

Aug. 19, 1952

R. SUTTON

2,607,543

PIRN WINDING MACHINE

Filed July 30, 1947

7 Sheets-Sheet 1

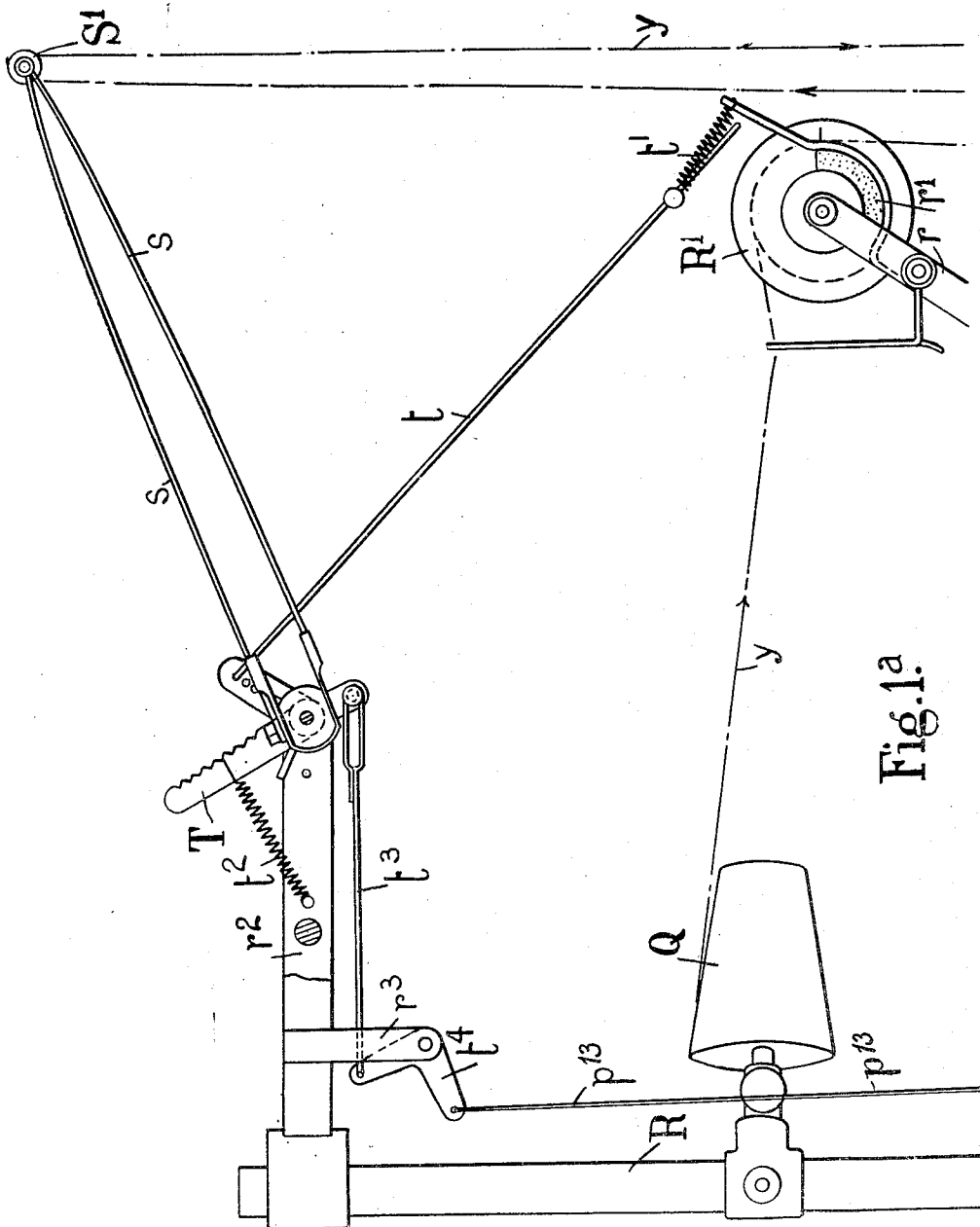


Fig. 1a.

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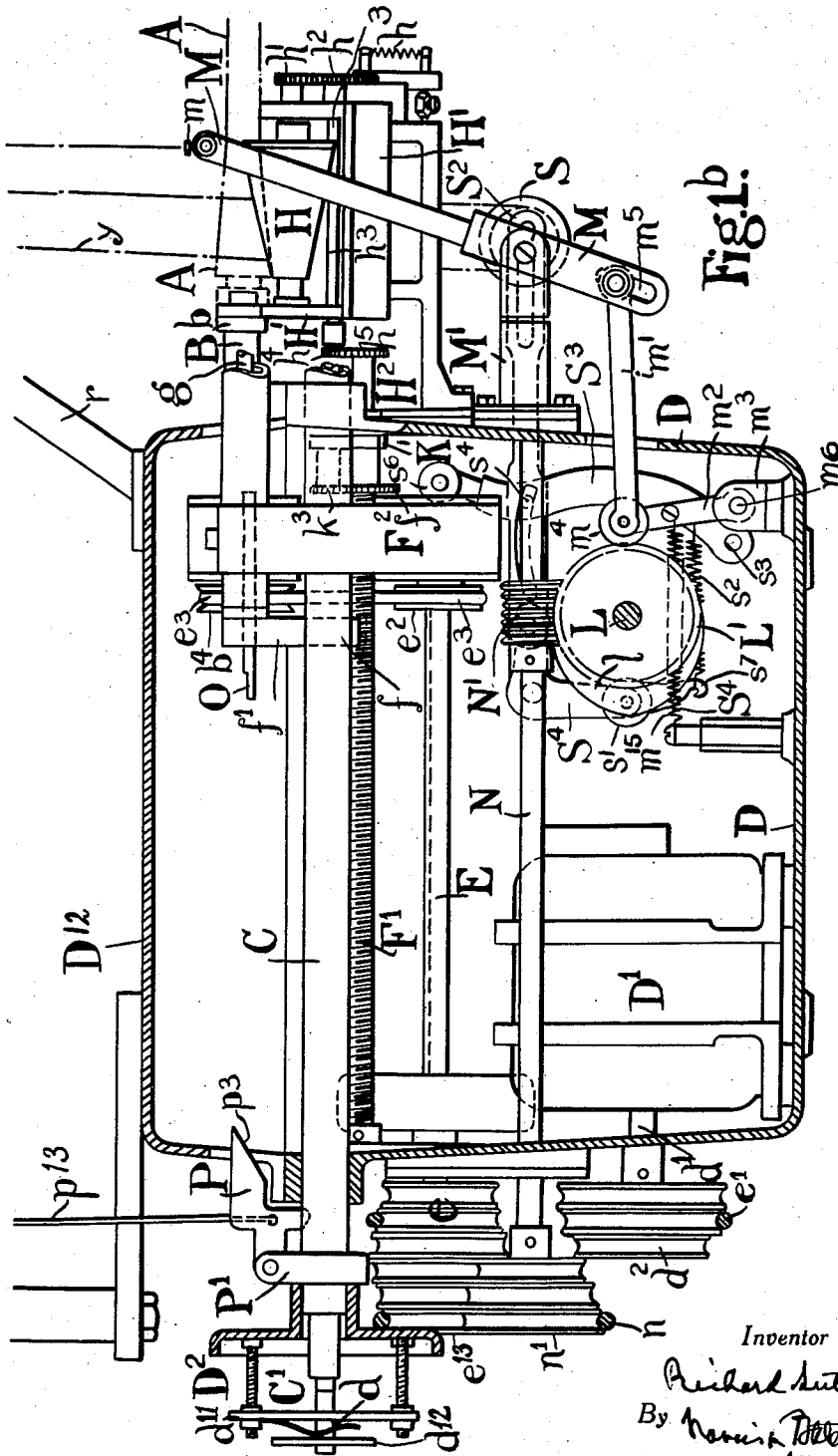
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7 Sheets-Sheet 2



