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J. M. PATRICK

2,204,442

WARP BEAM

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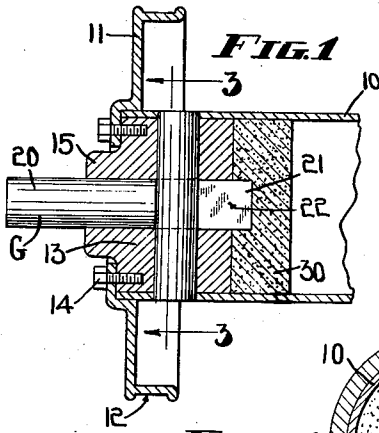


FIG. 4

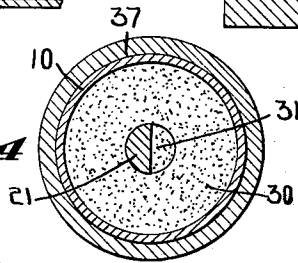
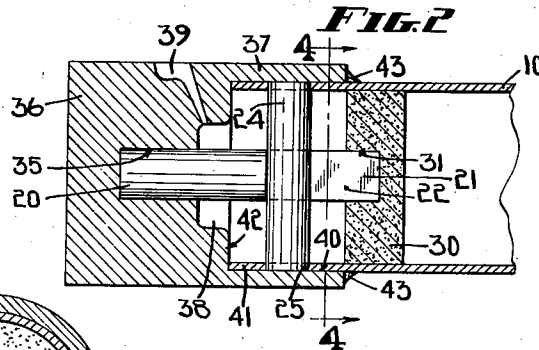


FIG. 2

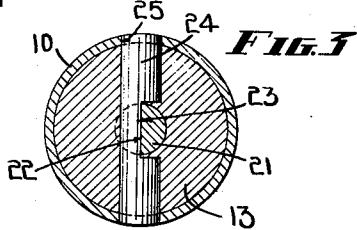


FIG. 3

FIG. 5

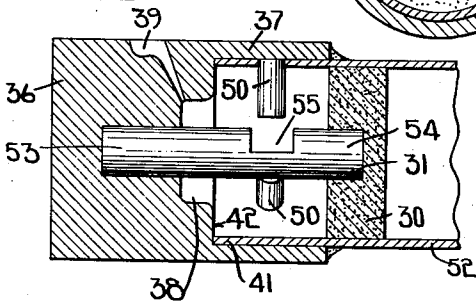


FIG. 6

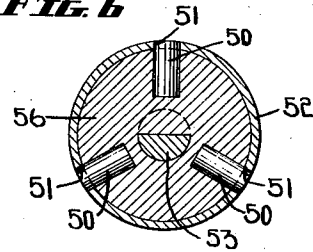


FIG. 7

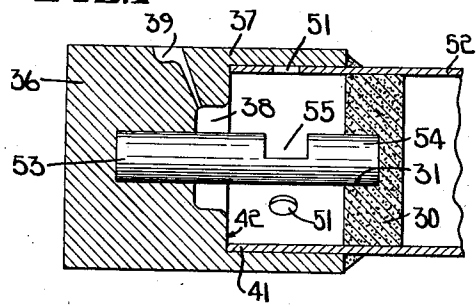
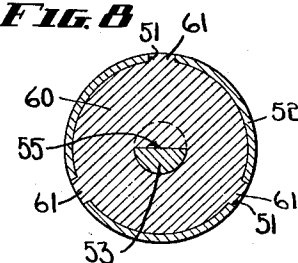


FIG. 8



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WARP BEAM

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2 Claims. (Cl. 242—118)

This invention relates to improvements in warp beams and it is a general object of the invention to provide a warp beam wherein the supporting gudgeon at the end thereof is held in place by metal cast into the metallic tube forming the barrel of the beam.

Loom warp beams ordinarily comprise a warp thread receiving barrel carrying a friction head or some similar device to retard the forward feeding of the warp during the weaving operation. The beam is generally formed with a gudgeon at each end to be received by holding pockets in the loom frame, and serving also to support the beam when the latter is in the warp winding machine. It is an important object of my present invention to provide a simple means for holding the gudgeon to the barrel when the latter is made of a metal tube or the like and also provide a method for holding the gudgeon and casting the holding block therefor when the barrel is horizontal.

Since warp beams are frequently comparatively long it is desirable to keep them horizontal during the molding operation, and it is a further object of my present invention to provide a stop or plug to be inserted into the tube to limit the flow of molten metal along the length of the tube. The plug is preferably made with a pocket to receive one end of the gudgeon while the other end of the gudgeon is received by an exterior mold or form fitting around the outside of the tube and also having a pocket to receive the outer end of the gudgeon. The outside mold therefore assists the plug in positioning the gudgeon while the metal is poured through either the outside form or a perforation in the tube to fill the space within the barrel and located between the mold and plug.

