May 17, 1938. C. P. PARK 2,117,353

BOBBIN AND METHOD OF MAKING THE SAME

Filed Feb. 10, 1937

Fig. 1.

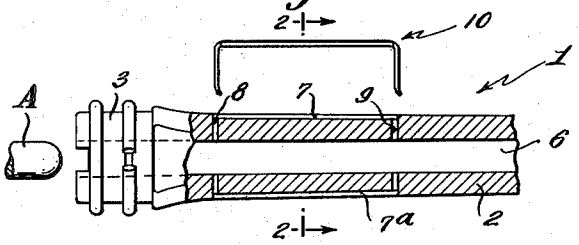


Fig. 2.

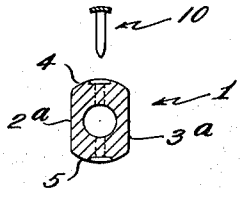


Fig. 3.

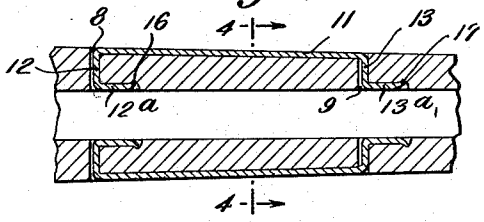


Fig. 4.

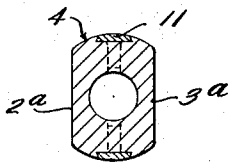
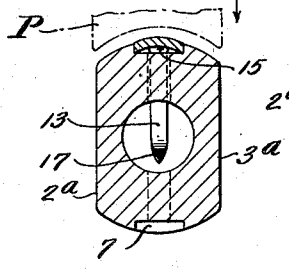


Fig. 5.



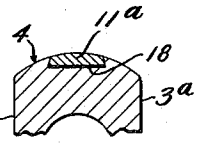


Fig. 8.

Fig. 6.

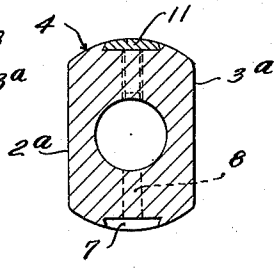


Fig. 7.

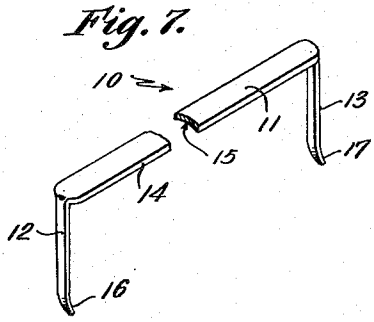
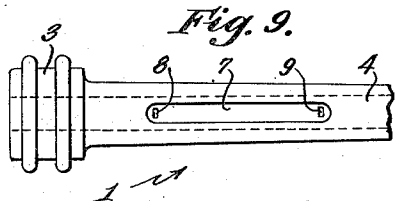


Fig. 9.



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UNITED STATES PATENT OFFICE

2,117,353

BOBBIN AND METHOD OF MAKING THE SAME

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Application February 10, 1937, Serial No. 125,062

6 Claims. (Cl. 139—289)

This invention pertains to weaving and relates more particularly to improved bobbins for loom shuttles and to a method of making such bobbins.

In certain types of loom, electrically controlled stop and/or replenishment mechanisms are employed. In such looms it is common to provide a feeler designed to complete the actuating circuit of such mechanically controlled mechanism by engagement with a metallic contact element carried by the bobbin. This contact is normally covered by the yarn mass on the bobbin and is exposed for engagement by the feeler only when the yarn is substantially exhausted.

Preferably the contact element carried by the bobbin should be of substantial length, longitudinally of the bobbin, to insure proper engagement by the feeler under practical conditions of mill use. Moreover, the contact element should be smooth and substantially flush with the outer surface of the bobbin body in order to prevent it from catching or abrading the yarn; it should be so designed that its presence will not interfere with the operation of winding the yarn upon the bobbin, or with the shape of the wound yarn mass, or with the operation of the bobbin holding means of the shuttle, or with the ejecting and replenishment devices of the loom; and it should be so firmly secured to the bobbin body as to enable it to undergo all of the various operations and handlings to which a bobbin is subjected during use without becoming loose, distorted or otherwise functionally damaged.

