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J. P. LACKS

2,170,334

BOBBIN FOR WIRE WEAVING LOOMS

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Fig. 1.

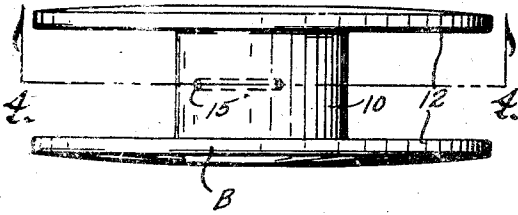


Fig. 3.

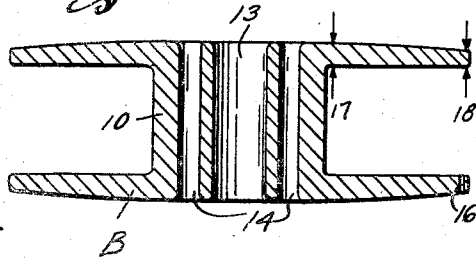


Fig. 2.

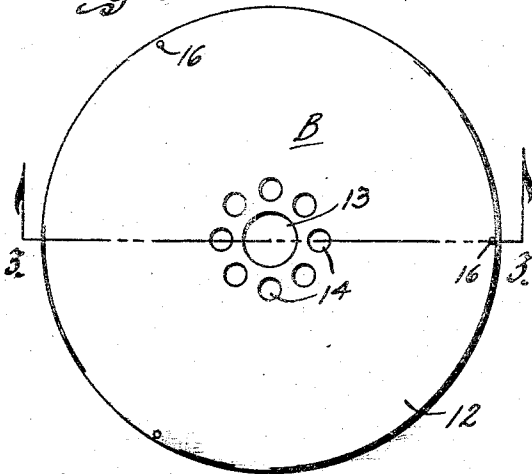


Fig. 4.

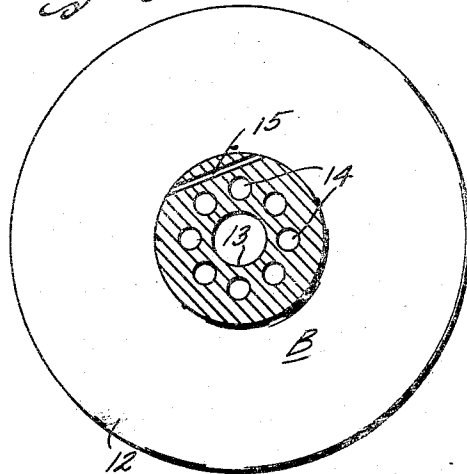
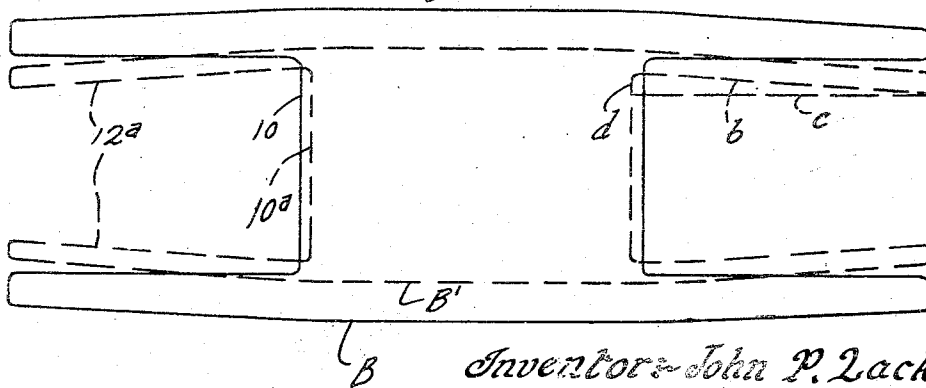


Fig. 5.



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BOBBIN FOR WIRE WEAVING LOOMS

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1 Claim. (Cl. 242—123)

An object of my invention is to provide an inexpensive bobbin particularly adapted for wire weaving looms to replace the steel bobbins now in use therewith.

5 A further object is to provide a bobbin which can be efficiently operated and which will eliminate many of the problems and disadvantages inherent in the usual steel bobbin consisting of a hub with dished flanges at its ends.

