

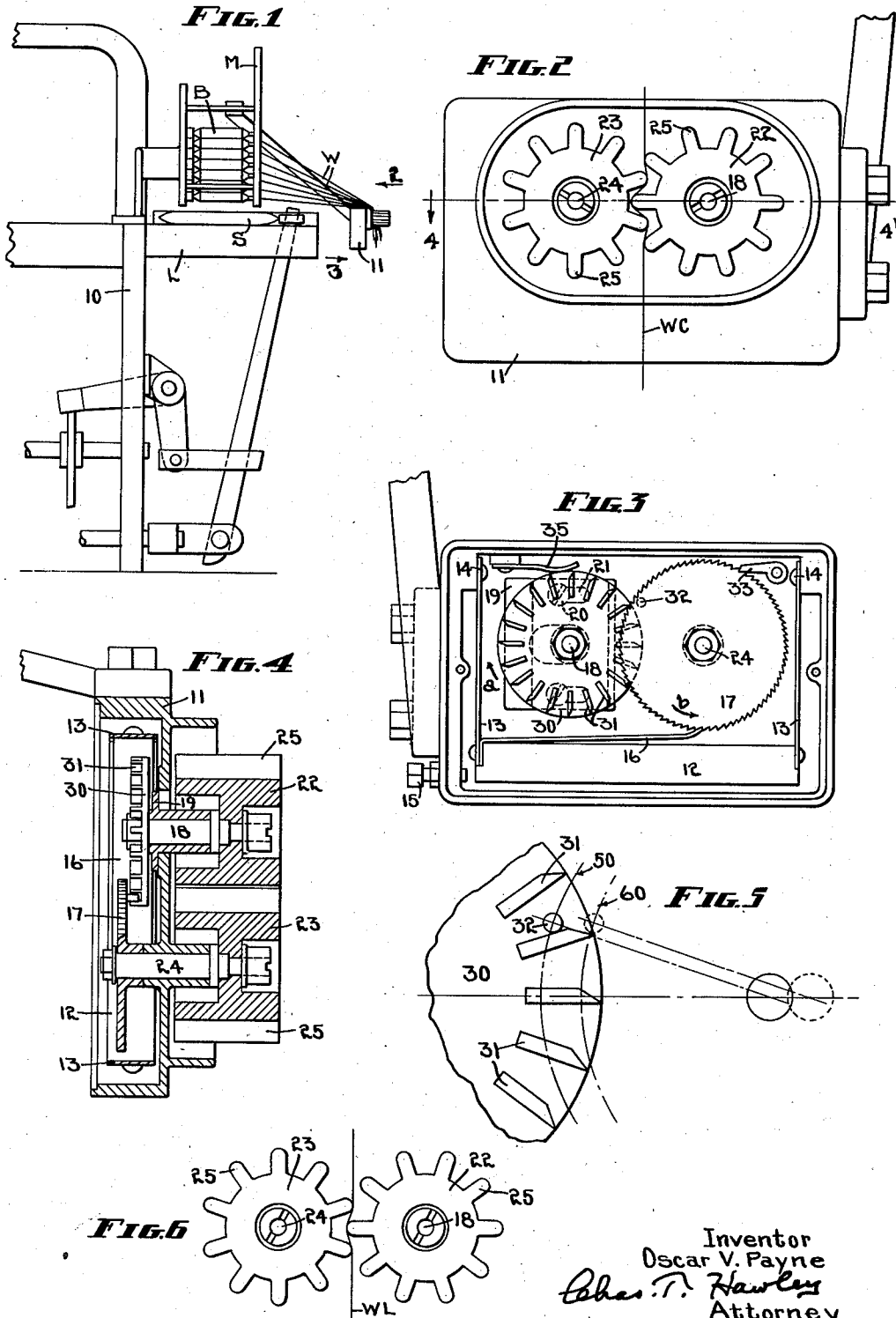
June 8, 1937.

