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3,224,467

FEEDING MECHANISM FOR WEFT IN LOOMS

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2 Sheets-Sheet 1

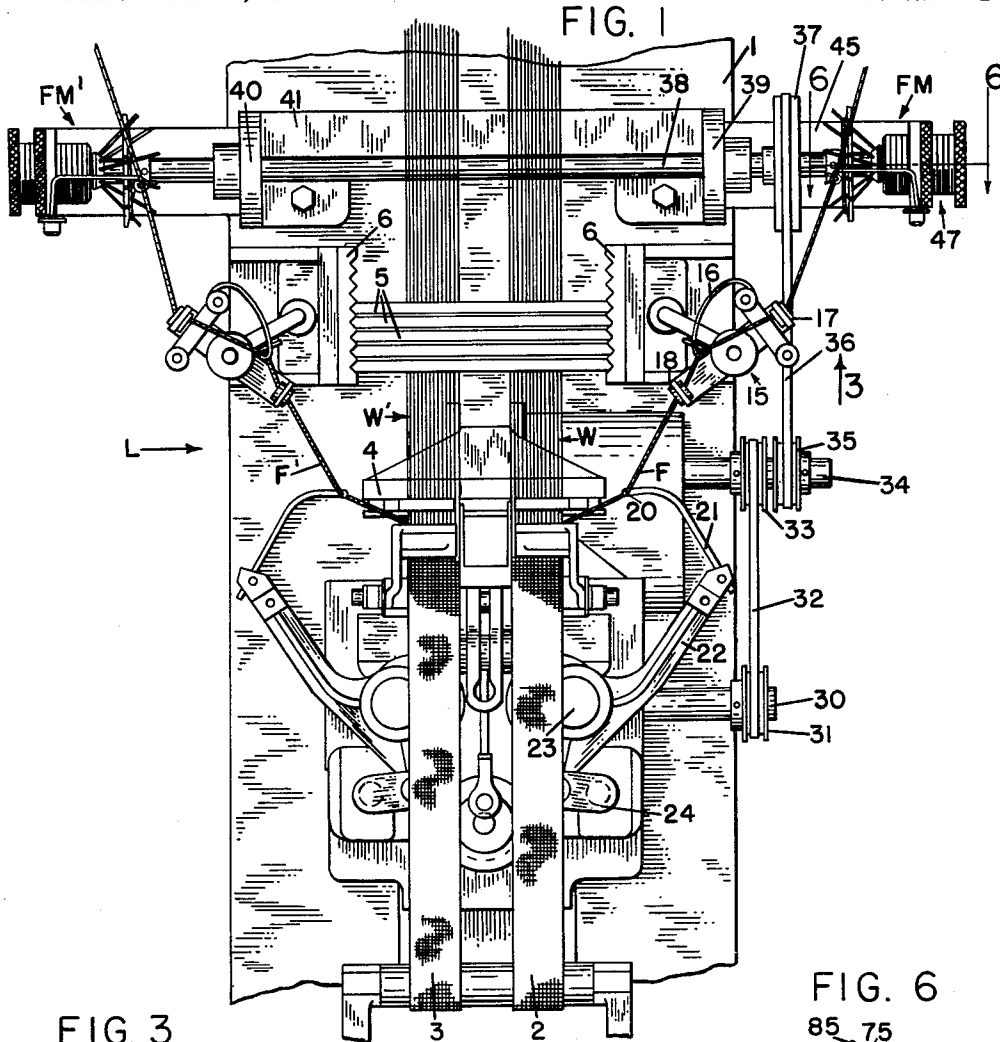


FIG. 3

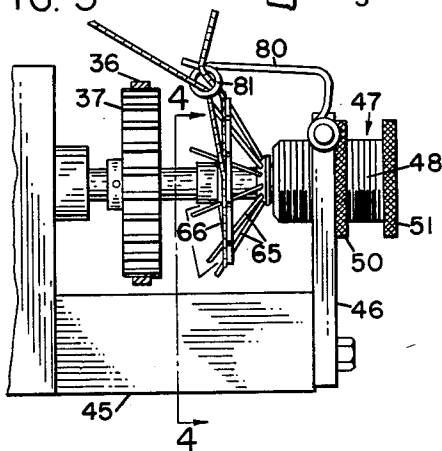
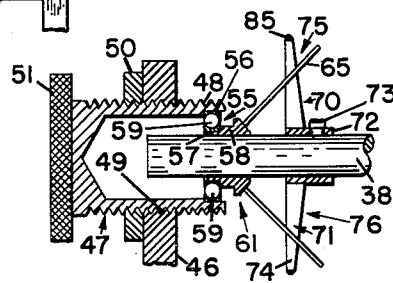


