Mar. 20, 1923. 1,448,980

F. J. SCHMUTZ

YARN EXAMINING MACHINE

Filed May 12, 1922 5 sheets-sheet 1

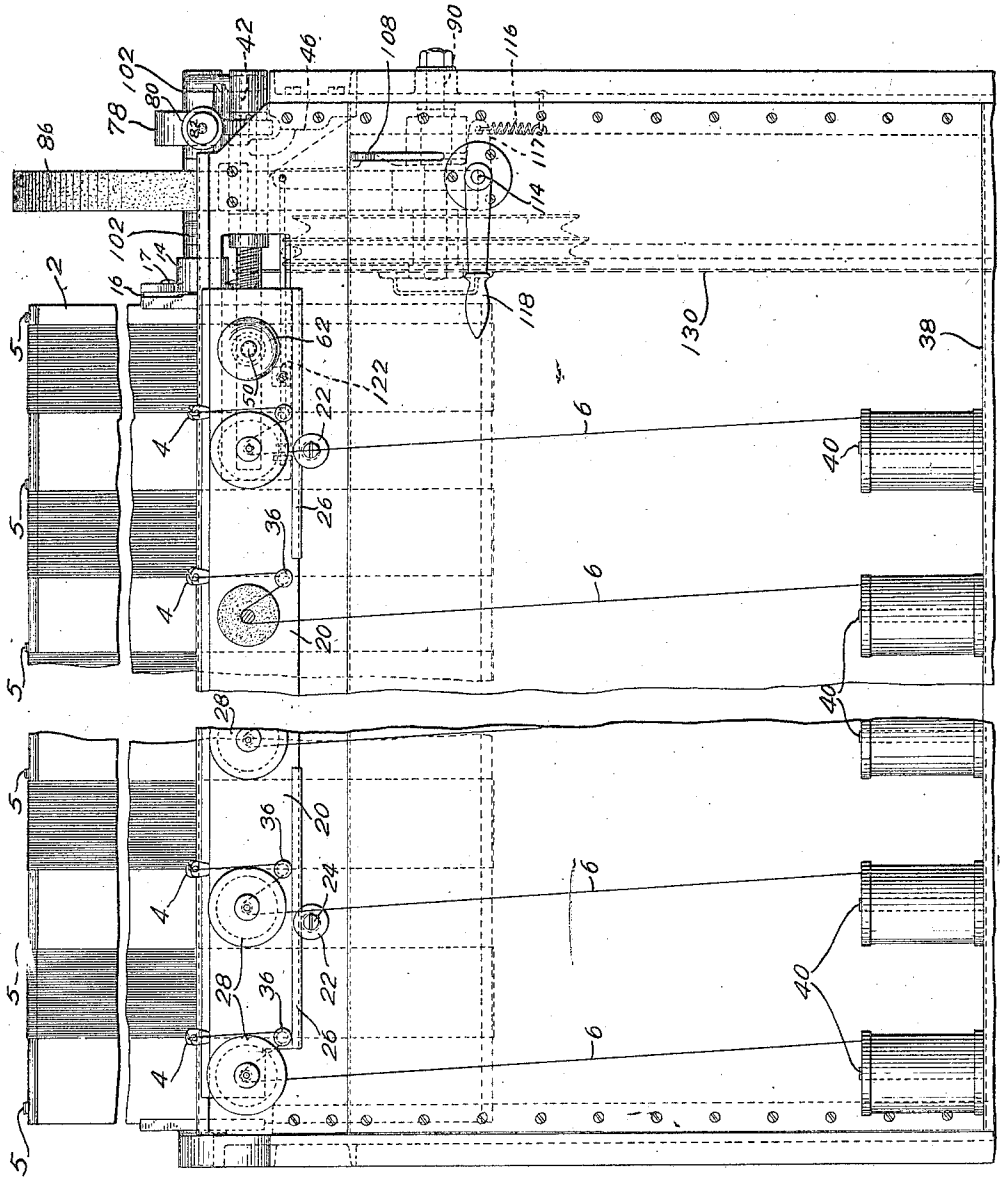


Fig. 1.

