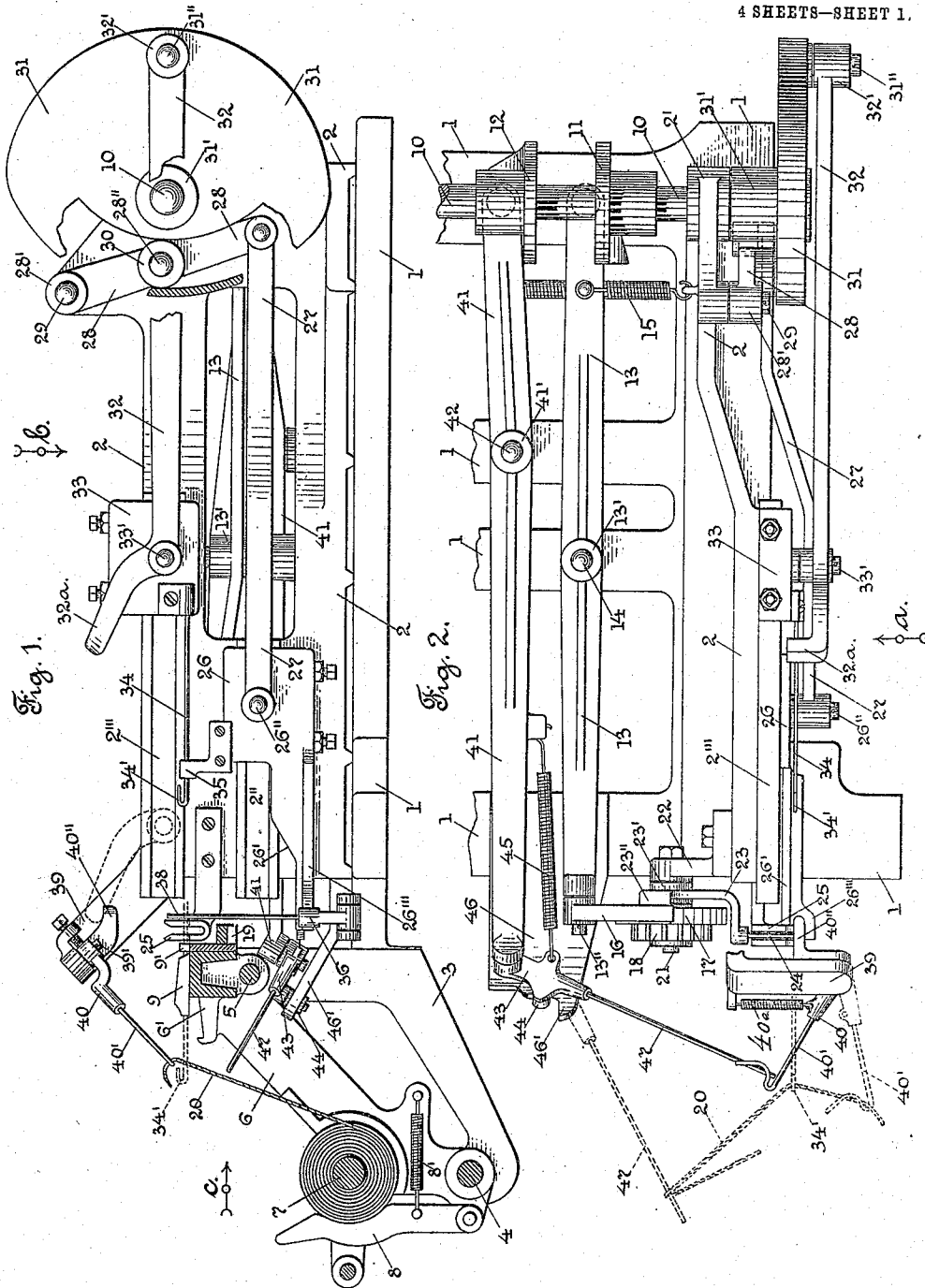


F. A. WHITMORE & W. DOUGHERTY.
MACHINE OR MECHANISM FOR DRAWING YARN OR THREAD INTO CARRIERS.
APPLICATION FILED OCT. 6, 1908.

933,214.

Patented Sept. 7, 1909.
4 SHEETS—SHEET 1.