It is necessary to make some provision for preventing the cast metal when cool from sliding lengthwise within the tube and this result I may accomplish in several different ways. In the preferred form I employ a rod extending diametrically through the barrel and having its ends received by apertures in the barrel, the gudgeon and rod having mutual engagement along flattened areas so that each tends to prevent rotation of the other as the molten metal flows around them.

In a modification I employ rods or the like secured in perforations in the barrel and projecting toward the center thereof but without having contact with the gudgeon. These short rods become embedded in the molten metal and by their

engagement with the barrel hold the cast metal and gudgeon in fixed position.

In another modification the barrel is provided with apertures which are closed by a portion of the outside mold so that the molten metal flows outwardly through said perforations but is stopped by an interior cylindrical surface of the outer mold, thus forming lugs which prevent longitudinal motion of the cast metal in the tubular barrel.

In all forms of the invention I find it desirable to use the plug when the barrel is kept horizontal during the molding operation, and in the modified forms some portion of the gudgeon located within the mass of molten metal will be non-circular so as to prevent relative rotation of the gudgeon with respect to the molten metal which surrounds it. Some warp beams are formed with attaching means for the warp requiring perforations extending along the beam and when a beam of this type is to be used the plugs can be washed out before the beam is put in use, otherwise the plug may remain within the barrel.

A beam made according to any of the forms of the invention to be set forth hereinafter may have a friction head which fits over the end of the beam and is held by fastening means which extend into the cast metal.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth in the claims.

In the accompanying drawing, wherein three convenient embodiments of my invention are set forth:

Fig. 1 is a vertical section through one end of a beam made according to my present invention after the casting operation has been completed,

Fig. 2 is a view similar to Fig. 1 but showing the plug and outside mold in place to confine the molten metal,

Fig. 3 is a vertical section on line 3—3 of Fig. 1,

Fig. 4 is a vertical section on line 4—4 of Fig. 2,

Fig. 5 is a view similar to Fig. 2 but showing the first modification of the invention wherein short rods held by the warp barrel extend into the body of cast metal,

Fig. 6 is a view similar to Fig. 3 but showing the first modification,

Fig. 7 is a second modification in which the cast metal flows into perforations formed in the beam barrel, and

Fig. 8 is a view similar to Fig. 3 but showing the second modification.

Referring to Fig. 1, I have shown a hollow metallic beam barrel 10, preferably of steel, and a friction head 11 having a periphery 12 to receive some form of friction device, such as a strap, to control let-off of the warp during weaving operations. Located in the end of the tube 10 is a block of cast metal, such as cast iron, indicated at 13 into which are tapped bolts 14 which hold the friction head 11 securely to the barrel 10. The cast metal 13 may have a hub 15 extending along a steel gudgeon G which projects beyond the end of the hub to be received either by bearings in the warp winding machine or pockets in a loom frame. In all forms of my invention the beam will be substantially as described except for the form of the gudgeon G and certain other characteristics of the cast metal 13 which will appear hereinafter. The gudgeon is turned to be true with the surface of the barrel 10 and the latter will have wound thereon warp threads which will ordinarily be confined between warp heads not shown but well-known and similar, for instance, to those set forth in Patent No. 2,025,890.

In the preferred form of my invention the gudgeon has an outer bearing surface 20 and an inner end 21 which is semi-circular in cross section as suggested in Fig. 4, thereby providing a flat surface 22 against which lies another flat surface 23 formed on a steel cross rod 24 the ends of which fit closely into perforations 25 formed in the barrel 10. When preparing to cast metal around the gudgeon and the rod 24 a plug 30 is fitted into the tube 10 for a distance depending upon the length of the gudgeon. This plug fits as closely as is consistent with sliding engagement with the interior of the tube and is formed with a cylindrical pocket 31 which receives the inner end of the slabbled or semi-circular gudgeon end 21. The diameter of the pocket 31 is substantially the same as that of the gudgeon or slightly larger and the fact that the pocket 31 is circular in cross section permits the placement of the plug 30 in any angular position relatively to the tube 10.

The outer end 20 of the gudgeon is then fitted into a pocket 35 aligned with the pocket 31 and formed in an outer mold or form 36 which has a shell 37 extending along and fitting closely over the outer surface of the tube 10 at the end thereof, as suggested in Fig. 2. The body of the mold 36 may be recessed as at 38 to form the previously described hub 15, and a metal pouring gate 39 may be provided.

When assembling the parts for the preferred form the rod 24 has its ends fitted into the perforations 25 and the flattened surface parallel to the axis of the barrel. The gudgeon is then inserted into pocket 35 and the shell 37 of the mold 36 fitted over the end of the tube and slid therealong. The inner cylindrical surface 40 of the shell permits rotation of the latter so that the surface 22 can be made to lie along the surface 23. Further endwise motion of the outer mold toward the plug will move the inner end of the gudgeon into the pocket 31 and when the mold 36 has been moved as far as possible by engagement of the end 41 of the barrel with a vertical wall 42 of the mold, clay or the like indicated at 43 is used to seal the joint between the outer surface of the tube 10 and the end of the shell 37.