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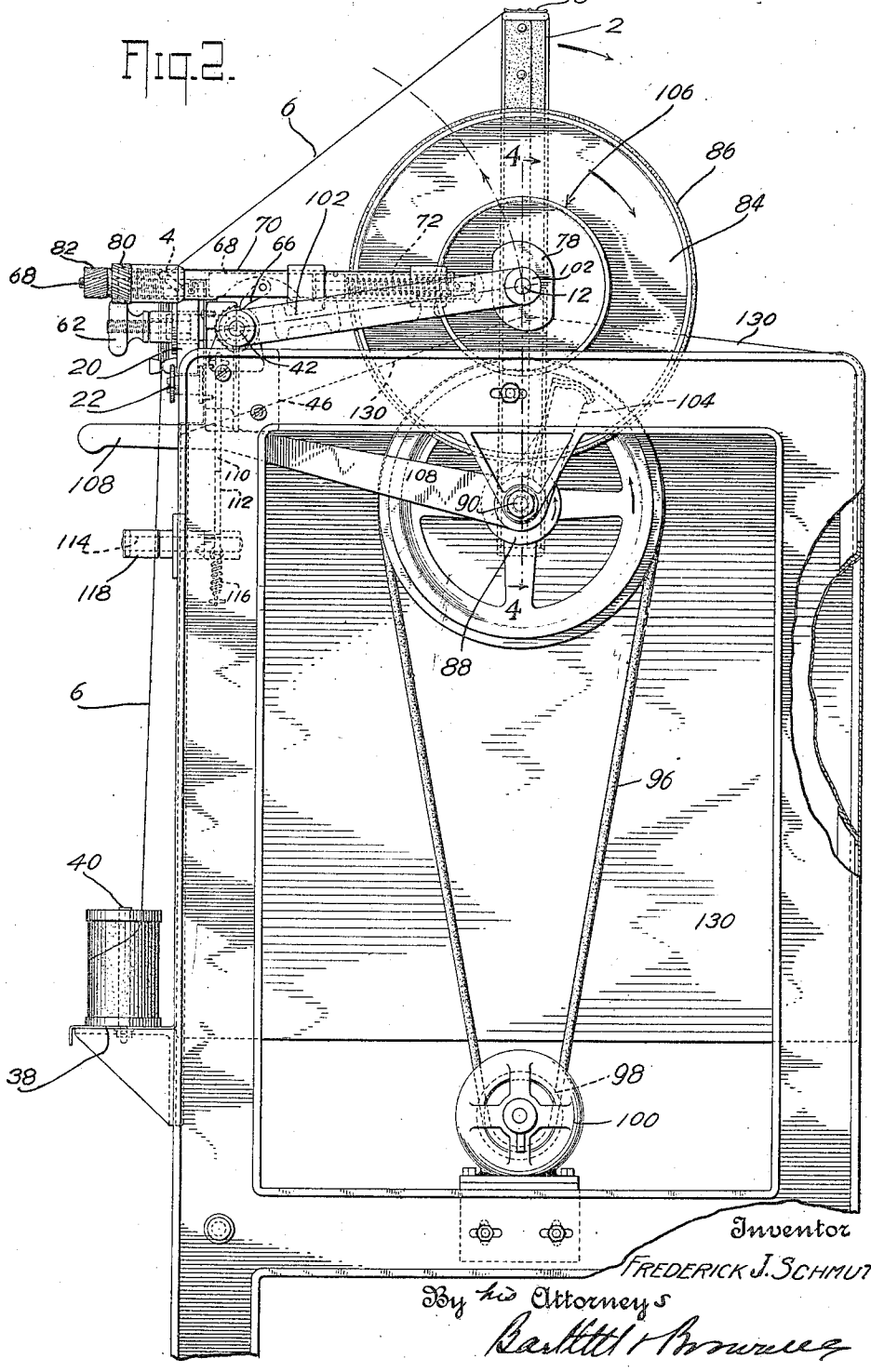
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Fig. 2.



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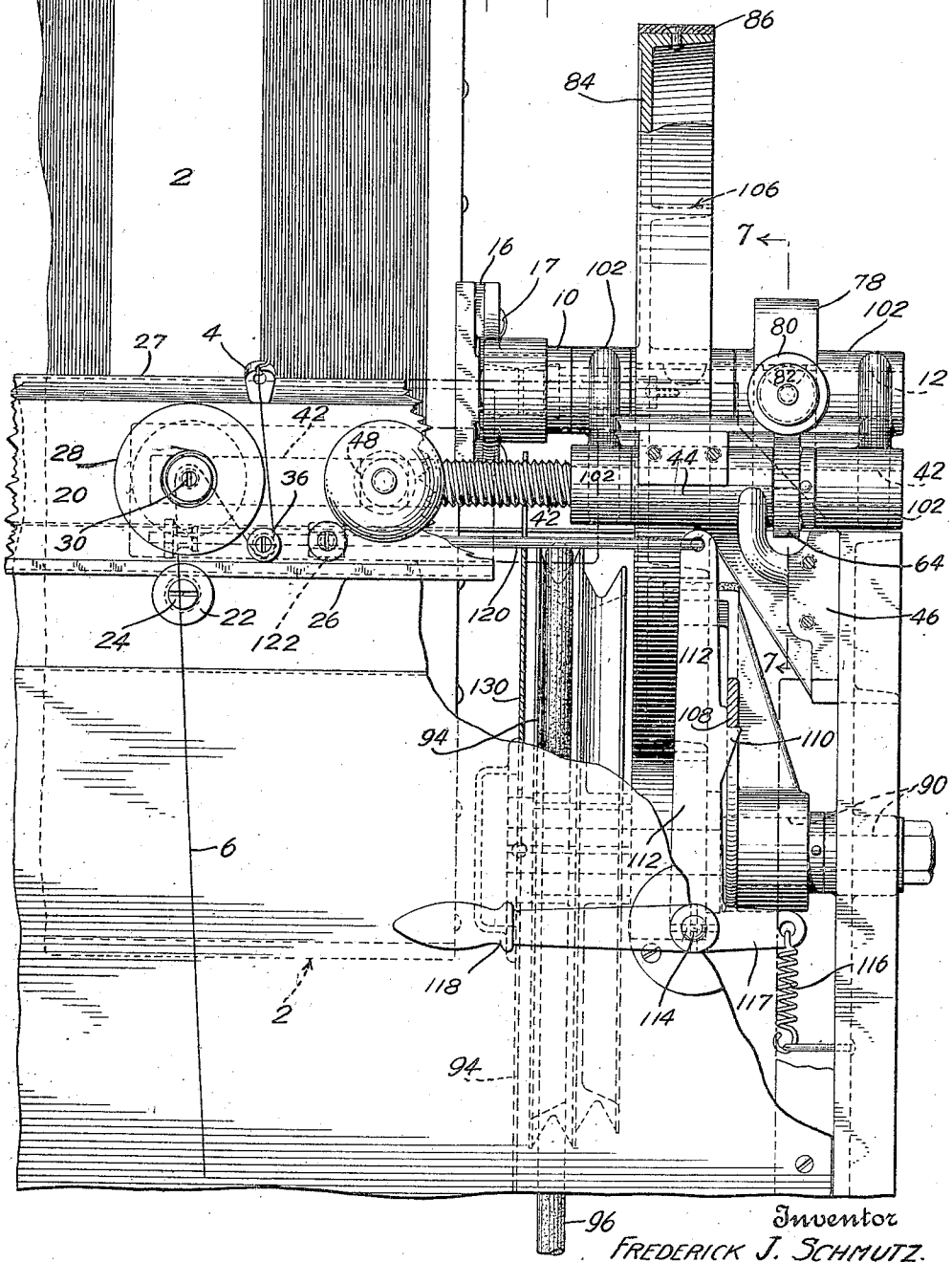
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Fig. 3.