However, the above conditions are not easily met. Bobbins are commonly made of wood and have an axial bore for the reception of a spindle. Thus the fastening means for the contact element can not extend diametrically across the bobbin. The wall of wood which surrounds the bore is quite thin and readily split or cracked and the bore must not be restricted by parts projecting inwardly beyond the inner surface of said wall. Moreover, it is sometimes desirable to provide two independent contact elements on the bobbin, such contacts preferably being insulated from each other by the material of the bobbin body, and thus bands or similar fastening means embracing the bobbin body are impracticable. While it has heretofore been proposed to insert a metallic contact member by pushing it forwardly into an undercut or dovetailed slot extending forwardly from the butt end of the bobbin and then applying means to prevent the contact member from slipping out during use, such a method of holding the bobbin member in place is inadequate, as the thin edges of the dovetailed slot easily split off during use, especially when the bobbin is subjected to the action of certain types of bobbin-stripping machine.

The principal objects of the present invention are to provide a bobbin having incorporated therein a contact member or members so mounted as to satisfy all of the conditions met with in mill practice and in particular to provide a contact member so secured in position that it will not loosen during the normal life of the bobbin; to provide contact means of simple and inexpensive type affording all of the desired contact surface but without substantially affecting the shape or external contour of the bobbin; to provide contact means readily applicable to bobbins whether of the usual cylindrical type or those having flat blade-like bodies; and to provide a novel method of securing metallic contact elements to bobbin bodies.

Further objects and advantages of the invention will be pointed out in the following more detailed description and by reference to the accompanying drawing in which

Fig. 1 is a fragmentary side elevation, partly in vertical section, of a bobbin prepared for the reception of a contact member in accordance with the present invention, showing the contact member ready for assembly with the bobbin, proper;

Fig. 2 is a section substantially on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary section similar to Fig. 1, showing two contact members fully assembled with the bobbin in accordance with the present invention;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is an enlarged transverse section showing an early stage in the assembly of the contact member with the bobbin;

Fig. 6 is a view similar to Fig. 5, showing the parts at a later stage in the operation;

Fig. 7 is a fragmentary perspective view illustrating a preferred form of contact member, drawn to large scale;

Fig. 8 is a fragmentary transverse section similar to Fig. 6, showing the slight modification; and

Fig. 9 is a fragmentary plan view of the bobbin of Fig. 1, showing the bobbin as prepared for reception of the contact member.

Referring to the drawing, the numeral 1 designates a bobbin such as is commonly used in the shuttle of a weaving loom. This bobbin comprises a body portion 2 and a butt portion 3, the butt portion being of circular cross section and somewhat larger in diameter than the body por-

tion and being provided with means whereby the butt may be securely held in position within a shuttle. As here illustrated the bobbin is of the so-called flat type such, for example, as illustrated in the application for Letters Patent of the United States, Serial No. 116,334, filed by William J. McGeough on December 17, 1936, although the invention is not necessarily limited to bobbins of the flat type. As here illustrated, the body portion 2 of the bobbin has the opposite substantially flat faces 2a and 3a (Fig. 2) (which are normally disposed substantially horizontally in the shuttle) and the edge faces 4 and 5 which are narrower than the faces 2a and 3a, and which are preferably smoothly rounded and outwardly convex.

Bobbins employed in loom shuttles are commonly furnished with a bore extending forwardly from the butt end, and the bobbin here illustrated is shown as provided with such a bore 6. In the flat type of bobbin this bore does not extend to the tip of the bobbin, since the body portion of the bobbin tapers in thickness, the flat surfaces 2a and 3a approaching quite closely at the tip end of the bobbin. The presence of this bore, which is necessary for the reception of a spindle during winding and in some types of shuttle for positioning the bobbin in the shuttle, precludes the employment of any means for securing the contact in position which would extend diametrically across the entire thickness of the bobbin.

In accordance with the present invention and in preparation for the assemblage of the contact member with the bobbin proper, the body portion of the bobbin is provided with a narrow, elongate, shallow recess 7 (Figs. 1 and 9) which as here illustrated, is in one of the narrow edges of the bobbin and which is disposed forwardly of the butt end. This recess 7 extends substantially parallel to the axis of the bobbin and preferably has substantially straight parallel sides and rounded ends. The recess may be formed by the use of a suitable tool, for example, a tool in the nature of an end mill. Obviously if the material of the bobbin be of such character that it may be moulded, the recess 7 may be formed during the moulding operation.

In accordance with a preferred embodiment of the invention, passages 8 and 9 are formed in the wall of the bobbin body, extending from the ends of the recess 7 radially inward into the bore 6. These passages may be formed by drilling or otherwise, in accordance with the material of which the bobbin body is made.