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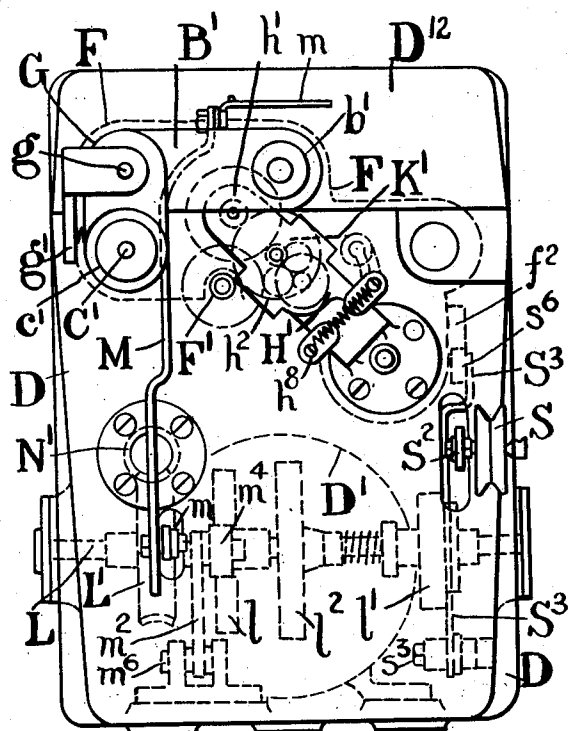
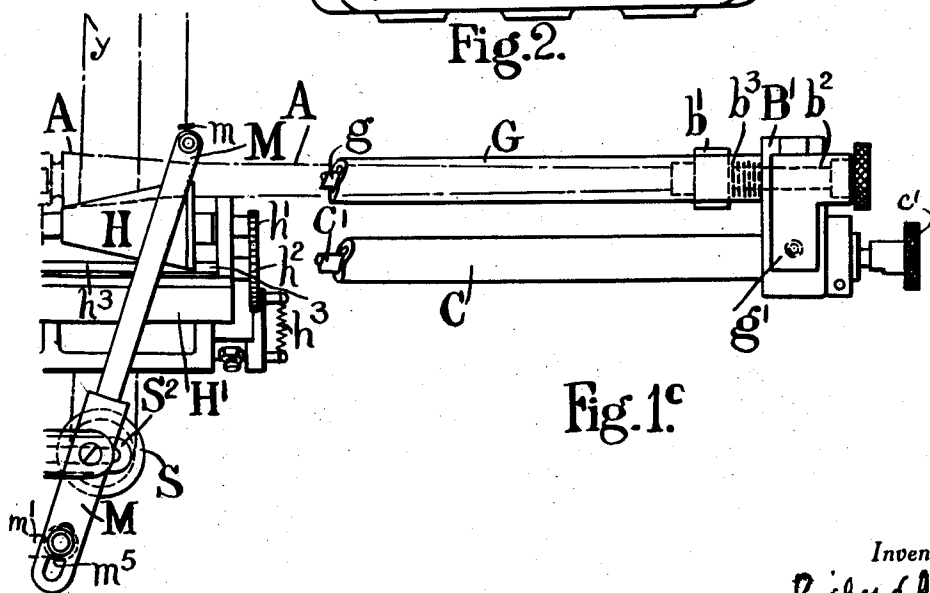
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7 Sheets-Sheet 3