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Fig.4.

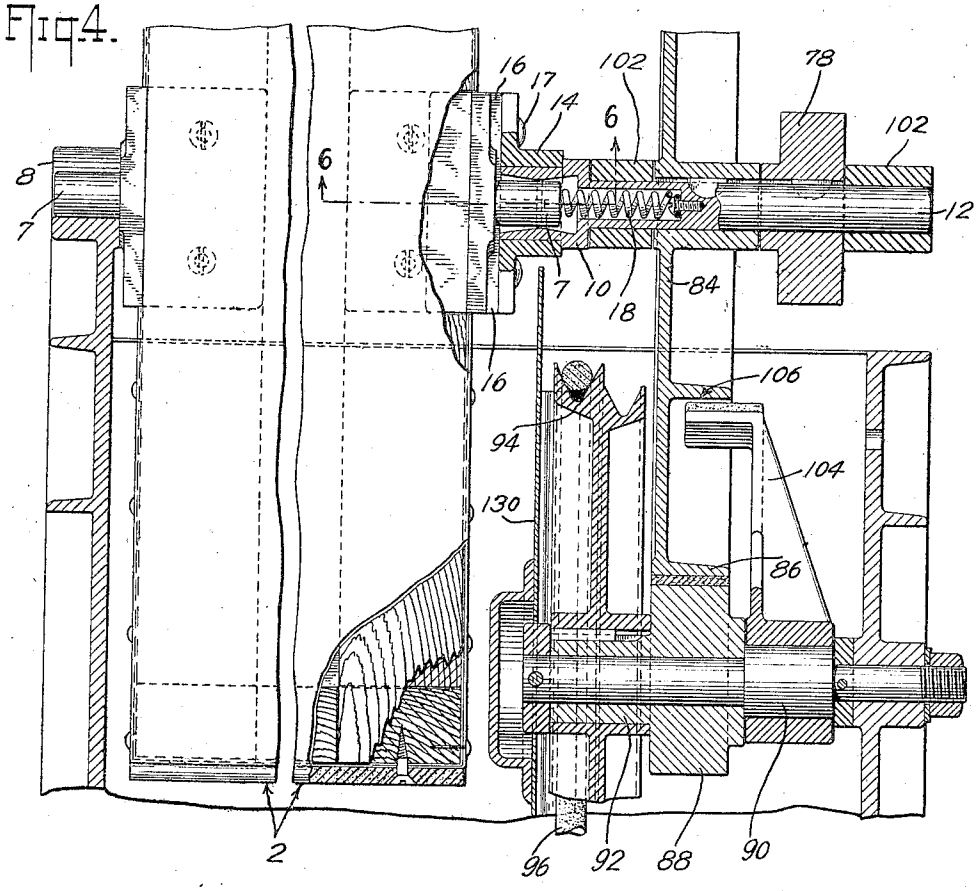


Fig.5.

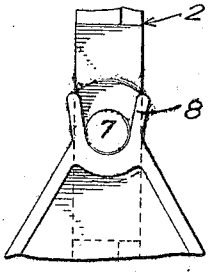
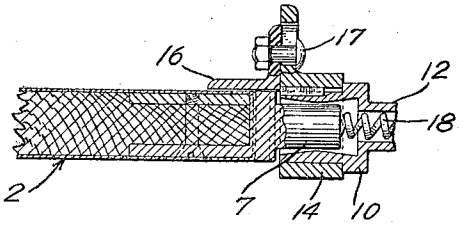


Fig.6.