Molten metal such as cast iron is then poured

into the gate 39 and surrounds the gudgeon and the rod 24, flowing into that part of the pocket 31 not occupied by the end 21 of the gudgeon and flowing also into the recess 38 to form the hub 15. Flow of the molten metal along the tube is limited by the plug 30 and upon cooling the cast metal tightly grips the gudgeon and rod 24, the latter holding the cast metal block 13 in fixed position with respect to the barrel 10 and the cast metal holding the gudgeon centrally with respect to the barrel. Any tendency of the gudgeon or the rod 24 to turn will be prevented by the mutual engagement of the surfaces 22 and 23. After cooling the mold 36 is removed but the plug 30 may remain in the barrel 10 if desired. If, on the other hand, the barrel is to be provided with perforations for the purpose of holding warp threads such as those shown in Gordon Patent No. 1,654,216, the plug 30 will be washed out.

In the first modification shown in Figs. 5 and 6 I may use three short rods 50, preferably of steel, which are fitted into apertures 51 in the periphery of tubular steel barrel 52 and gudgeon 53 has a cylindrical outer end as in the preferred form and has also a cylindrical inner end 54. Between the ends the gudgeon is machine or otherwise treated to provide a non-circular portion 55. The gudgeon is held by the mold 36 which will be the same as in the preferred form and fits into the pocket 31 of the plug 30 which will also be the same as in the preferred form. In this modification the cast metal will be introduced in the same manner as that described in the preferred form while the beam barrel is horizontal and upon cooling the rods 50 will hold the mass or block of cast metal 56 tightly with respect to the barrel while said mass of metal will hold the gudgeon centrally with respect to the tubular barrel.

In the second modification of the invention shown in Figs. 7 and 8 the gudgeon 53 may be the same as in the first modification but the rods 50 are omitted and the apertures 51 are covered by the shell 37 of the mold 36. In this second modification therefore the metal flows out into the apertures 51 and is limited by the interior surface 40 of the shell 37. Upon cooling the integral lugs 61 on the block 60 of cast metal pass into the apertures to hold metal 60 rigidly with respect to the tubular barrel 52 and the gudgeon will be held as in the first modification.

It is to be understood that in both the first and the second modifications the plug 30 will be used as in the preferred form and can remain within the barrel if desired.

From the foregoing it will be seen that I have provided an improved form of warp beam wherein the supporting gudgeon is held by a body of cast metal poured directly into the hollow metallic barrel. It will also be seen that flow of the molten metal along and within the hollow barrel is limited by the plug 30 which also provides a support for the inner end of the gudgeon during the molding operation. In the preferred form it will be seen that the engaging surfaces of the rod 24 and the gudgeon tend to position these parts, the inner end of the gudgeon being supported not only by the plug as already described but also by the rod 24. Also in the preferred form the semi-circular end 21 of the gudgeon is able to slide along surface 23 of the rod 24 when the mold 36 is moved over the end of the tube 10, thereby assisting in directing said end 21 into the pocket 31. In the first

modification the short rods 50 are gripped tightly by the cooling cast metal to hold them fixedly to the hollow barrel. In the second modification the molten metal flows through the apertures 51, the extent of the flow being limited by the shell 37.

The method for securing the gudgeon to the barrel as set forth hereinbefore is not claimed in this application but is made the subject matter of another application.

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 warp beam having a metallic tubular barrel provided with perforations adjacent one end thereof, a gudgeon projecting from one end of the barrel, a rod fitted into the perforations and extending across the interior of the barrel, said gudgeon and rod having mutually engaging flattened surfaces, and a block of cast metal engaging the interior surface of the barrel and surrounding the gudgeon and the rod and closing said end of the barrel, the rod tending to

prevent movement of the block of cast metal relatively to the barrel, and said rod and block of cast metal holding the gudgeon in fixed position with respect to the barrel.

2. In a warp beam having a metallic tubular barrel with diametrically opposite perforations in the periphery thereof adjacent one end of the barrel, a gudgeon projecting from said end of the barrel and having a flattened area, a rod extending diametrically across the interior of the barrel and having the ends thereof terminating in said perforations and having a flattened area engaging the flattened area of the gudgeon, mutual engagement of said areas tending to prevent rotation of the gudgeon and rod about the axes thereof, and a block of cast metal closing the end of the barrel and engaging the interior surface of the latter and surrounding the rod and gudgeon to hold the same against relative motion, said rod tending to prevent movement of the block of cast metal relatively to the barrel and said rod and block of cast metal tending to hold the gudgeon in fixed position relatively to the barrel.

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