Witnesses
M. Bredt.
M. Reed.

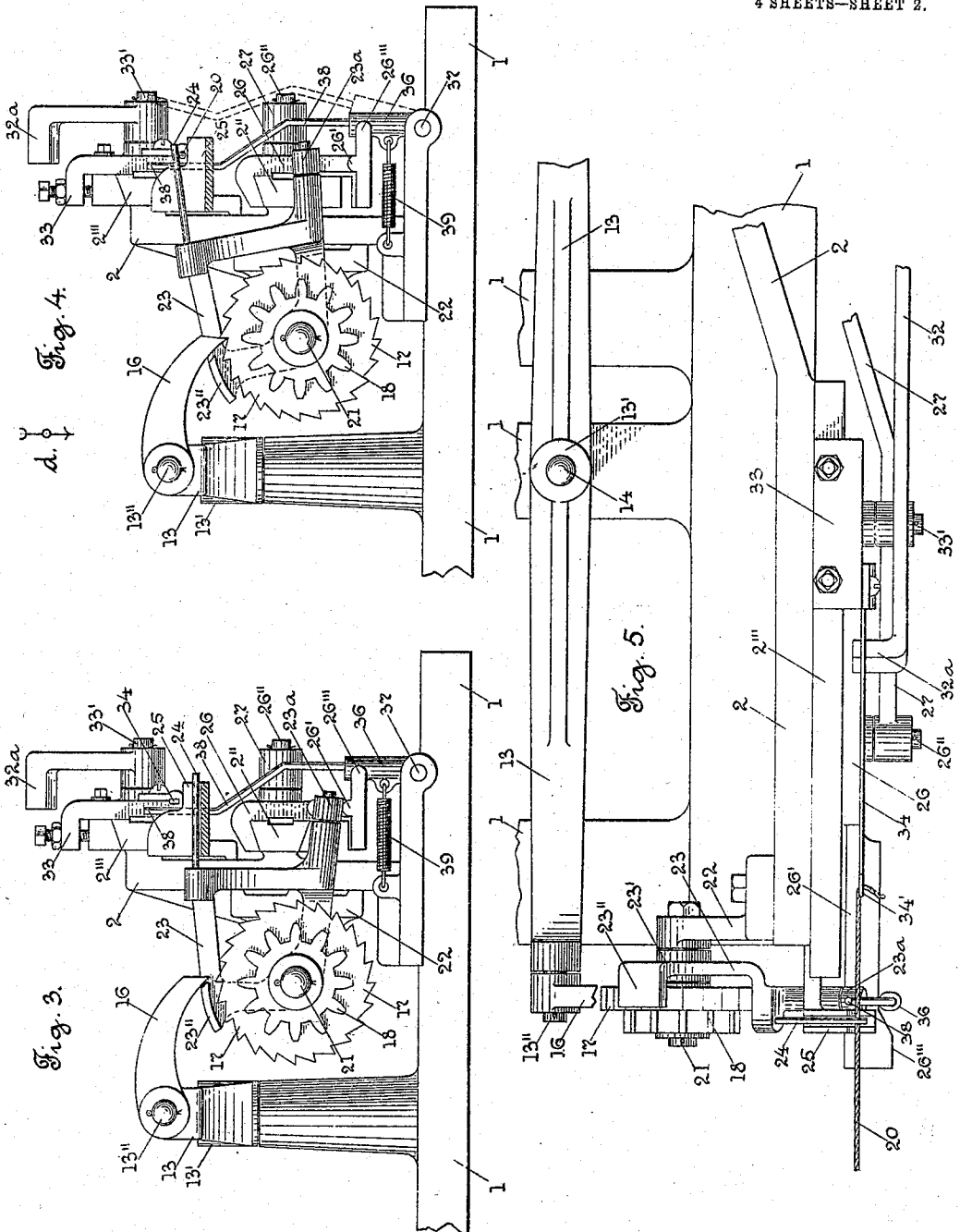
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Witnesses
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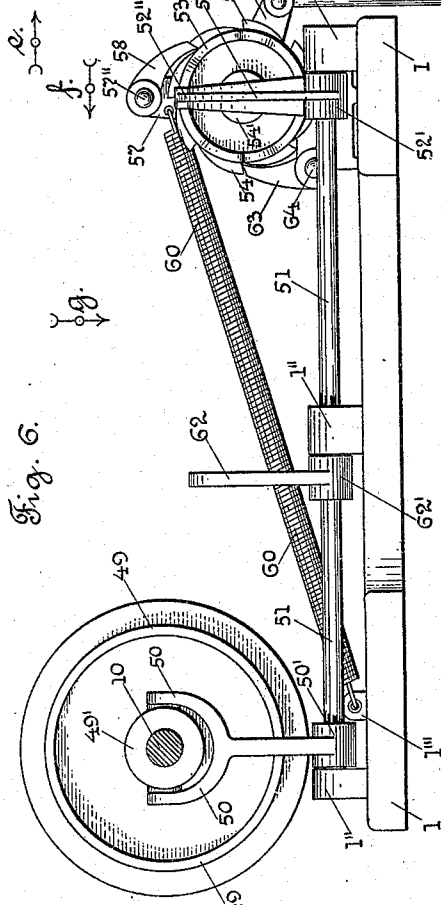