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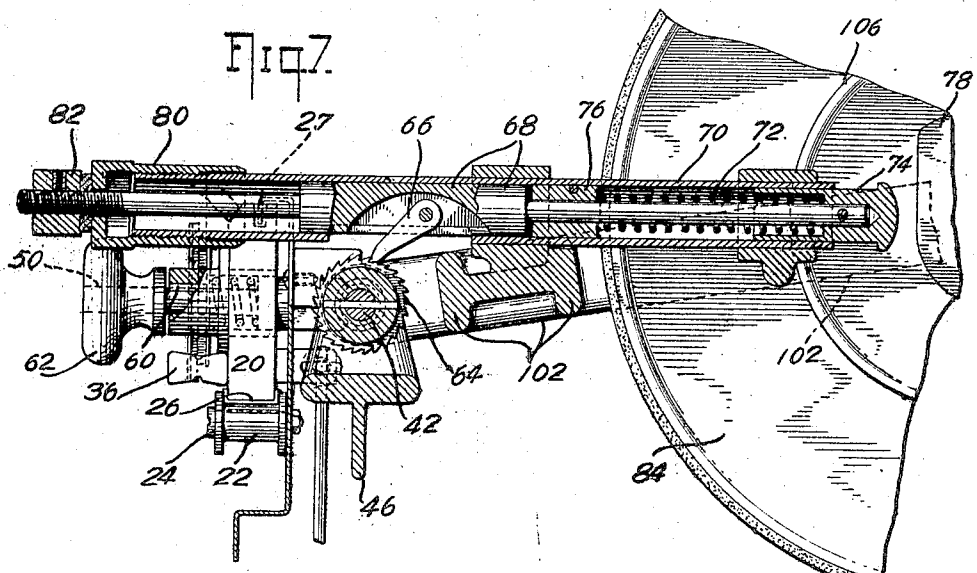
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YARN EXAMINING MACHINE

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Fig 7.



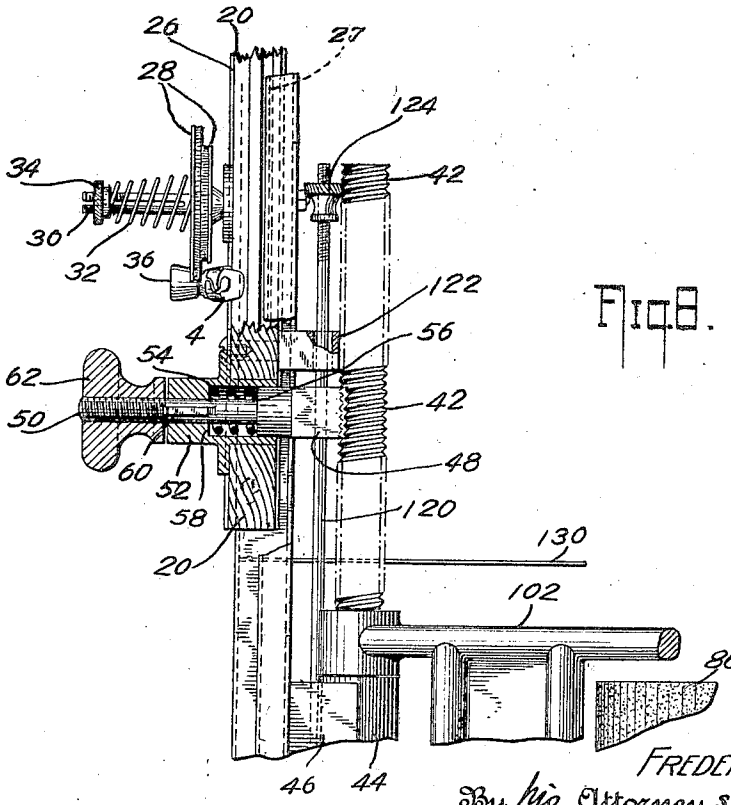


Fig 8.

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Patented Mar. 20, 1923. 1,448,980

UNITED STATES PATENT OFFICE.

FREDERICK J. SCHMUTZ, OF SOUTH MANCHESTER, CONNECTICUT, ASSIGNOR TO CHENEY BROS., OF SOUTH MANCHESTER, CONNECTICUT, A CORPORATION OF CONNECTICUT.

YARN-EXAMINING MACHINE.

Application filed May 12, 1922. Serial No. 560,485.

To all whom it may concern:

Be it known that I, FREDERICK J. SCHMUTZ, a citizen of the United States, residing at South Manchester, county of Hartford, State of Connecticut, have invented a certain new and useful Improvement in Yarn-Examining Machines, of which the following is a full, clear, and exact description.

My invention relates to machines that are particularly adapted for use in examining yarns, threads, raw silk fibre and other strands, and has for its object to provide a novel and improved machine of this character.