FIG. 6



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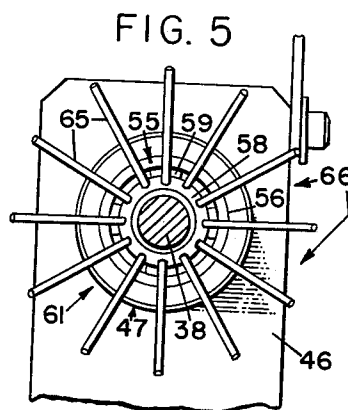
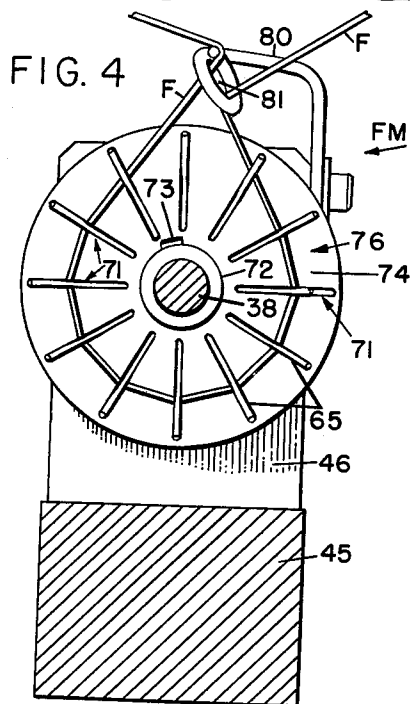
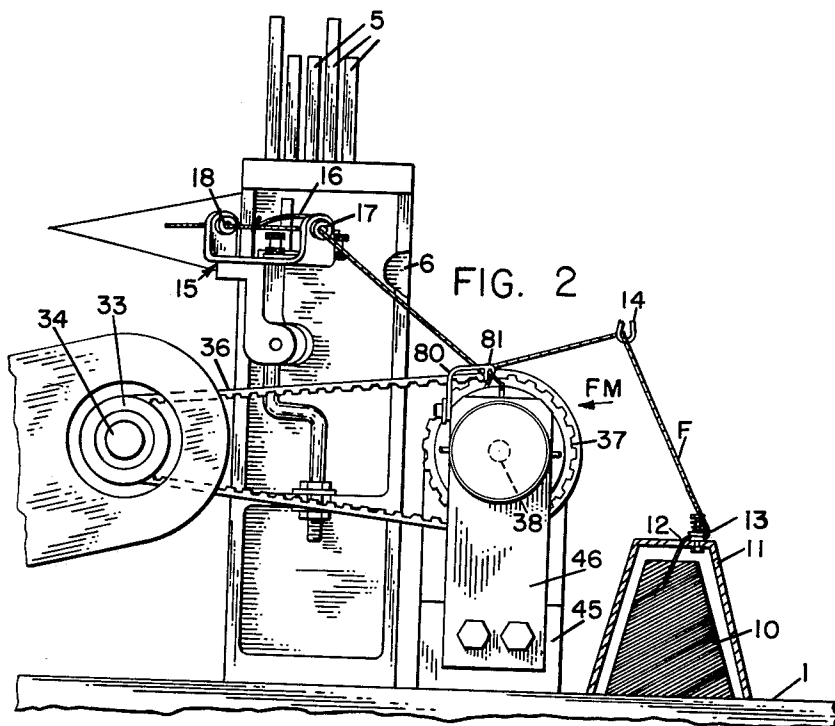
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FEEDING MECHANISM FOR WEFT IN LOOMS

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2 Sheets-Sheet 2



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3,224,467

**FEEDING MECHANISM FOR WEFT IN LOOMS**  
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This invention relates to weft feeding mechanism for looms and it is the general object of the invention to provide means for varying the amount of weft delivered to a loom while the latter is in operation.