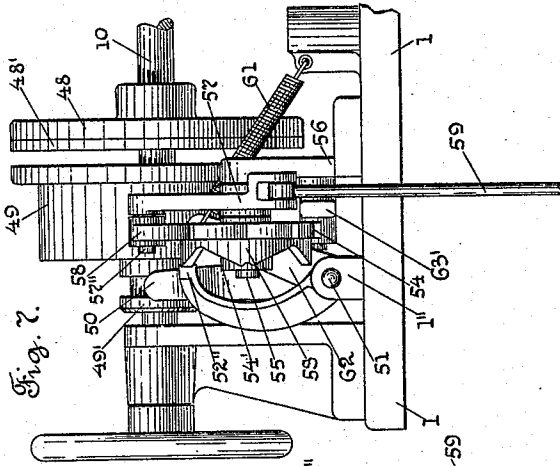
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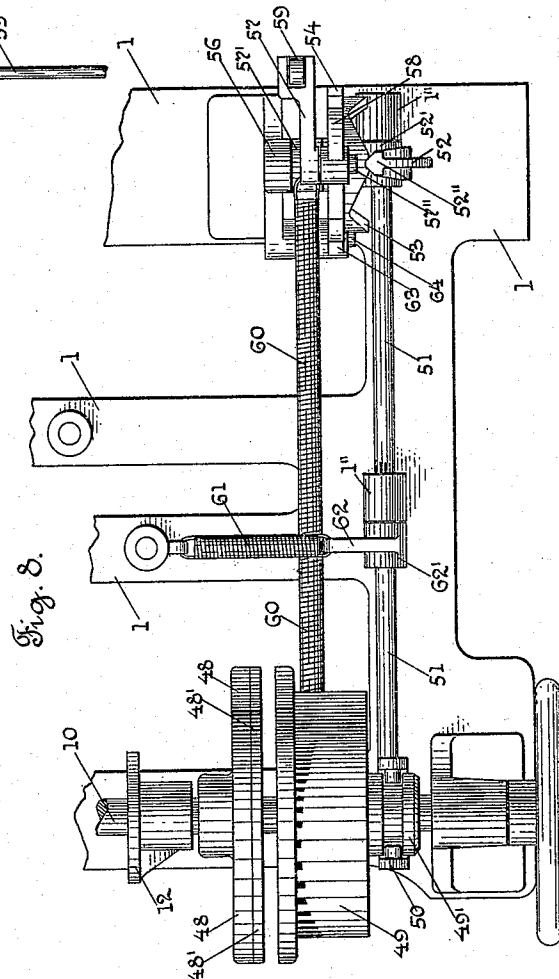
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4 SHEETS—SHEET 3.