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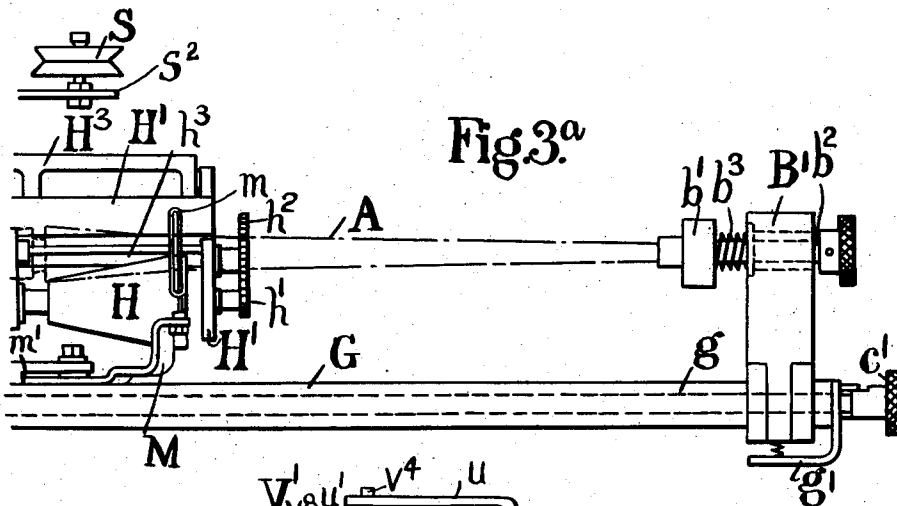
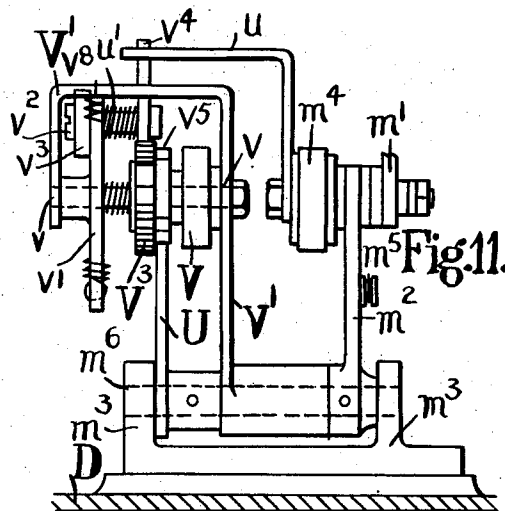
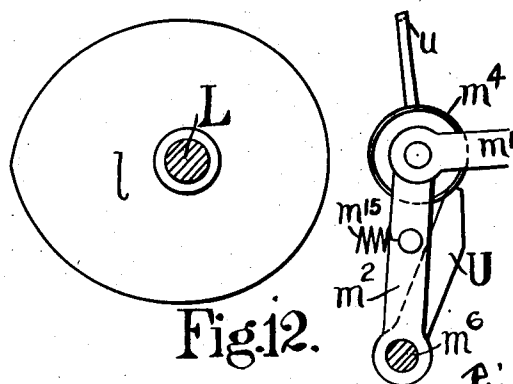
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7 Sheets-Sheet 5



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PIRN WINDING MACHINE

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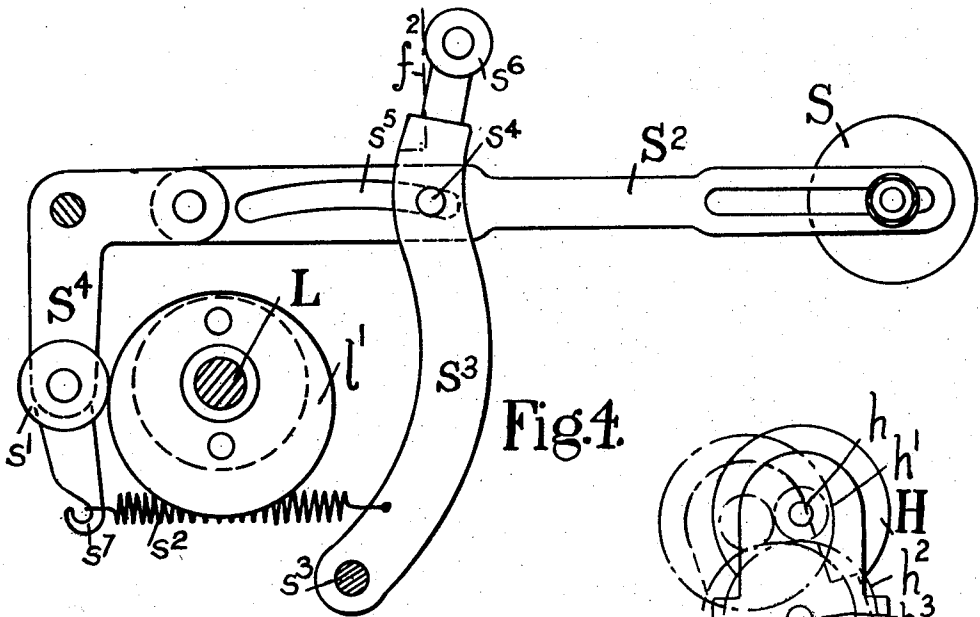


Fig. 4.

Fig. 5.

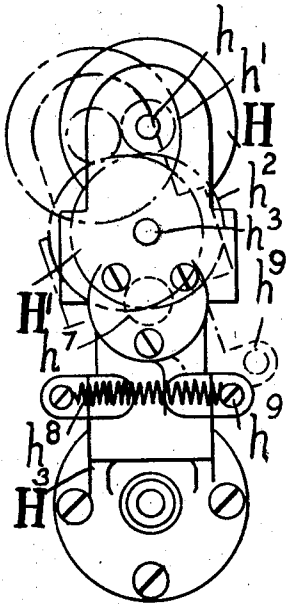
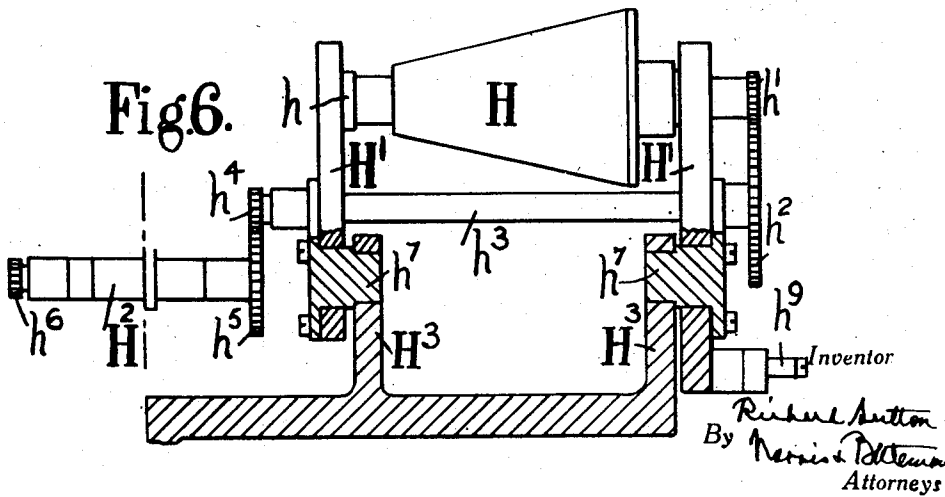


Fig. 6.