In certain types of looms the weft is drawn from a stationary weft supply or package and fed to a weft laying instrumentality, such as a needle, at high speed. Because of the high speed a small difference in the amount of weft fed compared to the amount used will result in either a surplus or a deficiency of weft in a very short time. Feeding mechanisms have been proposed heretofore aimed at meeting this condition but they either require the loom to be stopped for an adjustment, or do not deliver weft at a uniform rate due to the shape of the surface of the feeding mechanism around which the weft is wrapped.

It is an important object of this invention to provide a feeding mechanism which requires the weft to be advanced by engagement with feeding members at the bottom of V notches, which can be moved toward or from an axis of rotation during loom operation to reduce or increase the amount of weft fed for each rotation of the feeding members. In this way it is possible to correct the rate of delivery of weft without stopping the loom and the notches can be relied on to deliver uniform amounts of weft.

It is a further object of the invention to provide a feeding mechanism which will deliver weft in a substantially fixed plane for all adjustments of the amount of weft fed. This result is accomplished as set forth herein by making one of the cooperating feeding members in the form of a disk the plane of which is substantially at right angles to the axis of rotation of the members. The aforesaid V notches move relatively to a flat surface of the disk during adjustments and thus effect delivery of weft at points which are more or less fixed in said plane.

It is a further object of the invention to provide the aforesaid disk with radial slots through which extend rod or wire elements which are oblique to the axis of rotation. The ends of the rod elements remote from the axis form the aforesaid notches with the disk, and the rod elements are mounted on a hub slidable along a shaft while the loom is running to alter the radial distance of the notches from the axis.

It is a further object of the invention to mount a head for movement in a fixed structure in a direction coaxial with the disk member and cause the head when thus moved to slide the hub with its rod elements along the shaft. By having the head screw threaded in the structure it can be turned to effect very small adjustments in the rate of feed of the weft.

In order that the invention may be understood reference will be made to the accompanying drawings which illustrate by way of example, one form of the invention and in which:

FIGURE 1 is a plan view of a needle loom having the invention applied thereto,

FIGURE 2 is a side elevation of part of the loom shown in FIGURE 1 as seen from the right hand side of the latter,

FIGURE 3 is an enlarged front elevation of the feeding mechanisms seen at the upper right side of FIGURE

1 and looking in the direction of arrow 3 in that figure, and

FIGURE 4 is an enlarged section on line 4—4, FIGURE 3, showing the aforesaid disk and the rod elements,

FIGURE 5 is a view similar to FIGURE 4, but with the disk removed to show the hub which supports the rod elements,

FIGURE 6 is a longitudinal section on line 6—6, FIGURE 1.

This invention is usable on a needle loom of the type shown in the Turner Patent No. 2,625,959, but it is not limited in its use to such a loom. A copending application Serial No. 311,285 filed by E. Dolbeare and A. Krukonis shows a somewhat similar feeding mechanism applied to a Turner type needle loom. The drawings of the present case include a figure similar to a figure of the copending case, and only enough of the loom thus shown will be described to indicate how the loom parts cooperate with the feeding mechanism.

Referring to FIGURES 1 and 2 the loom L includes a flat plate 1 which supports the weaving instrumentalities of the loom, and also the right and left hand feeding mechanism FM and FM<sup>1</sup> respectively. The loom set forth herein is designed to weave two webs or fabrics 2 and 3 at the same time. A common reed 4 beats up filling or weft threads F and F<sup>1</sup> to incorporate them into webs 2 and 3.

Harness frames 5 are raised and lowered between guides 6 to form sheds in warp system W and W<sup>1</sup> by mechanism not shown herein. Since the mechanisms for producing the two fabrics are the same except for hand, only one of them will be described in detail, namely, the one in the right hand part of FIGURE 1.