Witnesses
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W. Leas.



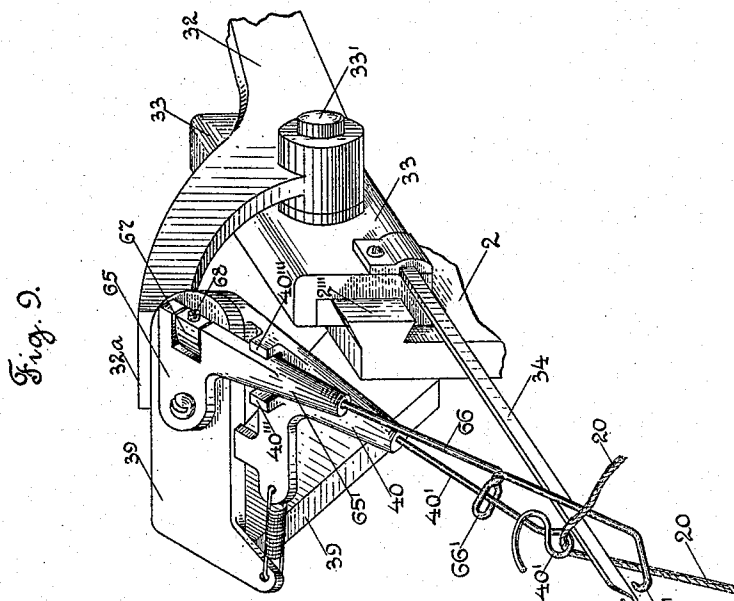
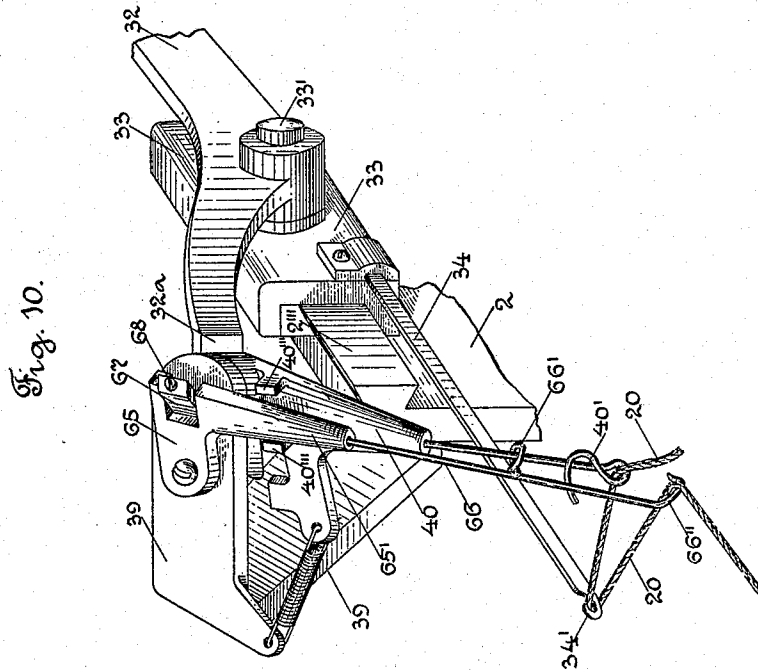
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4 SHEETS—SHEET 4.



Witnesses
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UNITED STATES PATENT OFFICE.

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MACHINE OR MECHANISM FOR DRAWING YARN OR THREAD INTO CARRIERS.

933,214.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed October 6, 1908. Serial No. 456,368.

To all whom it may concern:

Be it known that we, FRED A. WHITMORE and WILLIAM DOUGHERTY, citizens of the United States, both residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have jointly invented certain new and useful Improvements in Machines or Mechanism for Drawing Yarn or Thread into Carriers, of which the following is a specification.

Our invention relates to a machine or mechanism for drawing yarn or thread into carriers or tubes, and to that class of machines shown and described in U. S. Letters Patent, No. 516,147, in which yarn or thread is drawn into carriers, which are used with spools, in looms for weaving tufted fabrics, and our invention particularly relates to improvements on the mechanism for drawing yarn or thread into the carriers, shown and described in said Patent, No. 516,147.

The object of our invention is to provide improved mechanism for drawing the yarn or thread into the carriers, and to combine with said mechanism a stop motion mechanism, which stops the operating of the spool carriage when the threading needle fails to draw a thread into a thread tube; also to combine with said mechanism a threading and slackening device of improved construction.

Our invention consists in certain novel features of construction of our improvements as will be hereinafter fully described.

We have only shown in the drawings a detached portion of a drawing in machine of the class referred to, with our improvements combined therewith, sufficient to enable those skilled in the art to understand the construction and operation of the same.