The several features of the invention will be clearly understood from the following description and accompanying drawings, in which—

Figure 1 is a front view, partly broken away, of a strand examining machine embodying the features of the invention in their preferred form;

Fig. 2 is an elevation of the right hand end of the machine, partly broken away;

Fig. 3 is a front view of a portion of the machine on an enlarged scale and partly broken away;

Fig. 4 is a sectional elevation, on an enlarged scale, taken on the line 4—4 of Fig. 2;

Fig. 5 is a detailed end elevation showing particularly the bearing for one end of the examining board of the machine;

Fig. 6 is a detailed sectional view partly, in elevation, taken on the line 6—6 of Fig. 4;

Fig. 7 is a sectional view, partly in elevation, taken on the line 7—7 of Fig. 3; and

Fig. 8 is a sectional plan view taken on the line 8—8 of Fig. 7.

The strand examining machine illustrated in the drawings is provided with a board 2, and a series of guides 4 for severally guiding a plurality of strands 6 to the board. The board 2 is rectangular and is rotated about its longitudinal axis during the operation of the machine, and the guides 4 are moved longitudinally of the board and in timed relation to the rotation thereof to cause the strands to be wound toward the left on the board in separate planes so as to be conveniently visible for the purposes of examination. A series of spring clips 5 are secured to one of the longitudinal edges of the board for conveniently securing the ends of the strands in place, the operator using one clip to hold the leading end of one strand and using the next clip to the left after the completion of the winding operation to hold the other end of the strand.

The examining board 2 has co-axial trunnions 7 secured on its ends. The trunnion on the left hand end of the board is mounted in a fixed U-shaped bearing 8 on the frame of the machine and the trunnion on the other end of the board is mounted in a hollow bearing head 10 formed on the inner end of a shaft 12. A block 14 is secured on the bearing head 10 and is provided with an inwardly projecting wing 16 that engages a side of the examining board, the head 10 and block 14 constituting a chuck to cause the board to rotate with the shaft 12. The wing 16 forms a flange of an angle-iron which is secured to a flange on the block 14 by a bolt 17 that extends through a slot in the latter flange to enable the wing 16 to be adjusted to accommodate different thicknesses of boards. In order to secure an even winding of the strands on the board it is of importance that there should be no axial movement of the board during the winding operation, and to this end a coiled spring 18 is arranged in an axial socket in the shaft 12 and is interposed between the end of the trunnion 7 and the end wall of the socket, the spring urging the board toward the fixed bearing 8. The inner wall of the bearing head 10 for the right hand trunnion 7 is made conical as shown to enable the opposite end of the board to be tipped upwardly, when the board is so positioned that the wing 16 faces downwardly, so as to bring its trunnion out of the bearing 8 and thus permit the board to be easily removed from the machine and another board inserted if desired.

The thread or strand guides 4 are mounted on the upper edge of a carrier 20 which is in the form of a bar of substantially the length of the examining board. The carrier is mounted and guided on flanged rollers 22 which are mounted on studs 24 secured to the frame of the machine, the lower edge of the carrier being faced with U-shaped metal strips 26 secured thereto which engage the rollers 22. The upper edge of the carrier

is guided by means of a depending flange 27 projecting from the machine frame which engages in a U-shaped slot in the carrier.

In the illustrated machine means is provided for placing a uniform tension on the strands as they are being delivered to the board, and to this end a plurality of thread tensioning devices are mounted on the carrier 20 through which the strands severally pass. As shown, each thread tension comprises a pair of opposed discs 28 having their inner faces lined with plush or similar material between which the thread passes. Each pair of discs 28 are mounted on a stud pin 30 secured to the carrier and are pressed toward each other by means of a spring 32 coiled about the stud and interposed between the outer disc and a nut 34 screw-threaded on the end of the stud, this construction enabling the tension placed on the individual strands to be independently adjusted by means of the nuts 34. By mounting the tension devices on the carrier 20, instead of using stationary tension devices, insures a uniform tension being placed on each strand during the operation of the machine. In some cases as where raw silk fibre is used, it has been found that sufficient tension is placed on the strands if they are passed directly from the tension discs 28 to the guide 4, but in case a greater tension is desired a series of porcelain studs 36 are mounted on the carrier 20 over which the strands may be passed one or more times to increase the tension.

As illustrated in Figs. 1 and 2 of the drawings the thread, yarn or other strands may be supplied to the machine wound on spools which may be supported on an elongated shelf 38 secured to the front of the machine frame, the spools being held in place on the shelf by means of upwardly extending stud pins 40 over which the spools are placed. In case raw silk fibre is to be used in the machine it may, if desired, be drawn directly from the cocoon, the cocoons being placed in suitable receptacles on the shelf 38.