Referring to FIGURE 2, a stationary supply of weft 10 is housed within a shell 11 the upper part of which has an outlet 12 for the weft f. The weft passes between tension pads 13 under spring stress and then goes to a guide 14 from which it is led to the mechanism FM. From the latter mechanism the weft is led to a tension spring arm 16 between guide eyes 17 and 18 on a tension unit 15. The filling goes from guide eye 18 to eye 20 of a weft needle 21 mounted on an oscillating arm 22. The yarn F then passes from the eye 20 to the fabric 2. The arm 22 rocks about a stud 23 and is oscillated by a link 24 operated by known mechanism.

The matter thus far described except the feeding mechanism may be as usual, and as previously suggested is duplicated on the left hand side of the loom. It will be seen that the mechanism FM is intermediate tensions 13 and 15 which serve to hold the thread F taut, although permitting it to move as needed by the loom. It will be understood that needle 21 will move from the position shown in FIGURE 1 to the left to carry filling thread F through the warp W in which a shed has been formed by a harness frame 5. The weft is then caught at left hand selvage and the fabric 2 and the needle 21 is then moved to the right. During movement of the needle to the left, the arm 16 will move down as viewed in FIGURE 1 to pay out some at least of the filling which had been stored in tension 15 due to action of feeding mechanism FM. As the needle moves out of the shed spring 16 will move in a direction to take up weft being advanced by mechanism FM to be stored in the tension 15.

The loom includes a shaft 30 which acts to operate the mechanism (not shown) which oscillates arm 22, and a pulley 31 secured to shaft 30 has trained around it a belt 32 which is trained around a second pulley 33 fast with another shaft 34, which by mechanism (not shown) acts to reciprocate the reed 4. Pulley 35 secured to shaft 34

has trained around it a belt 36 which is also trained around a pulley 37 fastened to a shaft 38 which is rotatable in bearings 39 and 40 of a bearing member 41 supported by plate 1. The foregoing, except for certain parts associated with shaft 38, is usual.

In carrying the invention into effect, the loom is provided with a fixed structure 45 having an upstanding arm 46 in which is screw threaded an adjusting head 47 provided the screw threads 48 which fit into the screw threaded hole 49 of arm 46, see FIGURES 3 and 6. A lock nut 50 is threaded on screw 48 between arm 46 and a knurled hand hold 51. By turning the knurled lock nut 50 against the arm 46 the setting of the head 47 can be fixed.

The outer end of shaft 38 is supported in part at least, by the head 47 through the mechanism shown more particularly in FIGURE 6 and including a ball bearing 55 having an outer ball race 56 fixed with respect to the head 47, and the inner race ring 57 fastened to a hub 58 which is slidable along shaft 38. The balls 59 in the races by reason of the concavity of the latter cause the hub 58 to move along shaft 38 when the head 47 is turned with respect to the fixed structure 45. Hub 58 can thus be moved from the right or left from the position shown in FIGURE 6 depending upon the direction in which the head 47 is turned.

The hub 58 has secured thereto a number of wire or rod elements 65 which are spaced uniformly around the shaft 38. The hub 58 and the parts associated with it may be considered as a longitudinally movable member 61 and the rods 65 as elements which are separated by spaces 66. The elements 65 are oblique relative to the axis of shaft 38 and their axes preferably lie in planes which also contain the axis of shaft 38.

Secured to shaft 38 is another member 70 which has radial slots 71 through which elements 65 extend. The disk member 70 has a hub 72 which is held in longitudinally and angularly adjusted position with respect to shaft 38 by adjusting screw 73. The disk may be considered to have elements 74 between the slots 71, and the slots may be considered as spaces for the elements 65 separating elements 74. There is an element 74 for each element 65 and the disk when turned by shaft 38 exerts a force on the elements 65 causing rotation of member 61 which is mounted for free rotation on shaft 38 as well as being slidable therealong. The parts 61 and 70 are coaxial cooperating members, the elements 65 and 74 of which pass through the spaces 71 and 66 to form notches 75 which are effective to draw weft from the package 10 and advance it toward tension 15. The apices remote from eyelet 81, to be later described, are most effective to advance the weft, and the weft may pull away from the apices near the eyelet as suggested in FIGURE 4.

An inspection of FIGURE 6 will show that the elements 65 and 74 form V shaped notches 75 which point toward shaft 38 and have their apices formed by the surfaces 76 of disks 71 and adjacent rods 65.