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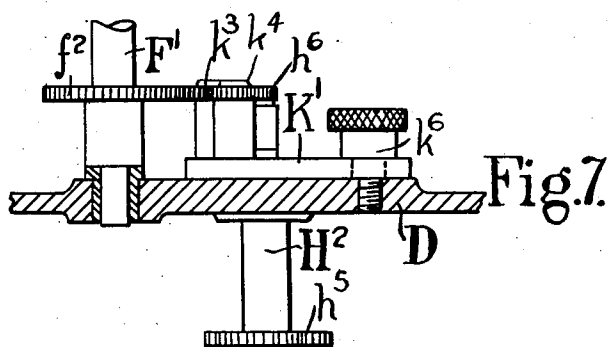
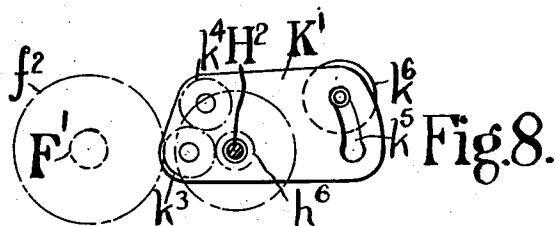
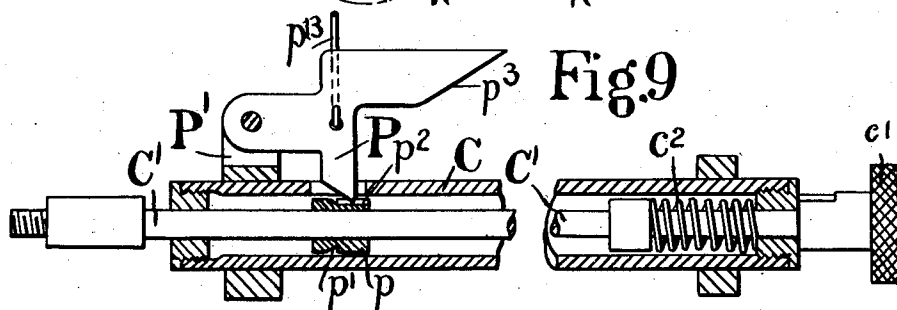
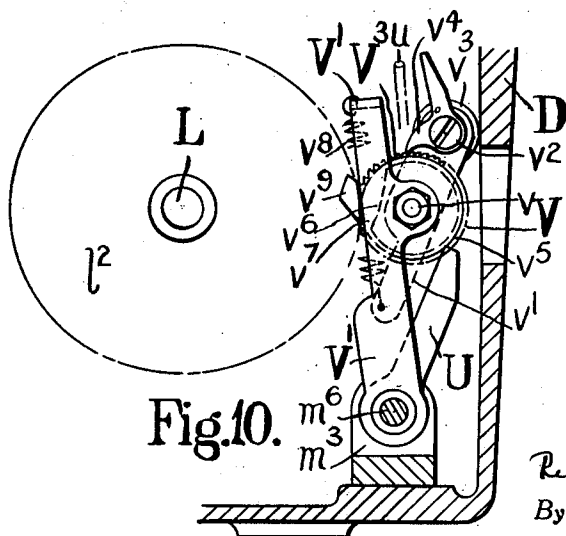
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PIRN WINDING MACHINE

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UNITED STATES PATENT OFFICE

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PIRN WINDING MACHINE

Richard Sutton, Foulridge, England

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In Great Britain August 6, 1946

11 Claims. (Cl. 242—45)

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This invention relates to improvements in pirn winding machines of the kind in which the yarn is wound onto a tube or other yarn carrier in layers at an angle to the axis thereof, the yarn gradually advancing from the base to the tip of the pirn as winding proceeds so that the finished pirn has a tapered end at the base.

According to the invention compensating means are provided to equalise the tension on the yarn during the traverse of the thread laying guide for the laying of each chase as the diameter wound varies from a maximum to a minimum, the movement of the compensating means being synchronised with the movement of the thread laying guide.

The invention is illustrated in and will be described with reference to the accompanying drawings in which:

Figs. 1^a, 1^b, and 1^c are collectively a side elevation of the machine, the casing which houses the greater part of the operating mechanism being in section;

Fig. 2 is an end view;

Figs. 3 and 3^a are collectively a plan with the cover of the casing and the yarn tension compensating mechanism carried thereon removed;

Fig. 4 is a side elevation of the mechanism operating the compensating thread guide roller;

Figs. 5 and 6 are a side elevation and end elevation respectively of the mechanism controlling the traverse of the pirn carrying spindle from the pirn as the latter is built up;

Figs. 7 and 8 are a plan and side elevation respectively of the mechanism for driving the traversing mechanism of the pirn so that the traversing mechanism will rotate in the same direction whichever the direction of rotation of the pirn whereby the machine can be employed for winding weft-way twisted yarn or twist way twisted yarn;

Fig. 9 is a detail sectional view of the automatic stop motion control;

Figs. 10 and 11 are a side elevation and front elevation respectively of a mechanism which can be employed when winding pirns necessary for certain types of automatic looms which require that a predetermined number of turns of yarn should be "bunched" on the pirn at the commencement of winding, i. e. should be wound on without any traverse of the thread laying guide.

Fig. 12 is a side elevation of the form of lever actuating the thread laying guide employed with the bunching mechanism shown in Figs. 10 and 11.