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2,082,902

THREAD HOLDER FOR AUTOMATIC LOOMS

Filed April 2, 1936



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UNITED STATES PATENT OFFICE

2,082,902

THREAD HOLDER FOR AUTOMATIC LOOMS

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Application April 2, 1936, Serial No. 72,361

16 Claims. (Cl. 139—247)

This invention relates to improvements in thread holders for automatic looms and is more particularly adapted for use with very fine yarns such as those made from artificial filaments.

In the operation of multicolor bobbin changing looms the bobbins in the magazine are prone to rotate on their axes as they await transfer and unwind the filling, resulting in a slackness which may cause breakage due to lay motion. In my prior Patent No. 1,979,765 I have set forth a thread holder having two toothed rolls between which extend the weft ends of the reserve bobbins. One of the rolls is connected to a ratchet wheel fed by a pawl mounted on a weight suspended for free limited vibration. The support for these various structures is bolted to the loom and during operation the weight and support have a relative motion due to loom vibration the effect of which is to move the pawl with respect to the ratchet wheel, thereby feeding the fluted rolls in a direction which takes up slack in the weft ends.

In magazines having a relatively high capacity of bobbins, and where the bobbins are wound with very fine filling so that only a few transfers occur during the course of an hour's operation, the constant turning of the rolls with alternate crimping of the weft ends is likely to cause abrasion of the latter, particularly if they be made of artificially produced filaments. It is the general object of the present invention to provide mechanism which will give the fluted rolls an intermittent take-up motion the effect of which is to subject the weft ends to much less abrasion than would be the case if the rolls rotated continually.

In my prior Patent No. 1,979,765 provision is made to adjust the distance between the toothed rolls so that they may be separated to lessen the crimping of the weft ends. This condition is desirable when the yarn is delicate and it is a further object of my invention to reduce the angular feed of the rolls as the crimping is lessened. To accomplish this result I may secure a toothed driven disk to the adjustable stud for one of the rolls, and drive said disk intermittently by the ratchet which moves about a fixed axis and is driven by the vibration motor of which the aforesaid weight forms a part. As the driving contact between the disk and ratchet moves away from the fixed axis during adjustment the angular feed is reduced. The alteration to reduce crimping therefore automatically effects a simultaneous reduction of the feed.

With these and other objects in view which will appear as the description proceeds, my in-

vention resides in the combination and arrangement of parts hereinafter described and set forth.

In the accompanying drawing, wherein a convenient embodiment of my invention is set forth,

Fig. 1 is an end elevation of a loom having my thread holder applied thereto,

Fig. 2 is an end elevation taken in the direction of arrow 2, Fig. 1, on an enlarged scale,

Fig. 3 is a reverse end elevation similar to Fig. 2 but taken in the direction of arrow 3, Fig. 1,

Fig. 4 is a horizontal section on line 4—4, Fig. 2,

Fig. 5 is a diagrammatic view showing the co-operating parts of the driving and driven disk, with an adjustment of the feed and crimping indicated, and

Fig. 6 is a diagrammatic view similar to a portion of Fig. 2 but with the toothed rolls separated.

Referring to the drawing, the loom frame 10, magazine M with reserve bobbins B with weft ends W, lay L, and shuttle S are all as usual. An arm A on the magazine carries a housing 11 and during loom operation this housing vibrates with a horizontal component which is transverse to the housing as viewed in Fig. 2.

A weight 12 is suspended on spring links 13 secured at their upper ends as at 14 to the housing. An adjusting screw 15 in the housing may be aligned with the weight to limit vibration thereof. A spring pawl 16 is carried by the weight and extends upwardly and to the right as shown in Fig. 3 to engage a ratchet wheel 17 loose on a stud 24 fixed in the housing. A small bearing bracket 19 is held in horizontally adjusted position by screws 20 threaded into the housing and passing through slots 21 in the bracket. A stud 18 is rotatable in the bracket, and the distance between studs 18 and 24 may be varied.