The contact member 10 preferably consists of an integral piece of sheet copper or other suitable conducting metal and comprises a body portion 11 of substantially the same contour and dimensions as the recess 7, and is furnished with integral prongs 12 and 13 at its opposite ends. These prongs are disposed to lie substantially at right angles to the body portion 11 and are of sufficient length to furnish the desired anchorage of the contact member to the body of the bobbin as hereafter described. Preferably, the contact member is made of sheet metal by a punching or stamping operation. Before application to the bobbin, the body portion 11 of the contact member is preferably arched transversely, so that its under surface is concave, as shown at 15, (Fig. 7), this arching being upon a radius of curvature less than that of the peripheral surface of the bobbin body in which the recess 7 is formed. Preferably the tips of the prongs 12 and 13 are pointed and initially given a slight curvature toward the forward or tip end of the bobbin, as illustrated in Fig. 1.

Having prepared the bobbin and the contact member as above described, the contact member is then disposed in the position illustrated in Fig. 1, and its prongs 12 and 13 are pushed downwardly through the passages 8 and 9 until their tips project into the bore 6. After the body portion 11 of the contact member has seated within the recess 7, suitable tools are applied for securing it in position. For example, a presser member or platen P (Fig. 5) having an under surface curved correspondingly to the curvature of the edge 4 of the bobbin, is caused to bear upon the upper transversely curved surface of the body portion 11 of the contact member, while at substantially the same time a blunt ended arbor A (Fig. 1) is pushed into the bore 6 from the butt end of the bobbin, the combined action of these tools being to force the body portion 11 firmly into the recess 7, and to flatten the transverse curvature of this body portion until it substantially conforms to the curvature of the edge surface 4 of the bobbin. In thus flattening the body portion 11 by applied pressure, the edges 14 of the latter are caused to press against and actually to bite into the material of the bobbin body at the opposite edges of the recess 7, such edges 14 tending to diverge from each other downwardly. (In Figs. 4, 6 and 8 the divergence of these edges is much exaggerated for illustrative purposes). Thus the edges are embedded in the material of the bobbin body, the upper surface of the member 11 lying flush with and partaking of the same curvature as the edge surface 4 of the bobbin body. At the same time the combined action of the tools P and A bends the inner portions 12a and 13a of the prongs 12 and 13 so that they lie substantially parallel to the axis of the bobbin and are impressed or indented into the wood of the bobbin body. Thus the inner surfaces of these bent-over portions of the prongs lie substantially flush with the wall of the bore 6. Since the tips 16 and 17 of these prongs are initially slightly curved, they tend to dig into the material of the bobbin body and in the completed structure point outwardly toward the outer surface of the bobbin, thus insuring a smooth inner surface for the bore 6 and a firm anchorage of the contact member to the material of the bobbin proper, the bent-over portions 12a and 13a in effect constituting enlargements of the outer parts of the prongs, preventing their withdrawal from the passages 8 and 9, respectively.

If desired, in order to insure an even better anchorage of the contact member, the under surface of the body portion 11 of the contact member and/or the bottom of the recess 7, may be coated with a suitable adhesive capable of effectively uniting metal to the material of the bobbin body. Such an adhesive may, for example, be one of the synthetic resins or one of the isomers of rubber such, for example, as result from the treatment of rubber at a high temperature with a sulphonic acid. It is contemplated that under some conditions such an adhesive alone may be found sufficient to retain the contact member in place without recourse to the use of the prongs 12 and 13 or other mechanical attaching elements, although it is believed that under most conditions it is desirable to use such mechanical connecting parts as the integral prongs 12 and 13.

Since it is possible to mount the bobbin in the shuttle in either of two positions 180° apart, it is

desirable to provide contact members such as above described at diametrically opposite points on the bobbin body, and thus, as illustrated in the present drawing, it is proposed to furnish the bobbin with a recess 7 in each of its narrow edges 4 and 5 and to mount contact members such as the member 10, in each of these recesses by the mode of procedure above described.

By proceeding in the manner described, the contact members are firmly and securely anchored in position without in any way restricting the bore 6 and without substantial tendency to crack the relatively thin material forming the wall of the bobbin body. Furthermore, the contact member may be as long lengthwise of the bobbin as may be desired (in order to assure proper contact by the filler mechanism of the loom) and the butt of the bobbin may be made of any usual form and type for cooperation with the retaining means of the shuttle or to cooperate with the winding mechanism. Moreover, the body of the bobbin is not substantially changed in its external contour, so that a yarn mass of any usual type may be wound in the same way as though the bobbin were not provided with the contact element. When the contact element has been assembled as described its outer surface is flush with that of the bobbin body and no rough edges are exposed such as might catch or abrade the yarn, and since the contact member is so firmly secured in position with its edges embedded in the material of the bobbin body, it is possible to employ, for the contact member, such a soft material as copper, which has a high conductivity making it very desirable as an element of an electrical circuit.