The mechanism for actuating the carrier 20 comprises a shaft 42 having one end extending through and journaled in a bearing 44 formed on the upper end of a bracket 46 secured to the machine frame. The inner portion of the shaft 42 is screw-threaded and engaged by segmental screw threads formed on the end of a block 48. The block 48 is formed on the rear end of a plunger rod 50 which extends through a hollow bushing 52 secured in an aperture in the carrier 20. The screw-threaded block 48 is pressed in operative engagement with the screw-threaded portion of the shaft 42 by means of a spring 54 coiled about the plunger 50 and interposed between a shoulder 56 on the plunger and a shoulder 58 on the inner wall of the bushing 52. The block is held from turning movement by means of a key 60 on the plunger engaging a slot in the bushing 52. A knob 62 is screw-threaded on the forward end of the plunger. With this construction upon rotation of the screw-threaded shaft 42 in a counter-clockwise direction the carrier 20 will be moved longitudinally to the left to guide the thread as it is wound on the board, and the carrier may be brought back to its initial position after the completion of the winding operation by retracting the plunger 60 by means of the knob 62 so as to disconnect the block 48 from the screw-threaded shaft 42. The shaft 42 is thus rotated by means of a ratchet wheel 64 secured thereon, which is engaged by a pawl 66 pivotally mounted on a reciprocating plunger 68. The plunger 68 is mounted to slide in a tubular casing 70 and is urged rearwardly by means of a spring 72 coiled about the plunger and interposed between a head 74 secured on the rear end of the plunger and a bearing collar 76 secured in the casing. The plunger is moved forwardly to operate the ratchet wheel 64 by means of a cam 78 carried by the shaft 12 that acts on the head of the plunger. Through this connection between the carrier 20 and the cam 78 the carrier is moved intermittently toward the left to guide the thread during the winding operation, and as illustrated the cam 78 is so shaped that each movement of the carrier takes place as an edge of the board is brought into engagement with the strands. Such intermittent traversing of the strand guiding carrier is found to be advantageous over a construction in which the carrier is fed continuously, as the stretches of the threads extending over the faces of the boards are arranged more nearly at right angles to the edges of the board, the deflection of the thread taking place for the most part across the edges of the board.

In machines of this character it is desirable that there should be provision for varying the spacing of the coils of each strand on the board so as to compensate for different thicknesses of strands. To this end the actuating mechanism for the carrier 20 has provision for adjustment during the operation of the machine to vary the extent of each intermittent movement of the carrier. As shown a micrometer sleeve 80 is screw-threaded on the forward end of the tubular casing 70 and the forward end wall of this sleeve is adapted to be engaged by a stop nut 82 secured on the end of the plunger 68 so as to limit the rearward movement of the plunger by means of its spring 72. With this construction it will be apparent that by adjusting the sleeve 80 on the tubular casing 70 that the extent of the movements imparted to the plunger 68 by the ac-

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tuating cam 78 and hence the extent of each of the intermittent movements imparted to the strand guiding carrier 20, may be regulated as desired.

The shaft 12 is driven by a drum 84 secured thereon having a peripheral friction flange 86 which is operatively engaged by the periphery of a friction driving pulley 88 loosely mounted on a stud shaft 90 having its ends secured to the machine frame. The driving pulley 88 is provided with a hub 92 (Fig. 4) on which is secured a grooved pulley 94 which is driven through a belt 96 by a pulley 98 carried by the shaft of an electric motor 100 mounted on the machine frame.

The machine is thrown into and out of operation by moving the friction drum 84 into and out of operative engagement with the driving pulley 88. To this end the shaft 12 on which the friction drum 84 is mounted, is journaled in bearings on the rear end of a supporting bracket arm 102 which is pivotally mounted at its forward end on the shaft 42, the tubular casing 70 for the pawl carrying plunger 68 being also mounted on this bracket arm so that the pulley 84 is adapted to be raised and lowered about the shaft 42 as a center, toward and from the friction driving pulley 88. During the operation of the machine the friction drum 84 is held in operative engagement with the driving pulley 88 by gravity. To raise the friction drum 84 out of engagement with the driving pulley 88, a bell crank is pivotally mounted on the stud shaft 90 and is provided with a brake-shoe formed on the upwardly extending arm 104 thereof which, when the bell crank is turned in a counter-clockwise direction (viewing Fig. 2) engages the periphery of an annular flange 106 on the drum 84 and by exerting a wedging action on the rotating drum, raises the drum from the friction driving pulley 88 and frictionally stops the rotation of the shaft 12. The bell crank is thus turned in said direction by the gravity of a forwardly extending arm 108 thereof. The brake-shoe is held out of engagement with the flange 106 of the friction drum during the operation of the machine by the engagement of the arm 108 thereof with a shoulder 110 formed on the upright arm of a latch lever 112 which is secured on the inner or rear end of a shaft 114 pivotally mounted in the machine frame. The shoulder on the latch lever 112 is held in engagement with the weighted arm 108 by means of a spring 116 having one end connected with a horizontal arm 117 on the latch lever and its other end fixed to the machine frame. A hand operated arm 118 is secured to the outer end of the shaft 114. With this construction upon swinging the arm 118 downwardly the latch lever 112 is swung out of engagement with the weighted arm 108, thus permitting the brake-shoe to engage with the flange 106 to raise the friction drum 84 out of engagement with its driving disc 88 and stopping the shaft 12. When it is desired to again throw the machine into operation the weighted arm 108 is raised by the operator into engagement with the stop shoulder 110 on the latch lever 112, thus disconnecting the brake-shoe from the friction drum 84.