Referring to the drawings:—Figure 1 is a side view of a portion of a drawing in machine of the class referred to, with our improvements applied thereto, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is a plan view, looking in the direction of arrow *b*, Fig. 1, showing some parts not shown in Fig. 1, and some parts which are shown in said figure are left off. Fig. 3 shows, on an enlarged scale, the front of the machine with the stop motion mechanism, looking in the direction of arrow *c*, Fig. 1. Fig. 4 corresponds to Fig. 3, but shows some parts in a different position. Fig. 5 is a plan view of

Fig. 4, looking in the direction of arrow *d*, 55 same figure. Fig. 6 is a side view of the driving end of the machine, looking in the direction of arrow *e*, Fig. 7; some parts shown in Fig. 7 are left off in this figure. Fig. 7 is a front view of the parts shown in Fig. 6, looking in the direction of arrow *f*, same figure. Fig. 8 is a plan view of the driving end, looking in the direction of arrow *g*, Fig. 6. Fig. 9 shows in perspective, a modified construction of the threading and 65 slackening mechanism, shown in Figs. 1 and 2. Fig. 10 corresponds to Fig. 9, but shows some of the parts in a different position.

In the accompanying drawings, 1 is the bed or base plate of the machine, having the 70 frame 2 secured thereto. The bed plate 1 has brackets 3 secured thereto, which carry the guide rods 4 and 5, see Fig. 1, which form suitable supports or tracks for the spool carriage 6. The end pieces of the carriage 6 are adapted to receive the journals of the tuft 75 yarn beam or spool 7, which is held in position by a lever 8, which is pivotally mounted at its lower end and yieldingly held by a helically coiled contraction spring 8'. The 80 upper portion 6' of the carriage 6 is made to receive the bar carrying the yarn tubes 9, of ordinary construction, and which are placed with their inner ends toward the comb 9', in the usual way. 85

The frame 2 has a bearing 2' for a shaft 10, which is operated by suitable driving mechanism shown in Figs. 6 to 8, inclusive, and to be hereinafter described. The shaft 10 carries two cam disks 11, and 12, see Fig. 90 2. One of these cam disks, as 11, operates a lever 13, which has its hub 13' pivotally mounted on a stud 14 on the base plate 1. A helically coiled contraction spring 15 attached to the lever 13 and to a stationary 95 part of the machine, acts to hold the end of said lever in operative engagement with the cam 11. The lever 13 has pivotally mounted on its end opposite from the cam 11, on a stud 13'', a pawl 16 which is 100 adapted to engage and move a ratchet gear 17, in one direction, see Figs. 3, 4, and 5. The ratchet gear 17 has connected therewith a pinion 18, which meshes with and drives the rack 19 of the carriage 6, which rack 105 moves said carriage in one direction, after the yarn 20 has been drawn into a tube 9, to place the next tube 9 with its comb 9' in

the path of the threading needle. The ratchet gear 17 and the pinion 18 are loosely mounted on a stud 21 on a stand 22 secured on the frame 2. Also loosely mounted on the stud 21 is the hub 23' of a feeler lever 23; the upwardly extending arm of said feeler lever 23 has a shield 23'' thereon which extends over the ratchet gear 17 and is adapted to be moved in or out of the path of the pawl 16. The upper and outer portion of the feeler lever 23 has attached thereto the feeler wire 24, see Figs. 3, and 4, which is guided in the V shaped piece 25, and is adapted to feel for the thread 20, when the thread is drawn over the lower portion of the V shaped piece 25, see Fig. 4. When no thread 20 is drawn over the lower portion of the V shaped piece 25, as shown in Fig. 3, the feeler wire 24 drops to the lower part of the piece 25, and the shield 23'', which is moved in under the pawl 16, prevents it from engaging the ratchet gear 17. The lower horizontally extending arm of the lever 23 carries a roll 23^a, see Fig. 3, which travels on and engages a cam shaped extension 26' on a slide 26, to move up the lever 23 and raise the feeler 24.