The pirn A onto which the yarn *y* is wound is

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held between a support *b* on the end of a short horizontal shaft B, and a second support *b*¹ rotatably mounted on a pin *b*² mounted in an arm or bracket B¹ slidably mounted on a horizontal tube C.

The support *b* holds the base end of the pirn A with sufficient friction that the pirn A will rotate with the shaft B and the support *b*¹ is held in frictional contact with the tip of the pirn A by the spring *b*³ which also allows of the retraction of the support *b*¹ from the tip of the pirn for removal of the latter from the machine and for placing an empty pirn between the two supports.

Most of the mechanism of the machine is housed in a casing D, and the shaft B projects through the end of the casing so that at the commencement of winding the pirn A is outside the machine but as the winding continues it moves into the casing until when the pirn is fully wound only the portion last wound remains outside the casing.

The shaft B is driven from a reversible motor D¹ so that it can be rotated in either direction according to whether weft or twist yarn is being wound, the motor D¹ being located at the bottom of the casing D. The shaft *d*¹ of the motor D¹ carries a stepped pulley *d*² which drives a correspondingly stepped pulley *e* by the band or cord *e*¹. The pulley *e* is secured on one end of a splined shaft E on the other end of which is mounted a pulley *e*², which rotates with the shaft E but is capable of sliding longitudinally thereon. The pulley *e*² drives by the band or cord *e*³ a pulley *b*⁴ secured on the shaft B.

The shaft B driving the pirn A and the pulley *e*² driven by the shaft E are each mounted in a bearing in a carriage F slidably mounted on the tube C and which is traversed from the front end of the casing D, in the position shown in Fig. 1, to the rear end thereof, during the winding of the pirn by a screwed rod F¹. The rod F¹ is engaged by a half-nut *f* on the end of an arm *f*¹ secured to the end of rod *g* housed in tube G secured at its inner end to the carriage F and its outer end is carried by the arm or bracket B¹ slidably mounted on the tube C. A lever *g*¹ is secured to the end of the rod *g* so that by pressing the lever the arm *f*¹ will be moved angularly to bring the half nut *f* into or out of engagement with the screwed rod F¹.

The screwed rod F¹ receives its rotation during the winding of the pirn from a cone H carried by a pivoted cradle H¹ (see Figs. 5 and 6). The axis of the cone H is parallel to the axis of

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the pirn and the inclination of the cone is the same as but in the opposite direction to the inclination of the conical "chase" of the yarn as it is wound on to the pirn. The cone H is secured on a spindle h on one end of which is affixed a pinion h^1 gearing into a wheel h^2 on a spindle h^3 which carries at its opposite end a pinion h^4 gearing with a wheel h^5 on a short shaft H^2 carrying a pinion h^6 on its inner end. The shaft H^2 is coaxial with the pivots h^7 carrying the cradle H^1 and mounted in the bracket H^3 , so that any pivotal movement of the cradle H^1 about its pivot will not disengage the pinion h^4 from the wheel h^5 . The cone H is held in frictional contact with the yarn on the pirn by a spring h^8 one end of which is anchored to a projection h^9 on the lower end of the cradle H^1 and the other end of which is anchored to the bracket H^3 .

The pinion h^6 on the shaft H^2 , journaled in the end of the casing D (see Figs. 7 and 8), engages a pinion k^3 journaled in a plate K^1 pivotally mounted on the shaft H^2 and capable of being pivoted about the shaft to bring either of the two wheels k^3 or k^4 into engagement with a wheel f^2 on the screwed rod F^1 . The wheel k^3 is always in engagement with the pinion h^6 and the wheel k^4 and when the plate K^1 is in the position shown in Figs. 7 and 8, the pinion h^6 drives the wheel f^2 through the wheel k^3 , the wheel f^2 and rod F^1 thus being rotated in the opposite direction to the pinion h^6 . In this position the wheel k^4 rotates idly. When the plate K^1 is moved to bring the wheel k^4 into engagement with the wheel f^2 the wheel k^3 moves out of engagement with the latter and the drive thereto from the pinion h^6 is through the wheels k^3 and k^4 so that the wheel f^2 and rod F^1 are rotated in the same direction as the pinion h^6 . The gearing from the cone H to the pinion h^6 is preferably such that when the pirn is rotating in the direction for winding weft yarn the pinion h^6 will be rotated in the opposite direction to that necessary for the rotation of the rod F^1 and consequently the drive will be through the pinion h^6 , wheel k^3 and wheel f^2 which when the pirn is rotating in the opposite direction for winding twist yarn, the pinion h^6 will be rotating in the same direction as that necessary for the rod F^1 and the drive for the latter will be through pinion k^3 , wheel k^3 , wheel k^4 and wheel f^2 .

The plate K^1 is provided with a slot k^5 concentric with the shaft H^2 and a locking bolt k^6 passes through the slot k^5 and engaging in the casing C to lock the plate in either of its two positions.

The yarn is guided onto the pirn by an oscillating thread guide m carried on the end of an arm M pivotally mounted on a bracket M^1 extending forwardly from the end of the casing D. The lower end of the arm M is connected by a link m^1 to an arm m^2 pivoted on a bracket m^3 . The pivot pin of the link m^1 and arm m^2 carries a runner m^4 which engages a cam l mounted on a transverse shaft L, the runner being held in contact with the cam by a spring m^{15} acting on the arm m^2 .

The transverse shaft L is driven from the shaft E by a second stepped pulley e^{13} thereon which drives through the band or cord n a stepped pulley n^1 on a longitudinal shaft N, on the opposite end of which is secured a worm N^1 driving a worm wheel L^1 on the end of the cam shaft L. The oscillation of the thread guide m is thus synchronised with the rotation of the shaft B rotating the pirn A.

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So that the chase of the yarn wound onto the pirn can be varied if desired, the distance moved by the guide m for each oscillation is preferably adjustable and this adjustability is obtained by connecting the link m^1 in a slot m^5 in the arm M. Thus by varying the position of the end of the link m^1 in the slot m^5 , its distance from the pivot point of the arm in the bracket M^1 can be varied.