In the illustrated machine means is provided for automatically stopping the machine when a predetermined amount of thread has been wound on the examining board. To provide for this a rod 120 is pivotally connected at one end with the upper end of the latch lever 112 and its other end extends loosely through an aperture in a stop lug 122 secured to the rear side of the carrier 20, and a stop nut 124 is screw-threaded on the extreme end of the rod. With this construction it will be apparent that when the carrier 20 has been moved a predetermined distance, the stop lug 122 thereon by engagemnt with the stop nut 124 will act through the rod 120 to swing the latch lever 112 out of engagement with the weighted arm 108 and thus stop the machine. By adjusting the stop nut 122 on the rod 120 the time of the throwing out of the operation of the machine may be regulated as desired. A sheet metal plate 130 is secured on the machine frame between the driving mechanism and the board so as to prevent oil, dust or other refuse from being thrown on the board.

From the foregoing it will be apparent that the illustrated machine is well adapted for use for examining the finer as well as the coarser yarns and other strands and that the machine may be readily adjusted to accommodate the different sizes of strands. It will also be apparent that the several strands are evenly and uniformly wound on the examining board, the coils of each strand being equally spaced and each strand being maintained under a constant tension throughout the winding operation. The examining board is so arranged in the machine that the examination may be conveniently made while the board is in the machine, or, if desired, the board with the strands wound thereon may be removed from the machine for future examination and another board placed in the machine. The provision of means under the control of the operator for automatically stopping the machine insures a predetermined number of windings of each strand on the board and enables a number of boards, if desired, to be wound uniformly.

While it is preferred to employ the specific construction and arrangement of parts illustrated and described it is understood that this construction and arrangement is

not essential except so far as specified in the claims and may be changed or modified without departing from the broader features of the invention.

What I claim is:

1. A strand examining machine having, in combination, a rotatable examining board member on which the strand is to be wound for examination, a carrier movable longitudinally of the axis of said member, means mounted on the carrier for guiding the strand to said member, a tension device mounted on the carrier for placing a tension on the strand as it is being wound on said member, and mechanism for rotating said member and for moving said carrier longitudinally in timed relation to cause the strand to be wound on said member with the successive coils of the strand arranged side by side in spaced relation.

2. A strand examining machine having, in combination, a rotatable examining board member on which the strand is to be wound for examination, a device for guiding the strand to said member, and mechanism for rotating said member and for relatively moving said member and said guiding device longitudinally of the axis of said member to cause the strand to be wound on said member with the successive coils of the strand arranged side by side in spaced relation, said mechanism having provision for adjustment to vary the timed relation of the rotation of said member and the relative longitudinal movement of said member and said guiding device.

3. A strand examining machine having, in combination, an examining board, a device for guiding the strand to said board, and mechanism for rotating said board and for moving said device longitudinally of the board in timed relation to cause the strand to be wound on the board with the stretches of the strand passing over the faces of the board arranged side by side in spaced relation, said mechanism having provision for adjustment during the operation of the machine to vary the timed relation of the operation of the board and said guiding device so as to vary the spacing of said stretches of the strand on the board.

4. A strand examining machine having, in combination, an examining board, a device for guiding the strand to said board, and mechanism for rotating said board and for intermittently moving said device longitudinally of the board as the strand is laid over the longitudinal edges of the board, respectively, so as to cause the strand to be wound on the board with the stretches of the strand passing over the faces of the board arranged side by side in spaced relation.

5. A strand examining machine having, in combination, an examining board, a device for guiding the strand to said board, and mechanism for rotating said board and for intermittently moving said device longitudinally of the board as the strand is laid over the longitudinal edges of the board, respectively, so as to cause the strand to be wound on the board with the stretches thereof passing over the faces of the board arranged side by side in spaced relation, said mechanism having provision for adjustment to vary the extent of said intermittent movements of said guiding device to vary the spacing of said stretches of the strand.

6. A strand examining machine having, in combination, a rotatable examining board member on which the strand is to be wound for examination, a device for guiding the strand to said member, mechanism for rotating said member and for moving said device longitudinally of the axis of said member in timed relation to cause the strand to be wound on said member, and devices for automatically throwing said mechanism out of operation at the completion of the movement in one direction of said guiding device, a predetermined distance.

7. A strand examining machine having, in combination, a rotatable member on which the strand is to be wound for examination, a device for guiding the strand to said member, and mechanism for rotating said member and for moving said device longitudinally of the axis of said member in timed relation to cause the strand to be wound on said member, and means for automatically throwing said mechanism out of operation a predetermined interval after it is thrown into operation, said means having provision for adjustment to vary the time of the throwing out of said mechanism.

8. A strand examining machine having, in combination, a rotatable member on which the strand is to be wound for examination, a carrier movable longitudinally of the axis of said member, a device mounted on the carrier for guiding the strand to said member, means for rotating said member, means for moving the carrier longitudinally in one direction in timed relation to the rotation of said member to cause the strand to be wound on said member comprising a screw, connections between the screw and carrier for moving the carrier longitudinally in said direction upon rotation of the screw in one direction and means for thus rotating the screw comprising a ratchet wheel, a pawl for actuating the ratchet wheel, and means for actuating the pawl having provision for adjustment to vary the extent of movement imparted by the pawl to said ratchet wheel.

