar toward the other cord and securing it thereto.

7. A machine of the character described comprising means for holding the parallel cords forming the sides of a false reed, a thread bar between the cords for supplying

thread having a longitudinal channel and an outlet for supplying thread, means for carrying a bight or loop of the thread toward one of the cords, knitting instrumentalities for securing the loop to the cord, rotary means for engaging a length of the looped thread and making a turn therein, reciprocating means above and below the thread bar for passing the turn of thread thereover, the bar having a lateral projection for holding a part of the thread and causing the same to be extended between said projection and reciprocating means in a direction approximating that of the bar, and instrumentalities for drawing a bight of thread from the portion surrounding the bar, toward the other cord and securing it thereto.

8. In a machine of the character described, a thread bar having a longitudinal thread guide and a lateral thread outlet, means for passing over the end of the bar a turn of the thread issuing from said outlet, and a lateral projection adjacent the end of the bar arranged to arrest a portion of the thread passed over the same.

9. In a machine of the character described, a thread bar having a longitudinal thread guide, a lateral thread outlet, and a pin or finger projecting laterally from the side of the bar approximately opposite to the thread outlet.

10. In a machine of the character specified, rotary guide members on one side of the machine out of alignment, each having guideways for a cord and for a knitting thread adapted to be wound around the cord, and an intermediate member connected to each of said guide members with provisions for universal movement with respect thereto and also having cord and thread guideways.

11. In a machine of the character specified, a rotary guide at one side of the machine having passages for a cord forming one side of a false reed and for a locking thread adapted to be wound about the cord, said guide including two members out of alignment, and a connection joining said members by universal joints.

12. A machine of the character specified, comprising instrumentalities for carrying lengths of a single thread between, and securing the same to, cords forming the sides of a false reed, and a device for holding the lengths of thread already secured to the cords back and away from the length being secured.

13. A machine of the character specified, comprising instrumentalities for carrying lengths of thread between, and securing the same to, both cords forming the sides of a false reed, and a device for holding the lengths of thread already secured to the cords back and away from the length being secured, said device being movable in a plurality of directions at right angles to each other to gather in the threads as they are secured.

14. In a machine of the character specified, a lease rod extending longitudinally of the machine between the two series of threads of a false reed, a bar out of the plane of the reed, a cam for oscillating said bar, and an intermediate member for communicating motion from the bar to the lease rod about an axis transverse to the length of the latter.

15. In a machine for making false reeds, a rod extending between the two series of threads forming the reed and mounted with provision for swinging about an axis transverse to its length, a pivoted bar below said rod, means for swinging said bar about its pivot, and a member for transmitting motion from the bar to the rod.

In testimony whereof I have affixed my signature, in presence of two witnesses.

WILBUR E. WINGATE.

Witnesses:

ARTHUR L. JENKINS,  
HARRY G. EMMONS.