The mechanism FM has associated with it a guide wire 80 having an eye 81 through which the filling F passes when approaching the members 61 and 70 from guide 14 and from which the filling issues as it travels toward tension 15 during operation of the machine. It will be understood from FIGURE 4 that the filling F is drawn naturally toward the apices of certain of the V shaped notches because of the tension under which it is held and rotation of shaft 38 will cause the two members 61 and 70 by their engagement with the weft at said apices to advance the weft toward the needle 21.

It is within the capacity of the loom to weave webs 2 and 3 in widths which may vary sufficiently to require the feeding of more or less yarn. When there is to be an adjustment in the amount of weft advanced toward the needle 21 the nut 50 can be loosened and the head 47 turned by reason of the hand hold 51 in a direction which will move the apices of the V-shaped notches 75 either to-

ward or away from the shaft 38, depending upon whether the amount of weft advanced is to be reduced or increased. It is to be understood that between the maximum and minimum limit of weft which can be advanced per rotation of the members 61 and 70, there is an infinite variation so that any desired length of weft between limits can be obtained by turning the head 47.

With respect to the disk 70 it may be noted that the outer ends of the radial slots 71 are preferably closed as at 85 to prevent the weft from accidentally entering a slot, and the surface 76 can be slightly conical as shown in FIGURE 6, or it can if desired, be formed as a plane. Whatever the form of the surface 76 the weft will be delivered from the notches at points which are in a plane substantially at right angles of shaft 38.

From the foregoing it will be seen that the invention provides means to vary manually the feed of weft in a loom while it is running and in amounts representing infinite adjustments between high and low limits. The shaft 30 which drives part at least of the loom is also the driving means by which the members 61 and 70 are rotated. The axial movement of member 61 changes the distance between the shaft 38 and the apices of the V shaped notches 75 and thus changes the amount of weft delivered per rotation of the members. The head 47 is coaxial with the members and aids in supporting the outer end of shaft 38. The outer ends of slots 71 are closed at 85 to prevent the weft from accidentally entering the slots, the disk thus having a continuous periphery. When the disk is slightly conical as shown in FIGURE 6, the weft can be drawn away from the aforesaid apices without engaging the parts of the disk radially beyond the apices.

I claim:

1. In feeding mechanism to advance weft from a stationary supply to weft laying means in a loom, said mechanism having two cooperating coaxial feeding members each having weft engaging elements separated by spaces distributed around the axis of said members, the elements of each member passing through the spaces of the other member, the elements of said two members incident to passing through said spaces forming a series of V-shaped notches the apices of which are located around said axis and in at least some of which the weft is engaged by the elements, said feeding mechanism being characterized by having drive means to cause rotation in unison of said members, and manual adjusting means normally stationary during operation of the loom to effect relative axial movement of said members during rotation of the latter to change the distance of said apices from said axis and thereby vary the amount of weft advanced from said supply to said weft laying means per rotation of said members.

2. In feeding mechanism to advance weft from a stationary supply to weft laying means in a loom, said mechanism having two cooperating coaxial feeding members each having weft engaging elements separated by spaces distributed around the axis of said members, the elements of each member passing through the spaces of the other member, the elements of said two members incident to passing through said spaces forming a series of V-shaped notches the apices of which are located around said axis and in at least some of which the weft is engaged by the elements, said feeding mechanism being characterized by having drive means to cause rotation in unison of said members, and manual adjusting means to effect relative axial movement of said members during rotation of the latter to change the distance of said apices from said axis and thereby vary the amount of weft advanced from said supply to said weft laying means per rotation of said members, said weft feeding mechanism also including a fixed structure, and said manual adjusting means is a head screw threaded in said structure coaxially with said members and is rotatable with respect to said structure to effect said change in the relative positions of said members.

3. The feeding mechanism set forth in claim 2 wherein

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one of said members is in the form of a disk having the spaces thereof formed as radial slots and the elements of the other members pass through said slots.

4. The feeding mechanism set forth in claim 2 wherein the members are mounted on a shaft operatively connected to said drive means and one end of said shaft is supported by said adjusting means.