9. A strand examining machine having, in combination, a rotatable member on which the strand is to be wound for examination, a carrier movable longitudinally of the axis

of said member, a device mounted on the carrier for guiding the strand to said member, means for rotating said member, means for moving the carrier longitudinally in timed relation to the rotation of said member comprising a screw, connections between the screw and carrier for moving the carrier longitudinally in said direction upon rotation of the screw in one direction, and means for thus rotating the screw comprising a ratchet wheel, a pawl for actuating the ratchet wheel, and means for actuating the pawl comprising a reciprocable plunger on which the pawl is mounted, a cam for intermittently engaging the plunger to move the plunger in the direction to cause the pawl to actuate the ratchet wheel, a spring for moving the plunger in the opposite direction, and means for adjusting the plunger toward and from the cam to vary the extent of movement inparted to the ratchet wheel by the pawl.

10. A strand examining machine having, in combination, a rotatable member on which the strand is to be wound for examination, means comprising a driving shaft for rotating said member, a carrier movable longitudinally of the axis of said member, a device mounted on the carrier for guiding the strand to said member, means for intermittently moving the carrier longitudinally in one direction in timed relation to the rotation of said member to cause the strand to be wound on said member comprising a cam carried by said driving shaft, a plunger adapted to be intermittently engaged by the cam to move the plunger in one direction, means for moving the plunger in the opposite direction when disengaged from the cam, connections between the plunger and carrier for moving the carrier in said direction, and means for adjusting the plunger toward and from the cam to vary the extent of the intermittent movements imparted to the carrier.

11. A strand examining machine having, in combination, a rotatable member on which the strand is to be wound, a carrier movable longitudinally of the axis of said member, a device mounted on the carrier for guiding the strand to said member, mechanism for rotating said member and for moving said carrier in one direction to cause the strand to be wound on said member, and devices comprising a rod acting when shifted in one direction to throw said mechanism out of operation, an abutment mounted on the rod and adjustable longitudinally thereof, and an abutment mounted on the carrier arranged to engage the abutment on the rod during the effective travel of said carrier to shift the rod in the direction to throw said mechanism out of operation.

12. A strand examining machine having, in combination, a rotatable member on which the strand is to be wound, means for rotating said member comprising a driving shaft, a device for guiding the strand to said member, a carrier on which said device is mounted capable of being moved in one direction during the operation of said member to cause the strand to be wound on said member, a screw, connections between the screw and carrier for moving the carrier in said direction upon rotation of the screw in one direction, and connections between the driving shaft and screw for thus rotating the screw, said latter connections having provision for adjustment to vary the timed relation of the movement of the carrier with relation to said rotatable member.

13. A strand examining machine, having, in combination, an elongated examining board rotatable about its longitudinal axis, a carrier, a plurality of devices for guiding a plurality of strands, respectively, to the board and a plurality of devices associated with said guiding devices, respectively, for placing a tension on the strands, said guiding and tensioning devices being mounted on the carrier and said tension devices being capable of individual adjustment to vary the tension thereof, and means for rotating the board and for moving the carrier to cause the strands to be wound on the board in a series of separate planes.

14. A strand examining machine having, in combination, an examining board, co-axial trunnions mounted on the ends of the board, a U-shaped bearing for one of the trunnions, a driving member having a bearing in one end for the other trunnion, a block carried by the driving member having a projection engaging a side of the board to cause the board to rotate with the driving member, means for rotating the driving member, said bearings and trunnions being constructed and arranged to permit the board to be removed from the bearings, and means for guiding a strand to the board to cause it to be wound in a plane on the board during the rotation thereof.

15. A strand examining machine having, in combination, an examining board having co-axial trunnions mounted on the ends of the board, a U-shaped bearing for one of the trunnions, a driving member having a bearing in one end for the other trunnion, a block carried by the driving member having a projection engaging a side of the board to cause the board to rotate with the driving member, means for rotating the driving member, said bearings and trunnions being constructed and arranged to permit the board to be removed from the bearings, yielding means carried by said block and tending to move said board toward said U-shaped bearing, and means

for guiding a strand to the board to cause it to be wound in a plane on the board during the rotation thereof.

16. A strand examining machine having, in combination, an examining board, a driving shaft, connections between the board and shaft for rotating the board, a device for guiding a strand to the board, a carrier for said device, means for moving the carrier during the rotation of the board to cause the strand to be wound in a plane on the board, a screw, connections between the screw and carrier for moving the carrier in said direction upon rotation of the screw in one direction, connections between the screw and shaft for thus rotating the screw, an arm having one end pivotally mounted coaxially with the screw and having its other end provided with a bearing in which the shaft is mounted, a driven friction pulley secured on said shaft, a driving friction pulley on which the driven pulley bears by gravity, and means for raising said driven pulley out of operative engagement with said driving pulley.

17. A strand examining machine having, in combination, a rotatable examining board member on which the strand is to be wound for examination, a device for guiding the strand to said member, mechanism for rotating said member and for moving said device longitudinally in one direction of the axis of said member in timed relation to cause the strand to be wound on said member, devices for automatically throwing said mechanism out of operation at the completion of the movement of said guiding device a predetermined distance in said direction, and means capable of being actuated by the operator for returning said guiding device to its initial position.

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