10 Another object is to provide a bobbin which eliminates dishing of the flanges made possible by the use of Dow metal to form the bobbin, which metal compared to steel is less than one-fourth as heavy as steel and accordingly, though having a
15 modulus of elasticity much less than steel, can be made thicker in the flanges of the bobbin than a steel bobbin to secure the desired strength and yet effect a satisfactory saving in weight of at least 60% over steel bobbins, such saving making
20 it possible to provide a satisfactory operating bobbin even when the bobbin is wound with a much greater amount of wire.

25 Still a further object is to provide a bobbin which eliminates snarling of the wire as it is run off the loom during weaving operation and which accordingly requires fewer setting operations of the loom by the operator and enables him to take care of a greater number of looms without wasting wire and time.

30 Still another object is to provide a bobbin which can be readily carried by the shuttle arms of a wire loom mechanism as easily as a steel bobbin and can at the same time have more wire thereon, thus making it possible to weave a greater length
35 of wire cloth with one bobbin filling than is possible with steel bobbins.

40 With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my bobbin, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claim and illustrated in the accompanying drawing. Although the invention is susceptible of a variety of embodiments, it is unnecessary to fully describe and illustrate more
45 than one in order to give a full understanding of the invention both from its structural and functional standpoints. Accordingly, I have illustrated a preferred and desirable embodiment
50 in the accompanying drawing, in which:

Figure 1 is a plan view of a bobbin embodying my invention and showing the bobbin approximately full size.

55 Figure 2 is a front elevation thereof.

Figure 3 is a sectional view on the line 3—3 of Figure 2.

Figure 4 is a sectional view on the line 4—4 of Figure 1; and

Figure 5 is a diagrammatic sectional view on an enlarged scale showing the comparison in size and shape between my bobbin and a steel bobbin of the usual construction, the steel bobbin being shown by dash lines.

On the accompanying drawing I have used 10 the reference character B to indicate generally my bobbin. The bobbin B comprises a hub 10 and a pair of flanges 12. The hub and the flanges are formed integrally of one material as shown in Figure 3, and such material is preferably Dow 15 metal or the like. The hub 10 is provided with the usual bore 13 and openings 14. A bobbin as disclosed, when made of Dow metal, can be readily die cast with the bore 13 and the openings 14 cast therein. Holes are provided to receive the 20 inner and outer ends of the wire to be wound on the bobbin. Such holes are indicated at 15 in the hub 10 and at 16 in one of the flanges 12.

The flange 12 adjacent the hub 10 as indicated by the dimension line 17 in Figure 3 is considerably thicker than at the dimension line 18. 25 It is possible to cast the bobbin in this manner and the weight of the bobbin may thus be reduced to a minimum, since there is less strain because there is less wire pressing against the flange at 18 30 than there is at 17. Accordingly the thickness of the periphery of the flange can be reduced without detrimentally sacrificing the strength of the flange required to support the flange against bending when wound with wire.

35 In Figure 5 I have shown a comparison between my bobbin and a bobbin B' of the usual steel construction. The bobbin B' has a hub 10a and flanges 12a. The flanges 12a are usually made of sheet steel of a predetermined thickness 40 throughout and riveted on the ends of the hub 10a. To effectively resist bending, these flanges must be dished inwardly which produces a triangular space indicated at b, c, and d, particularly conducive of snarling the wire when wound 45 on the bobbin. Obviously the distance between the flanges 12a at their peripheries determines the path of the wire adjacent the ends of the hub 10a during the winding operation. This permits snarling of the wire adjacent the flanges 50 and consequently when the steel bobbin is being used in the weaving operation, there is likelihood of breaking the wire and consequent necessity of stopping the loom and either re-tying the wire or throwing away the remaining part on the 55

bobbin. Obviously this is expensive and in actual practice I have found that there is a high percentage of such unsatisfactory operation of the steel bobbin as compared to almost 100% satisfactory operation of my bobbin.

Efforts have been made over a period of many years to develop a straight-sided bobbin as it was realized that the dished flange of the steel bobbin was entirely unsatisfactory. Making a bobbin with straight sides, as I have done, out of steel resulted in the bobbins being much too heavy and if they were made of aluminum the expense was too great. Also aluminum is lacking in endurance whereas Dow metal has almost the same durability as steel and I have found in practice that having a Dow metal bobbin with straight sides produces less wear than a steel bobbin with dished sides, due to wear between the wire and the flange of the steel bobbin caused by the wedge-like space in which the wire is wound.