The motor D^1 is controlled by a make and break switch D^2 mounted on the end of the tube C. The stationary contacts d of the switch D^2 are in the form of a spring mounted on a disc d^{11} of insulating material and the other contact is carried on a disc d^{12} also of insulating material affixed on the end of a rod C^1 extending from end to end of the tube C on which the carriage F is slidably mounted. The rod C^1 is so mounted in the tube C that it can be rotated in relation thereto and can also move longitudinally therein. It is rotated by the knob c^1 and a spring c^2 (see Fig. 9) tends to move it in a direction to disengage the contact carried by the disc d^{12} out of engagement with the stationary contact d . The movement of the rod C^1 by the spring c^2 is prevented during the running of the machine by a catch P pivotally mounted on a bracket P^1 surrounding the tube C. One end of the catch P passes through a slot in the tube C into the path of a circumferential groove p^1 in a collar p secured on the rod C^1 . One side of the groove is substantially radial so that when the end of the catch P is engaged in the groove by retracting the rod C^1 against the pressure of the spring c^2 the rod C^1 is held with the contacts of the switch D^2 in engagement and will remain in engagement until the catch P is lifted, the lifting of the catch P being automatically effected either at the completion of the winding of the pirn or should the yarn supply to the pirn break or become exhausted as will be hereinafter described.

So that the contacts of the switch C^2 may be disengaged manually should it be desired to stop the machine at any time, a longitudinal groove p^2 is also formed in the collar p , this groove being of the same depth as the peripheral groove p^1 . Thus if the catch P is engaged in the groove p^1 , i. e. the machine is running, it is only necessary to rotate the rod C^1 by the knob c^1 until the groove p^2 coincides with the end of the catch P and the rod is then free to be moved longitudinally by the spring c^2 to open the switch C^2 and stop the driving motor D^1 . To close the switch it is then only necessary to pull back the rod C^1 and rotate it sufficiently to move the groove p^2 away from the catch P.

The catch P is operated automatically on the completion of the winding of the pirn by a dagger O adjustably mounted in the carriage F, the dagger O engaging the inclined surface p^3 of the catch P when the carriage F has reached the portion on its inward travel corresponding to the completely wound pirn.

The yarn package Q from which the yarn y is supplied is carried by a bracket R affixed to a cover D^{12} of the casing D. The cover D^{12} also carries a pulley R^1 supported on a bracket r around which the yarn passes, preferably one complete turn plus a fraction of a turn, and this pulley is under the control of a light brake r^1 which comes into operation on breakage of the yarn. After passing round the pulley R^1 the yarn passes round a compensating pulley S which is constantly oscillating and from the pulley S it passes over the pulley S^1 carried at the end

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of a pivotal light wire arm s and thence to the thread laying guide m .

The object of the oscillating compensating pulley S is to equalise the tension on the yarn during the traverse of the guide m during the laying of each chase since for each chase the diameter wound varies from a maximum at the commencement of the chase to a minimum at the end thereof whilst the speed of rotation of the pirn remains substantially constant.

The pulley S is rotatably mounted in one end of a right angle lever S^2 linked to a bell crank lever S^4 the depending end S^7 of which carries a runner s^1 which engages a cam l^1 on the transverse cam shaft L being held in contact therewith by a spring s^2 anchored at one end to the end s^7 of the bell crank lever S^4 and at the other end to an arm S^3 pivotally mounted on a stud s^3 carried by the casing D . The arm S^3 is provided with a transverse pin s^4 near its upper end and this pin s^4 engages in a curved slot s^5 in the lever S^2 and forms a pivot about which the lever S^2 can oscillate. The upper end of the arm S^3 carries a runner s^6 which lies in the path of a projecting face f^2 forming part of or secured to the carriage F .

At the commencement of winding of the pirn the difference between the maximum and minimum diameter wound for each chase is less than during the winding of the remainder of the pirn and accordingly the oscillating movement of the pulley S should be a minimum at the commencement of winding and gradually increase to a maximum when the base of the pirn has been wound. This requirement is obtained by the pivot for the lever S^2 being carried by the pivoted arm S^3 and engaging in the slot s^5 in the lever. At the commencement of the winding operation when the carriage F is in the position shown in Figs. 1 and 2 the arm S^3 is pushed over by the face f^2 on the carriage so that the pivot pin s^4 is at the right hand end of the slot s^5 . As the carriage F is gradually traversed along the screwed rod F^1 the arm S^3 will follow it by the influence of the spring s^2 until the pin s^4 reaches the left hand end of the slot s^5 at which point the maximum difference between the maximum and minimum diameter of each chase has been arrived at and continues for the remainder of the winding of the pirn. After the pin s^4 has reached the left hand end of the slot s^5 the face f^2 of the carriage F moves away from the runner s^6 owing to the pin s^4 being held by the end of the slot s^5 and the arm S^3 is maintained in this position by the spring s^2 during the remainder of the winding of the pirn.

As the cam l^1 imparting the oscillatory movement to the compensating pulley S is secured on the same shaft L as the cam l operating the thread laying guide m the movements of the pulley S and guide m are synchronised.

The light wire arm s carrying the pulley S^1 is connected to a three armed lever T pivotally mounted on an arm r^2 on the bracket R . One arm of the lever T is connected by a wire t and spring t^1 to the brake r^1 , the second arm is under the influence of a spring t^2 tending to rotate the lever T in a direction to apply the brake r^1 and the third arm is connected by the wire t^3 to one arm of a bell crank lever t^4 pivotally mounted on a bracket r^3 . The other arm of the bell crank lever t^4 is connected by a wire or rod p^{13} to the pivoted catch P which holds the rod C^1 in the position in which the switch D^2 is closed.

Should the yarn y become exhausted or break between the yarn supply package Q and the

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thread laying guide, the tension of the yarn or the pulley S^1 carried by the arm s is removed and consequently the spring t^2 will rotate the three armed lever T in an anti-clockwise direction.