While certain desirable embodiments of the invention have been illustrated by way of example, together with a mode of effecting the desired result, it is to be understood that the invention is not necessarily limited to the precise arrangements illustrated nor to the exact steps or order of steps suggested as a desirable mode of procedure, but is to be regarded as broadly inclusive of all equivalents falling within the terms of the appended claims.

I claim:

1. A bobbin for use in loom shuttles, said bobbin having a longitudinally tapered body portion and a butt portion and having a substantially cylindrical axial bore extending forwardly from the butt, the bobbin having a longitudinally extending elongate recess in its peripheral surface spaced forwardly from the butt, said recess extending longitudinally of the bobbin, a metallic contact plate disposed in said recess with the opposite longitudinal edges of the plate closely engaging the opposite edges of the recess and with its outer surface substantially flush with the peripheral surface of the bobbin, and anchoring prongs extending inwardly toward the axis of the bobbin from the plate into the material of the bobbin body, the inner end portion of each prong being disposed at an angle to the main part of the prong and being sunk in a recess in the inner wall of the bobbin bore.

2. A bobbin for use in loom shuttles comprising a butt portion having provision for securing the bobbin in position within a shuttle, the bobbin having an elongate body portion of electrical insulating material and having an axial bore extending forwardly from its butt end, the body portion having a plurality of longitudinally extending elongate recesses in its peripheral surface, said recesses being spaced forwardly from the butt, independent metallic contact plates disposed in the respective recesses and electrically insulated from each other, the longitudinal edges of each plate closely engaging the opposite edges of its respective recess, the outer surface of the plate being substantially flush with the peripheral surface of the body portion of the bobbin, and fastening means for each plate comprising a metallic element secured at its outer end to the plate and having anchorage means at its opposite end seated in a recess of the inner wall of the bobbin bore.

3. A bobbin for use in a loom shuttle, said bobbin having a butt portion of substantially circular transverse section, and a body portion having diametrically opposite relatively wide substantially flat faces, and relatively narrow intervening edge faces, elongate metal contact plates spaced forwardly from the butt portion and fitting tightly in recesses in the narrow edge faces of the body portion with their outer surfaces flush with said narrow edge faces respectively of the bobbin body, said plates being electrically insulated from each other, and an anchoring prong extending inwardly toward the axis of the bobbin from each end of each plate into the material of the bobbin body, the inner end portion of each anchoring prong being disposed at an angle to the main portion of the prong and being sunk in a recess in the inner wall of the bobbin bore.

4. A bobbin for use in a loom shuttle, said bobbin having a butt portion of substantially circular transverse section and a body portion having diametrically opposite relatively wide substantially flat faces and intervening relatively narrow, curved edge faces, the body portion having longitudinally extending slots in its narrow edge faces spaced forwardly from the butt, metallic contact plates tightly fitting within said slots with the outer surfaces of the plates flush with the narrow edge faces respectively of the bobbin body, each contact plate having an integral prong adjacent to each of its ends, said prongs extending radially inward through the material of the bobbin body to the bore of the bobbin, the inner portions of said prongs being disposed at an angle to the body of the respective prong and being sunk in recesses in the wall of the bore, the extreme tips of the prongs being turned toward the outer surfaces of the bobbin.

5. That method of applying metallic contact plates to bobbins which comprises forming a recess in a curved peripheral surface of the bobbin, providing a metallic contact plate which is arched to a radius of curvature less than that of said surface of the bobbin, disposing the contact plate in the recess, subjecting the contact plate to pressure thereby to flatten its arched surface and cause its opposite edges to bite into the opposite walls of the recesses while causing its outer surface to assume the curvature of and to lie substantially flush with the curved peripheral surface of the bobbin body, and permanently securing the contact plate in the recess.

6. That method of applying contact members to bobbins which comprises as steps forming longitudinally extending elongate recesses at diametrically opposite points of the periphery of a bobbin body forwardly of the bobbin butt, providing metallic contact members each having a body portion of substantially the same shape and dimensions as the corresponding recess but transversely arched to a radius of curvature less

than that of the recessed surface of the bobbin body, said contact members each having spaced integral prongs, passing said prongs into the material of the bobbin body while disposing the body portion of the contact plate in the respective recess, each plate with its concave side opposed to the bottom of the recess, and subjecting the contact plates to pressure such as to increase their radii of curvature and thereby to imbed their opposite edges in the material of the bobbin body and deflecting the inner end of each prong so as to dispose it at an angle to the main portion of the prong.

CARL P. PARK.