The slide 26 travels on a track 2'', see Fig. 1, on the frame 2, and has a stud 26'' thereon, on which is pivotally mounted one end of a connector 27, see Fig. 1; the other end of the connector 27 is pivotally connected with the lower end of a downwardly extending lever 28, which is pivotally mounted with its hub 28' on a stud 29 on the frame 2, see Fig. 1. The lever 28 has a stud 28'' thereon, on which is mounted a roll 30 which travels in a cam groove in one side of a cam 31, and is operated by said cam, which has its hub 31' mounted on the driven shaft 12, see Fig. 2. The cam 31 also has thereon a crank pin 31'', to which is pivotally connected the boss 32' on one end of the connector 32. The other end of the connector 32 is pivotally connected to a stud 33' on a slide 33, see Fig. 1, which is adapted to travel in the way or track portion 2'' on the frame 2. The slide 33 has secured thereto the inner end of a yarn or thread needle 34. The needle 34 is hooked at its outer end 34', see Fig. 1, and is supported in and connected to a guide arm 35, secured to the lower slide 26, see Fig. 1.

When the upper slide 33 moves forward, that is to the left in Fig. 1, the lower slide 26, operated by the cam 31 through connector 27, also moves with the slide 33, and the needle 34 is guided into the comb 9' on the inner side of the tube 9, and goes through the tube 9, preparatory to catching the yarn 20, as shown by broken lines in Fig. 1. The lower slide 26 remains in its forward position until the needle 34 has been moved back through the tube 9, and drawn the thread 20 over the V shaped piece 25. By this time the slide 33, through the rotation of the cam 31 and the connector 32, has moved far enough

back to allow the feeler wire 24 to feel for the yarn 20, see Fig. 4. If the yarn 20 is there it holds the feeler 24 up, as shown in Fig. 4, so that the pawl 16 will engage the ratchet 17 and move the carriage 6 one tooth, to carry the next tube 9 into the path of the threading needle 34. In case the yarn 20 is not in the path of the feeler wire 24, said feeler will drop to the bottom of the V shaped piece 25, as shown in Fig. 3, and allow the shield 23'' on the feeler lever 23 to lift the pawl 16, so that it will not engage the ratchet 17, see Fig. 3, and the carriage 6 will remain at rest. As the slide 26 moves back farther, it causes, by reason of the cam shaped surface 26''' on said slide, see Fig. 5, the arm 36, which is pivotally mounted on a stud 37 and carries a needle 38, to move to the right or outwardly, as shown by broken lines in Fig. 4, against the action of the helically coiled contraction spring 39. The movement of the needle 38 carries the ends of the yarn 20 away from the feeler wire 24, and out of the needle 34, to have said needle ready for the next operation. The advantages of this construction are, that the needle for threading the yarn goes through a tube 9 until it gets a thread, it may be once, or more than once, but the carriage 6 remains stationary, and does not move forward until there is a thread in each tube, and therefore no reversing mechanism is required, which has heretofore been used, and is shown and described in Patent, No. 516,174, above referred to.

Extending upwardly from the frame 2 and secured thereon, is a bracket or stand 39, which carries a stud 39', on which is pivotally mounted a lever 40 carrying a hook wire guide 40', see Fig. 1, located directly over the tube frame or carriage 6, when the hook wire guide 40' is in the position shown by full lines in Fig. 2. A spring 40^a acts to move inwardly the hook guide 40'.

In operating the machine, the operator takes the end of the yarn 20 from the spool 7, and places it in the hook guide 40', as shown in Fig. 1, then as the needle 34 with the slide 33 moves forward and arrives at its outer position, shown by dotted lines in Fig. 1, a projection 32^a on the connector 32 is adapted to engage an extension 40'' on the hook lever 40, and as the crank pin 31'' on the cam 31 moves from its lower position to its front position, the projection 32^a will engage and move down, the hook lever 40 which carries the hook guide 40', and cause the outer end of said guide to pass over and across the end of the yarn needle 34, as shown by broken lines in Fig. 2, so that as the yarn needle 34 moves back with the slide 33, it hooks the yarn 20 and draws it through a tube 9.

The cam 12 on the driving shaft 10 operates a lever 41, the hub 41' of which is

pivotally mounted on a stud 42 on the base plate 1, see Fig. 2. The other end of the lever 41 has pivotally mounted thereon an arm or lever 43, and a roll 44 on said arm 43, through a helically coiled contraction spring 45, is yieldingly held in engagement with the cam shaped surface 46' on the extended portion or stand 46, secured to the base plate 1, see Fig. 2. The lever 43 is adapted to carry the slackening needle or wire 47.