This movement of the lever T will apply the light brake r^1 to the pulley R^1 thereby immediately stopping delivery of the yarn from the yarn package Q if the movement of the lever T has been caused by breakage of the yarn, and it will also cause the bell crank lever t^4 to rotate in a clockwise direction thereby lifting the catch P out of engagement with the rod C^1 so that the latter will be moved longitudinally by its controlling spring c^2 to open the switch D^2 and stop the motor D^1 from which the whole of the machine receives its drive.

It is necessary that pirns for use in some types of automatic looms should have a number of turns of yarn wound on at the commencement of winding which have not been traversed the length of the chase. The operation of winding these turns of yarn is usually known as "bunching" and during the operation it is necessary that the traversing thread guide m should remain stationary or substantially stationary.

To obtain this "bunching" of the yarn a third cam l^2 is secured on the cam shaft L which cam operates mechanism to prevent the actuation of the guide m for a predetermined number of rotations of the shaft B carrying the pirn.

The bunching mechanism is shown in Figs. 10, 11 and 12 and comprises a runner V carried by a shaft v journaled in a cradle V^1 pivotally mounted on a shaft m^6 which is rotatably carried in the bracket m^3 on which the arm m^2 is pivotally mounted, the arm m^2 being secured to the shaft m^6 . A double armed lever v^1 also mounted on the shaft v carries at one end a pin v^2 on which is mounted a second runner v^3 , which engages the inner face of the front of the casing D , and a pivoted spring controlled pawl v^4 which engages a ratchet wheel V^3 loosely mounted on the shaft v and having a boss v^5 formed with a cut away portion v^6 the surface v^7 of which is preferably curved as shown in Fig. 10. The other end of the two armed lever v^1 is connected by a spring v^8 to the cradle V^1 , the tension of the spring tending to move the lever v^1 to press the runner v^3 against the face of the casing D . The ratchet wheel V^3 has a projection v^9 on its periphery the position of which coincides with the cut away portion v^6 of the boss v^5 .

An arm U is also secured to the shaft m^6 so that it will have the same angular movement as the arm m^2 . The arm U is of such a length that it will be prevented from movement in an anti-clockwise direction (Fig. 10) by the boss v^5 unless the cut away portion v^6 thereof is in its path. When boss v^5 prevents movement of the arm U the latter is in such a position that it holds the arm m^2 against the pressure of the spring m^5 in a position that the runner m^4 is out of the path of the cam l and consequently no movement is imparted to the arm M carrying the yarn laying guide m and the yarn is therefore "bunched" on to the pirn without the formation of a chase.

Each time the runner V is actuated by the rise of the cam l^2 the cradle V^1 is moved towards the face of the casing D and consequently the runner v^3 moves up the face and the two armed lever v^1 is moved in a clockwise direction (Fig. 10) about its pivots through an angular distance equal to one tooth of the ratchet wheel V^3 , so

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that the pawl v^4 rotates the wheel V^3 by one tooth. The wheel V^3 is thus rotated one tooth for each revolution of the cam l^2 , during which period the arm U holds the arm m^2 in a position in which the runner m^4 is out of the path of the cam l , until the cut away portion v^6 of the boss v^5 comes into the path of the arm U and releases the latter so that it will be moved forward with the arm m^2 by the spring m^5 to bring the runner m^4 into engagement with the cam l to reciprocate the thread laying guide m .

When the arm m^2 moves into the position to allow the runner m^4 to be operated by the cam l a projection u carried by the pin on which the runner m^4 is mounted located to the front of the tail of the pawl v^4 trips the pawl v^4 each time the runner m^4 is oscillated and allows the ratchet wheel to be rotated in a backward direction by a controlling spring u^1 so counteracting the forward rotation of the wheel by the action of the cam l . Thus during the normal winding operation the cut away portion v^6 of the boss v^5 remains in a position allowing the arm U to oscillate freely.

I claim:

1. A yarn winding machine of the kind referred to, the combination with a traversing carriage carrying a pirn, and a traversing thread laying guide, of compensating means for equalizing the tension of the yarn during the traverse of the thread laying guide, comprising a guide pulley around which the yarn passes from the yarn supply package to the thread laying guide, a pivoted lever carrying the guide pulley, a cam oscillating the pivoted lever, means for rotating the cam so that the lever and guide pulley are given one complete oscillation for each to and fro movement of the thread laying guide, a pivot pin for the pivoted lever, a pivoted arm carrying the pivot pin, the pivot pin being located in a slot in the lever, the pivoted arm being engaged at the commencement of winding by the traversing carriage carrying the pirn to cause the pivot pin to be at the end of the slot giving a minimum oscillation of the pulley and as the carriage is traversed allowing the arm to follow it until the pivot pin has travelled to the other end of the slot when the maximum oscillation is imparted to the guide pulley, the further travel of the carriage causing it to move away from the pivoted arm which remains in the position giving the maximum oscillation to the guide pulley during the remainder of the winding operation.

2. In a yarn winding machine of the kind referred to having a transversing carriage carrying a pirn, and compensating means for equalising the tension of the yarn during the traverse of the thread laying guide, the combination with a guide pulley around which the yarn passes to the thread laying guide of a pivoted lever carrying the guide pulley, a cam oscillating the pivoted lever, a cam shaft on which the cam is mounted, means for rotating the cam shaft so that the lever and guide pulley are given one complete oscillation for each to and fro movement of the thread laying guide, a pivot pin for the pivoted lever, a pivoted arm carrying the pivot pin, the pivot pin being located in a slot in the lever, the pivoted arm being engaged at the commencement of winding by the traversing carriage carrying the pirn to cause the pivot pin to be at the end of the slot giving a minimum oscillation of the pulley and as the carriage is traversed allowing the arm to follow it until the pivot pin has travelled to the other end of the slot when

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the maximum oscillation is imparted to the guide pulley, the further travel of the carriage causing it to move away from the pivoted arm which remains in the position giving the maximum oscillation to the guide pulley during the remainder of the winding operation, and a second cam mounted on the cam shaft and cooperative with the thread laying guide whereby the movement of the thread laying guide and the tension compensating guide pulley are synchronised.