The bobbins of wire weaving looms are used for feeding the filler or weft wire in the weaving of the cloth. These bobbins are caused to traverse the warp in the shed of the loom by means of shuttle arms which extend alternately into the shed, the bobbin being first picked up and carried by one arm and then by the other. The holding devices on the ends of the arms must receive the bobbin and the arm must support the weight of the bobbin during its movement through the shed. Obviously, therefore, since the shuttle arms and their associated operating mechanism are designed for a certain weight of steel bobbin, it is necessary to keep within this weight and I have found that this is made possible by the use of Dow metal which has a specific gravity of 1.8 as compared to steel of 7.9. This makes their relative weights—Dow metal 1.0 and steel 4.4. The relative strength of the two materials where equal thickness of metal is used, are Dow metal 75 and steel 100. It is evident therefore that increasing the thickness of the flange as shown in Figure 5 of my bobbin B relative to the steel bobbin B', gives me the same or greater strength yet due to the great difference in weight of 4.4 to 1, I produce a bobbin which is lighter.

As to the modulus of elasticity of Dow metal and steel, Dow metal resists 6,500,000 pounds to the square inch while steel resists 29,000,000 pounds to the square inch. This is a relative resistance of 4.46. However, with a lower modulus of elasticity, Dow metal will deflect more than steel of the same size. Accordingly with a relatively small adjustment of the cross sectional size of the flange 12 in my bobbin, I secure the desired stiffness and strength and yet secure satisfactory savings in weight in the neighborhood of 60%. It is therefore evident that the use of Dow metal or equivalent material makes it possible for me to provide a straight sided bobbin having the desirable characteristics set forth.

Since my bobbin is 60% lighter in weight, I have found that it is possible to increase the distance between the flanges 12 as compared to the flanges 12a of the steel-bobbin as illustrated in

Figure 5. This considerably increases the capacity and in actual practice I have found that the bobbin will work satisfactorily when filled with wire, whereas it was necessary to not fill the steel bobbin more than two-thirds full to get anything like satisfactory operation. A straight sided bobbin holds more wire than the same diameter dish sided bobbin and eliminates all snarling or roping due to turning over of the wire when filling and emptying the bobbin. By the elimination of snarling, less attention is necessary to the bobbin spring tension in weaving and the bobbin can be operated at higher speed due to its light weight and lack of snarls. This is a considerable improvement in the art of fine wire weaving on a reciprocating shuttle arm type of loom. A superior grade of cloth is made due to reduced sets and breaks in the cloth.

Uniform width of the cloth can be secured also due to the possibility of reducing bobbin tension and yet securing satisfactory operation. Actually my Dow metal bobbin will carry nearly double the amount of wire as compared to the steel bobbin with greater variation of tension on the shuttle spring being possible without causing trouble. This makes it possible for a weaver to operate a greater number of looms by 35 to 50% over the limit with the old steel bobbin. As each bobbin, on account of its larger size can hold a larger volume of wire, less operators are needed in the bobbin winding department. As to actual cost, after the first die cost is taken care of, Dow metal bobbins can be made for 40% of the cost for steel bobbins. This makes the initial cost and replacement and consequently the cost of producing the wire much less than where steel bobbins are used. In practice, due to the superior operation of the Dow metal bobbins, I have found they will outwear the steel bobbins.

From the foregoing it is obvious that I have provided a bobbin which has many advantages over the steel type and which can at the same time be inexpensively manufactured and replaced.

Some changes may be made in the material, construction and arrangement of the component parts of my bobbin without departing from the real spirit and purpose of my invention. I therefore intend to cover by my claim such modified forms of structure or use of mechanical equivalents as may be reasonably included within its scope.

I claim as my invention:

In a bobbin for wire looms, a hub having parallel ends and a pair of spaced flanges, said flanges having their inner faces substantially parallel with relation to each other, said flanges being thicker adjacent the hub than adjacent their peripheries, said hubs and said flanges being die-cast integrally and said hub having a bore and an annular series of openings therein surrounding the bore and extending from end to end of said hub, the material of said hub between said openings also extending from end to end of said hub.

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