At about the time the yarn needle 34 starts to move forward, the slackening mechanism, which operates the finger or wire 47, starts from its backward position shown by full lines in Fig. 2, and is moved forward by the lever 41, and guided by the cam portion 46' on the extension 46. As the arm 43 moves forward toward the yarn hook 40 in which the yarn is laid, the wire 47 comes under the yarn 20, and after the end of the wire 47 is got under the yarn, the cam 46 is so shaped, that as the lever 41 is moved forward, it causes the wire 47 to move out toward the front of the machine, causing the thread 20 to have a certain amount of slack, as shown by broken lines in Fig. 2. As soon as the needle 34 hooks the yarn 20, the wire 47 immediately returns to its inoperative position, leaving a slack between the spool 7 and the threading needle 34, to prevent the yarn from sliding out of the needle 34, while the needle is passing through a tube 9.

The advantages of the threading mechanism above described will be readily appreciated by those skilled in the art. It will be understood that there is a large hook guide 40', always in practically the same position and handy for the operator, and at rest, so that an inexperienced operator can readily hook the yarn, for the operator has time while the thread needle 34 is moving from its extreme forward position to its rear position, and then to its forward position again. Whenever it has been necessary for the operator to place the yarn onto the threading needle itself, during the time the needle was coming out of the tube, the operator was very liable to miss the threading of the needle on a high speed running machine.

Referring to Figs. 6, 7, and 8 of the drawings, in said figures is shown an improved shipping mechanism for the threading machine shown and described in Patent, No. 516,147, above referred to, which shipping mechanism we will now describe. The disk 48, which is mounted on the shaft 10, has a friction surface 48' thereon, and is adapted to be engaged and operated by a pulley 49, when the pulley is moved into contact with the friction disk 48 by a fork clutch lever 50, which extends into the grooved hub 49' on the pulley 49. The hub 50' of the clutch lever 50 is fast on a rock shaft 51, see Fig. 6,

which shaft is loosely mounted in suitable bearings 1'' on the bed or base plate 1. The other end of the rock shaft 51 has fast thereon the hub 52' of an upwardly extending cam lever 52, see Fig. 7. The upper inclined end 52'' of the lever 52 is adapted to engage with and be operated by a cam surface 53, in this instance on the side of a ratchet gear 54. The hub 54' of the ratchet gear 54 is loosely mounted on a stud 55 on a stand 56. Also loosely mounted on the stud 55 is the hub 57' of an angle lever 57. On the upwardly extending arm of the angle lever 57, on a stud 57'', is pivotally mounted a pawl 58 which is adapted to engage with the teeth on the ratchet gear 54 to operate said ratchet gear in one direction, when the angle lever 57 is operated by a suitable treadle mechanism, not shown, connected to a rod 59, which is connected at its upper end to the angle lever 57. A helically coiled contraction spring 60 is attached at one end to the lever 57 and at its other end to an ear 1''' on the base plate 1, and acts to move the angle lever 57, against the action of the operator on the treadle, not shown. Every time the angle lever 57 is rocked, through the operation of the treadle mechanism, the pawl 58 will turn the ratchet gear 54 one-eighth of its revolution, to bring a high or low point on the cam 53 in engagement with the lever 52, and cause, through cam arm 52, the shaft 50 to rock. A helically coiled contraction spring 61 is connected at one end to an upright lever 62, which has its hub 62' fast on the shaft 51, and at its other end to a stationary part of the frame, see Fig. 7, and acts to hold the cam lever 52 against the cam 53. A high point on the cam 52 moves the driving pulley away from the friction disk 48, as shown in Figs. 7, and 8, and a low point on the cam 52 causes the driving pulley 49 to engage the friction disk 48, to operate the machine. A pawl or latch 63 is pivotally mounted on a stud 64 and has a weighted extension 63', which acts to bring the latch 63 in engagement with the teeth of the ratchet 54, to hold said ratchet, see Fig. 6, and prevent said ratchet from turning backward.