As shown in Figs. 2 and 4 there is a fluted roll 22 fixed to stud 18, and there is a second fluted roll 23 loosely rotatable on stud 24. The teeth 25 of the rolls cause them to rotate together when the stud 18 is rotated and hold the weft ends taut.

In carrying my present invention into effect I secure a disk 30 to adjustable stud 18 as indicated in Figs. 3 and 4, and provide the same with a series of spaced relatively long teeth 31 which preferably project laterally from the disk. The ratchet wheel 17 has a single actuating pin 32 which moves in a path intersecting the path of travel of teeth 31. A hold pawl 33 may be used to prevent retrograde movement of the ratchet and a spring friction 35 engages the rim of disk 30 to hold the latter against rotation except at those times when there is a positive feed of the disk 30.

In operation, vibration of the loom causes motion of the weight 12 relatively to the housing and pawl 16 drives the ratchet wheel 17 loosely about stud 24 in a left hand direction as viewed in Fig. 3, or as shown by arrow b. When the weight moves to the right as viewed in Fig. 3 the pawl 16 effects an advance motion of the ratchet wheel 17 depending in extent upon the position of adjusting or stop screw 15. When the weight 12 moves to the left any tendency to give the ratchet wheel a retrograde motion is checked by hold pawl 33.

As the ratchet wheel rotates, pin 32 will engage one of the teeth 31 on the disk 30 and give the latter a slight angular motion in a right hand direction as viewed in Fig. 3, or in the direction of arrow a. Because of the fact that pin 32 moves about an axis eccentric with respect to the axis of the teeth 31, the said pin will leave one of the teeth 31 as the ratchet continues to rotate, and the disk 30, together with the fluted rolls, will remain at rest because of spring 35 until another rotation of the ratchet 17 brings the pin 32 against the next tooth 31. In this way a slight step-by-step advance motion on the part of disk 30 and therefore the rolls 22 and 23 is effected. The angular rate of travel of the rolls is therefore greatly reduced with diminished wear on the weft ends.

Another feature of my invention results from varying the position of stud 18. When the teeth 25 of the rolls are deeply meshed, as indicated in Fig. 2, the weft ends will be considerably crimped, as shown by the line WC. Under these conditions the stud 18 is nearest to stud 24, hence the pin 32 engages the teeth 31 relatively near the axis of disk 30 and gives the latter a relatively large angular motion. When fine yarns are used, the screws 20 are loosened and bracket 19 moved to the left, Fig. 3, resulting in a separation of the teeth 25 to cause less crimping, as shown diagrammatically in Fig. 6 by the line WL. By this same adjustment, however, the pin 32 engages the teeth 31 at points farther from the axis of disk 30 than previously, therefore the angular motion of the rolls is reduced. Both of these conditions are favorable to fine yarns, and it will be seen that separation of studs 18 and 24 reduces not only the crimping but also lessens the feed for the rolls, thereby reducing abrasion of the yarns. This relation is shown in Fig. 5, where the pin 32 is indicated as travelling in a path 50 when the rolls are close together, causing fast feeding with a high degree of crimping. When the rolls are separated the pin travels along path 60, causing a lower angular rate of motion of the rolls at a time when the crimping of the weft ends is least.

From the foregoing it will be seen that I have provided a simple reduction gearing the effect of which is to use the usual constant rotation of the ratchet wheel to give the fluted rolls a slow step-by-step advanced feed. This is found particularly useful in fine yarns, more especially of the artificial type. Furthermore, the adjustment to reduce crimping simultaneously lessens the feed of the rolls, these conditions adding their advantages and making the thread holder double responsive in its action on yarns when given different adjusted positions. It will also be seen that the teeth 31 and pin 32 constitute a controller in a train of force transmitting mechanism between the vibration motor and the rolls, the controller being effective to transmit a turn-