3. In a yarn winding machine of the kind referred to the combination with a traversing carriage of a spindle rotatably mounted therein to carry and rotate a pirn, a screwed rod by which the carriage is traversed, a cone held in frictional contact with the surface of the yarn as it is wound onto the pirn, a train of reduction gears through which the cone rotates the screwed rod, a thread laying guide for the laying of each chase onto the pirn, a tension compensating guide pulley over which the yarn passes to the thread laying guide, a pivoted lever carrying the guide pulley, a cam oscillating the pivoted lever, a cam shaft on which the cam is mounted, means for rotating the cam shaft so that the lever and guide pulley are given one complete oscillation for each to and fro movement of the thread laying guide, a pivot pin for the pivoted lever, a pivoted arm carrying the pivot pin, the pivot pin being located in a slot in the lever, the pivoted arm being engaged at the commencement of winding by the traversing carriage carrying the pirn to cause the pivot pin to be at the end of the slot giving a minimum oscillation of the pulley and as the carriage is traversed allowing the arm to follow it until the pivot pin has travelled to the other end of the slot when the maximum oscillation is imparted to the guide pulley, the further travel of the carriage causing it to move away from the pivoted arm which remains in the position giving the maximum oscillation to the guide pulley during the remainder of the winding operation, and a second cam mounted on the cam shaft and actuating the thread laying guide whereby the movement of the thread laying guide and the tension compensating guide pulley are synchronised.

4. In a yarn winding machine of the type referred to as in claim 3 the combination with the pirn carrying spindle of a reversible motor for driving it, whereby the spindle can be rotated in either direction according to whether weft or twist yarn is being wound and means in the gear train from the cone to the screwed rod so that the latter will always be rotated in the same direction.

5. In a yarn winding machine of the type referred to as in claim 3 the combination with the pirn carrying spindle of a reversible motor for driving it, whereby the spindle can be rotated in either direction according to whether weft or twist yarn is being wound, means in the gear train from the cone to the screwed rod so that the latter will always be rotated in the same direction, a switch controlling the current to the reversible motor, a rod operating said switch, a longitudinal tube in which the switch operating rod is rotatably and slidably mounted and on which the traversing carriage is slidably mounted, a spring holding the switch in the open position, a pivoted catch holding the switch in the closed position, the catch projecting through the tube and engaging a groove in the rod, a dagger carried by the carriage for operating the catch when the pirn is fully wound to release the rod

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and allow the spring to open the switch and stop the motor and means on the opposite end of the rod to the switch by which the rod can be rotated manually to release the catch and so cause the switch to open at any time during the winding of the pirn.

6. In a yarn winding machine of the type referred to as in claim 3 the combination with the pirn carrying spindle of a reversible motor for driving it, whereby the spindle can be rotated in either direction according to whether weft or twist yarn is being wound, means in the gear train from the cone to the screwed rod so that the latter will always be rotated in the same direction, a switch controlling the current to the reversible motor, a rod operating said switch, a longitudinal tube in which the switch operating rod is rotatably and slidably mounted and on which the traversing carriage is slidably mounted, a spring holding the switch in the open position, a pivoted catch holding the switch in the closed position, the catch projecting through the tube and engaging a groove in the rod, a dagger carried by the carriage for operating the catch when the pirn is fully wound to release the rod and allow the spring to open the switch and stop the motor, means on the opposite end of the rod to the switch by which the rod can be rotated manually to release the catch and so cause the switch to open at any time during the winding of the pirn, a pivoted arm carried by the traversing carriage, a half nut on the end of the pivoted arm, the half nut engaging the screwed rod to traverse the carriage, the arm being adapted to be raised to disengage the half nut from the rod to allow of a quick return of the carriage to its starting position after a pirn has been wound.

7. In a yarn winding machine of the type referred to as in claim 3 the combination with the yarn tension compensating means of a pulley around which the yarn passes before passing around the tension compensating guide pulley, a light brake adapted to act on the pulley, a pivotally mounted arm, a third pulley on the end of said arm around which pulley the yarn passes after passing round the compensating guide pulley and a spring influencing the pivoted arm to move upwards against the downward pressure of the yarn.

8. In a yarn winding machine of the type referred to as in claim 3 the combination with the thread laying guide of means to prevent the traversing of the thread laying guide at the commencement of the winding operation so that a number of turns of yarn are "bunched" on to the pirn.

9. In a yarn winding machine of the type referred to as in claim 3 the combination with the thread laying guide of means to prevent the traversing of the thread laying guide at the commencement of the winding operation so that a

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number of turns of yarn are "bunched" on to the pirn, and a third cam mounted on the cam shaft to control the said "bunching" means.

10. A yarn winding machine of the kind referred to as in claim 9 wherein said means to prevent the traversing of the thread laying guide hold the pivoted lever carrying the compensating pulley out of engagement with its controlling cam during the winding of the "bunching" turns of yarn onto the pirn and releases the lever when these turns have been wound to allow of the normal traversing movement of the thread laying guide.

11. A yarn winding machine, comprising a spindle to carry and rotate a pirn, a motor for rotating said spindle, a switch for controlling the motor, a rod for operating the switch, a spring acting on said rod to actuate it to open the switch, a catch cooperative with said rod to hold the switch in closed condition, a guide for laying the yarn on the pirn, a tension compensating pulley around which the yarn passes, a brake pulley over which the yarn passes to the compensating pulley, a brake cooperative with the brake pulley, a pivotally mounted tension responsive arm having a pulley on the free end thereof around which the yarn passes from the tension compensating pulley and from which the yarn passes to the yarn laying guide, a three-armed lever pivoted coaxially with and connected to said pivotally mounted tension responsive arm, a spring connected to one of the arms of the three-armed lever and acting to raise said tension responsive arm in response to loss of tension on the yarn, means connecting another of said arms of the three-armed lever to said brake and operative to apply the brake to the brake pulley by raising movement of said tension responsive arm, and means connecting the third arm of the three-armed lever to said catch and operative to trip said catch and thereby release said switch operating rod for movement by said spring to open the motor controlling switch simultaneously with the application of the brake to the brake pulley.

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