In Figs. 9 and 10, of the drawings, is shown a modified construction of the thread slackening mechanism previously described herein. In the mechanism shown in said Figs. 9, and 10, the lever 41, and the slackening needle mechanism connected therewith, shown in Fig. 2, is done away with, and a needle lever 65, which is pivotally mounted on the top of the stand 39, is substituted therefor. The lower lever or finger 40, which carries the hook guide 40', is operated as described above, by the extension 32^a, on the connector 32. The lever 40 has two extensions 40''' thereon, adapted to engage the portion 65' on the lever 65, on each

side of said lever, allowing a movement of said lever between said extensions. Extending out from the part 65', and loosely held therein, is the downwardly extending needle 5 66, which is held in place in the part 65' by a block or collar 67 attached to the needle 66 by a screw 68. The needle 66 has a loop 66' formed therein, through which passes the hook guide 40'. The lower part of the 10 needle 66 has a hook 66'' thereon, which extends below the threading needle 34. When the thread 20 is hooked into the hook guide 40', and the extension 32^a on the connector 32 depresses the lever 40, as above described 15 in connection with Figs. 1, and 2, the lever 40 will be moved to the position shown in Fig. 10, and the extension 40''' will cause a partial rotation of the lever 65, and also of the guide 40', which passes through the loop 20 66' on the wire 66, and will cause the wire 66 to rotate, and the hook 66'' thereon will catch the yarn 20, to make the slack of the yarns, as shown in Fig. 10. The further movement of the threading needle 34 and the 25 slide 33, and the disengagement of the extension 32^a from the lever 40, will allow both levers 40, and 65, and the needles or wires 66, and 40, to return to their inoperative position.

30 It will be understood that the details of construction of our improvements may be varied if desired, and they may be adapted to be used on machines of the class referred to of different construction.

35 Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. In a machine for drawing yarn or thread into carriers or tubes, a series of tubes 40 arranged side by side, means to support and move said tubes longitudinally, a reciprocating hook, means to cause said hook to pass through said tubes, one tube at a time, a guide over which the yarn is placed by the 45 operator, to automatically carry a thread of yarn into the path of said reciprocating hook, to allow said hook to catch the yarn and draw it through a tube.

2. In a machine for drawing yarn or 50 thread into carriers or tubes, a drawing in hook, mechanism to reciprocate said hook, a support for the carriers or tubes, means to advance said carriers or tubes step by step, and means to detect the absence of yarn in 55 said hook, after it has been withdrawn from a tube, and means to prevent the advance of said carriers or tubes when the yarn is missing in said hook, after it has been withdrawn from the tubes.

60 3. In a machine for drawing yarn or

thread into carriers or tubes, a series of carriers or tubes adapted to receive tufted yarn, a support for said series of carriers or tubes, a drawing in hook, means to reciprocate it, a guide for the hook as it approaches the 65 mouth of and is about to enter a carrier or tube, a detector to detect the yarn in said hook, after it has been withdrawn from the tube, and a vibrator mechanism under the control of the detector to advance a tube 70 step by step.

4. In a drawing in machine of the class described, a series of carriers or tubes connected together side by side, a longitudinal sliding support or carrier therefor, a hook 75 adapted to enter the tubes, one tube at a time, and a guide to automatically carry the yarn into the path of said hook, when said hook has entered one of said tubes.

5. In a drawing in machine of the class 80 described, a series of tubes arranged side by side, means to support and move said tubes longitudinally, a reciprocating hook, means to cause said hook to pass through said tubes, one tube at a time, a guide over which the 85 yarn is placed by the operator to automatically carry a thread of yarn into the path of said reciprocating hook to allow said reciprocating hook to catch the yarn and draw it through the tube, and a finger or wire to 90 slack the thread.

6. In a drawing in machine of the class described, a series of tubes, arranged side by side, a support for the same, means to move the tubes longitudinally, a reciprocating 95 hook, means to cause said hook to pass through the tubes, one tube at a time, a guide to carry the thread into the path of said reciprocating hook, and means to detect the presence or absence of yarn in said hook, at 100 each reciprocation thereof, and connections between said detecting means, and said tube feeding means.

7. In a drawing in machine of the class 105 described, a series of carriers or tubes for yarn, arranged side by side, means to advance said tubes longitudinally, a reciprocating hook to enter and pass through said tubes, one tube at a time, a guide, over which a thread is placed by the operator, to carry 110 the yarn into the path of the reciprocating hook, and means to detect the absence of yarn in the reciprocating hook, at each reciprocation thereof, and a finger or wire to slack the thread.

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