ing force to the rolls at certain intervals and effective to prevent such transmission of force between these intervals. During the intervals when the rolls are being turned the weft ends W are subjected to active stresses in tension, but between the intervals the crimping of the weft ends effected by the teeth of the rolls serves to maintain a static stress in the threads sufficient to hold them in proper position with respect to the lay. The total length of time during which the weft ends are subjected to active stressing is much less than the time during which they are subjected to static stresses, and therefore the weft ends are less likely to be worn and frayed than has been possible heretofore. For this reason my present invention is particularly useful with fine or loosely spun yarns.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In a thread holder for a loom, a housing subject to vibration as the loom operates, a weight suspended from the housing and capable of relative vibrational motion with respect to the housing during loom operation, a pair of thread engaging rolls, a rotatable actuator, means connected to the weight to turn the actuator during loom operation, an element movable with the actuator, and means moving with the rolls to be engaged by the element once for each revolution of the actuator to effect a relatively small angular motion on the part of the rolls.

2. In a thread holder for a loom, a housing subject to vibration as the loom operates, a weight suspended from the housing and capable of relative vibrational motion with respect to the housing during loom operation, a pair of thread engaging rolls, a rotatable actuator, connections between the actuator and weight to give said actuator a complete revolution by a given number of vibrations of the weight, an element movable with the actuator, and means moving with the rolls to be engaged by the element once for each revolution of the actuator to cause a partial rotation only of the rolls for said given number of vibrations of the weight.

3. In a thread holder for weft replenishing looms having reserve bobbins from which extend weft ends, a pair of fluted rolls having teeth which travel in intersecting paths and between which the weft ends extend, a vibration motor dependent upon loom vibration for its operation, a rotary element receiving constant motion from the motor during loom operation, and speed reducing connections between the element and rolls effective to give the rolls a relatively small angular advance motion for each revolution of the rotary element to stress the weft ends in tension at periodic intervals between which the weft ends are free from tensional stress.

4. In a thread holder for weft replenishing looms having reserve bobbins from which extend weft ends, a pair of fluted rolls having teeth which travel in intersecting paths and between which the weft ends extend, a vibration motor dependent upon loom vibration for its operation, a rotary element movable about the axis of one of the rolls, means to connect the motor to the element to drive the latter during loom operation, a second rotary element rigid with the other of the rolls, and means carried by the first element

to engage the second element and give the latter a relatively small angular motion for each complete revolution of the first element.

5 In a thread holder for weft replenishing looms having reserve bobbins from which extend weft ends, a pair of members having teeth travelling in intersecting paths to engage the weft ends and advance the same in a direction to keep said weft ends taut, an actuator for the rolls having a given angular rate of motion during loom operation, and means to turn the rolls by a series of separate impulses derived from the actuator and require the latter to have a complete revolution for each impulse, the rolls remaining at rest between impulses to relieve the weft ends of tensional strains.

6. In a weft replenishing loom having reserve bobbins from which extend weft ends, a pair of rolls having teeth moving in intersecting paths and between which the weft ends extend, driving mechanism for the rolls, and means to effect simultaneously a separation of the rolls to reduce the amount of crimping of the weft ends and also reduce the rate of travel of said rolls.

7. In a weft replenishing loom having reserve bobbins from which weft ends extend, a plurality of rolls to be located at different distances apart and having teeth which travel in intersecting paths and between which weft ends extend, the amount of crimping of the weft ends depending upon the distance between the rolls and being lessened as said distances increase, a regularly moving actuator movable about the axis of one of the rolls, a driven element secured to another of the rolls, and means on the actuator to engage the driven element to turn the latter and the rolls, the angular rate of motion of the driven element being reduced when the distance between the axes of said rolls is increased.

8. In a weft replenishing loom having a plurality of reserve bobbins from which extend weft ends, a pair of rolls having teeth moving in intersecting paths and between which the weft ends extend, an actuator to rotate the rolls, and variable driving connections between the actuator and rolls to drive said rolls at a given angular rate of motion when said rolls are normally at a given axial distance apart, and operative to give said rolls a lower rate of angular travel when the distance between their axes is increased for the purpose of reducing the amount of crimping caused by the teeth in the weft ends.