5. The weft feeding mechanism set forth in claim 3 wherein the periphery of said disk is continuous and the outer ends of said slots are closed, whereby the weft is prevented from entering said slots.

6. The weft feeding mechanism set forth in claim 4 wherein one of said members is secured to and rotated by said shaft and the other member is slidable along said shaft when said adjusting means moves along said axis.

7. The feeding mechanism as set forth in claim 3 wherein said disk member rotates at a stationary point along said axis for said disk member having a weft engaging surface which is slightly conical in a direction away from the other member, said conical surface engaging the weft as the latter is advanced and the weft when moving toward said weft laying means in a plane perpendicular to said axis being spaced from that part of said conical surface beyond said apices with reference to said axis.

8. In a weft mechanism for a loom having a stationary weft supply and a weft laying needle and operating with a tension means for the weft adjacent to said supply and another tension means adjacent to said weft laying needle, the mechanism being located between said tension means and having two cooperating coaxial rotatable weft feeding members each having a set of weft engaging elements separated by spaces distributed about the axis of said members and the elements of each member extending through the spaces of the other member and said elements forming V-shaped notches the apices of which point toward said axis and engage the weft thread, said feeding mechanism characterized by having a driving means to rotate one of said members about said axis and cause the elements thereof by engagement with the elements of the other member to rotate the latter, a head normally stationary and movable manually along said axis while the members are rotating and effective when thus moved to change the relative positions to said members to change the radial distance of said apices from said axis and thereby vary the amount of weft fed toward the needle for each rotation of said members.

9. In a weft feeding mechanism for a loom having a fixed structure and a stationary weft supply and a weft laying needle and operating with a tension means for the weft adjacent to said supply and another tension means adjacent to the weft laying needle and having two relatively movable weft engaging members, said measuring mechanism characterized by having one of said members formed as a disk formed with radial slots and having the other of said members provided with fingers extending through said slots, one finger for each slot, a shaft to which said one member is secured rotatable on said structure, means to drive the shaft, a hub rotatable on said shaft having said fingers secured thereto, and an adjusting head screw threaded in said structure concentric with said shaft operatively connected to said hub in such manner that said hub and head move together along said shaft

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as said head is rotated in said structure, said fingers being oblique with respect to said disk and forming with the latter weft receiving angular notches the apices of which move along said slots as the head when rotated causes the hub to move toward or from said disc member.

10. In a weft feeding mechanism for a loom having a fixed structure and a stationary weft supply and a weft laying needle and operating with a tension means for the weft adjacent to said supply and another tension means adjacent to the weft laying needle and having two relatively movable weft engaging advancing members, said feeding mechanism characterized by a normally stationary head independently rotatable on said structure about an axis and effective due to rotation to move relatively to said structure along said axis, operative connections between said head and one of said members causing the latter to move with the head when the latter moves with respect to said structure, driving means to rotate the other member about said axis to operate the feeding mechanism, and manually operable means associated with said head by which the latter can be independently rotated during operation of the feeding mechanism by said driving means to vary the relative position of said members, the weft being led from said supply around said members and then delivered to said weft laying needle, the length of weft delivered for each rotation of the said members depending upon their relative position with respect to each other.

11. In a weft feeding mechanism for a loom having a fixed structure and a stationary weft supply and a weft laying needle and operating with two relatively movable weft engaging members driving means to rotate said members about an axis, said feeding mechanism characterized by a head screw threaded into said structure and moved relatively thereto along an axis when rotated, means causing said members to move with respect to each other along said axis when said head is rotated, said members capable of being moved with respect to each other while being rotated by said driving means, and the length of weft advanced by a rotation of said members depending on the relative positions of said members.

12. The weft feeding mechanism set forth in claim 11 wherein said members are mounted on a shaft rotated by said driving means and one of said members is a disk secured to the shaft and having radial slots therein and the other member is loose on said shaft capable of sliding therealong and has wire fingers extending through said slots, the disk member rotating said other member by engagement of the sides of the slots with said fingers.

13. The weft feeding mechanism set forth in claim 12 wherein the parts of the fingers which project through the disk are at an acute angle with said shaft.

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