9. In a weft replenishing loom having reserve bobbins from which extend weft ends, a pair of rolls to be located at different axial distances from each other and having teeth travelling in intersecting paths and between which the weft ends extend, a regularly moving actuator, a variable driving connection between the actuator and the rolls, said driving connection driving the rolls at a reduced rate when said rolls are separated, to the end that a separation of the rolls to lessen the crimping of the weft ends simultaneously reduces the rate of angular travel of said rolls.

10. In a weft replenishing loom having reserve bobbins from which extend weft ends, a pair of rolls having teeth moving in intersecting paths and between which the weft ends extend, a regularly moving actuator for the rolls, variable reduction gearing between the actuator and the rolls effective to reduce the rate of rotation as the distance between the rolls is increased, and means to mount one roll at a plurality of different distances from the other roll to effect simultaneously a variation in the amount of crimping of the ends

between the rolls and also the angular rate of travel of said rolls.

11. In a weft replenishing loom having reserve bobbins from which extend weft ends, a pair of rolls having teeth moving in intersecting paths and between which the weft ends extend, a variable drive means for the rolls to give the latter a plurality of rates of angular motion dependent upon the distance between the axes of the rolls, and means to locate the rolls with their axes at different distances apart, said means effective jointly to reduce the amount of crimping the weft ends when the rolls are separated and diminish the angular rate of travel of said rolls.

12. In a weft replenishing loom having a series of weft bobbins from which extend weft ends to be subjected alternately to active and static stresses in tension, a pair of rolls between which the weft ends extend and having teeth which move in intersecting paths to engage said ends frictionally, a vibration motor dependent for its operation upon the running of the loom, and intermittently acting means connected to and driven by the motor to connect the latter to the rolls at given intervals longer than the time required for one vibration of the motor, the motor to turn the rolls to subject the weft ends to active tensional stress during said intervals and said means disconnecting the rolls from the motor between said intervals for a time longer than the time required for one vibration of the motor to cause the rolls to subject the weft ends to a static stress.

13. In a weft replenishing loom having reserve bobbins with weft ends to be subjected alternately to active and static stresses in tension, a pair of rolls between which the weft ends extend, said rolls having teeth moving in intersecting paths to engage and deform the weft ends, a vibration motor dependent for its operation upon running of the loom, a train of force transmitting mechanism between the motor and the rolls, and a controller in said train to transmit force from the motor to the rolls at periodic intervals longer than the time required for one vibration of the motor when the weft ends are to be subjected to active tensional stress, said controller effective to interrupt said train between the intervals for a time longer than the time required for one vibration of the motor and prevent transmission of force from the motor to the rolls when the weft ends are to be subjected to static stress by engagement with the teeth of the rolls.

14. In a weft replenishing loom having a series of weft bobbins from which extend weft ends, a pair of fluted rolls with teeth moving in intersecting paths and between which the weft ends extend to be tensioned, a weight caused to be vibrated by loom operation, a train of force transmitting mechanism between the weight and the rolls, and means depending upon vibration of the weight and located in said train to interrupt the transmission of force from the weight to the rolls for a plurality of successive vibrations of the weight.

15. In a thread holder for weft replenishing looms having reserve bobbins from which extend weft ends, a pair of members having teeth travelling in intersecting paths to engage the weft ends and place the latter under tension when said members move to keep the weft ends taut, a vibration motor dependent upon and operating whenever the loom is running, an actu-

ator for the members connected to and driven by the motor whenever the loom is running, and means dependent upon movement of the actuator to connect the latter to the members at
5 periodic intervals to move said members to place the weft ends under an active stress in tension, said members remaining at rest between the intervals to maintain a static stress in tension on the weft ends.
10 16. In a thread holder for a loom, a housing

weight suspended from the housing and capable of relative vibrational motion with respect to the housing during loom operation, a pair of thread engaging rolls, a constantly driven element, means to actuate the driven element by a force derived from the weight during loom operation, a driven member fixed with respect to one of the rolls, and means actuated by the driven element to actuate the driven member
intermittently.

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