

W. B. MITCHELL.
BOBBIN CARRIAGE AND BOBBIN OF LACE MACHINERY.
APPLICATION FILED SEPT. 6, 1910.

1,015,333.

Patented Jan. 23, 1912.

2 SHEETS—SHEET 1.

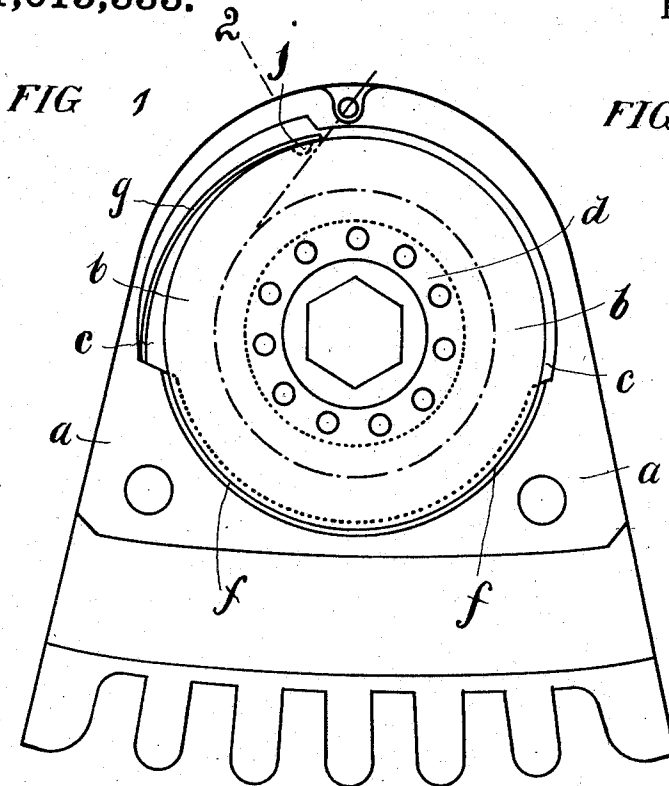


FIG 2

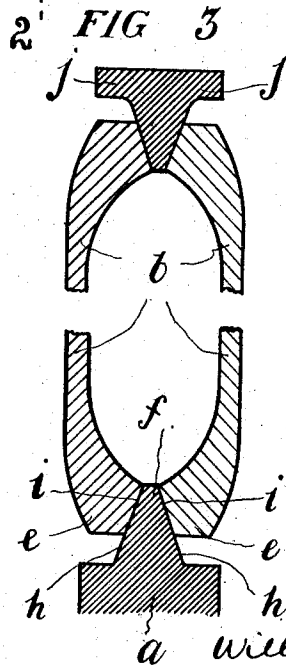
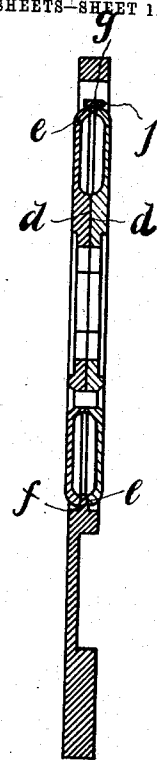


FIG 4

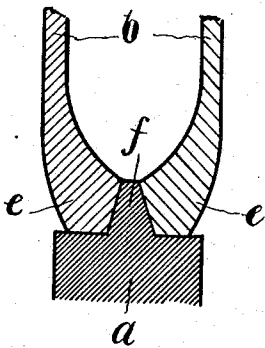
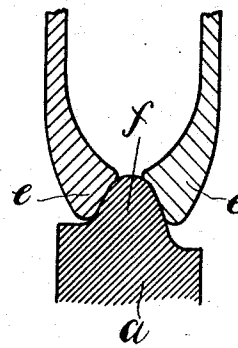


FIG 5



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FIG 6

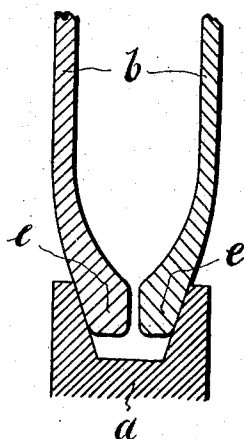


FIG 7

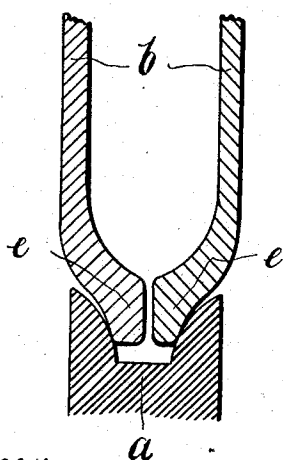
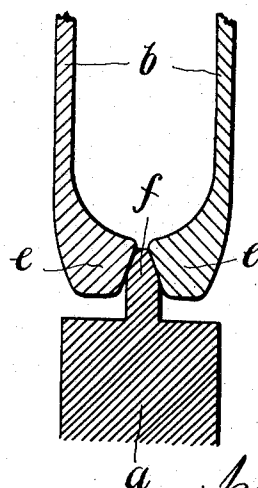


FIG 8



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UNITED STATES PATENT OFFICE.

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BOBBIN-CARRIAGE AND BOBBIN OF LACE MACHINERY.

1,015,333.

Specification of Letters Patent.

Patented Jan. 23, 1912.

Application filed September 6, 1910. Serial No. 580,661.

To all whom it may concern:

Be it known that I, WILLIAM BRUCE MITCHELL, a citizen of Great Britain, residing at 44 Portland road, Edgbaston, Birmingham, county of Warwick, England, managing director, have invented certain new and useful Improvements in Bobbin-Carriages and Bobbins of Lace Machinery, of which the following is a specification.

This invention comprises improvements in bobbin carriages and bobbins and has particular reference to carriages and bobbins of the kind used in twist lace machines. The carriages vary considerably in shape according to the type of loom on which they are employed, and the bobbins necessarily vary in accordance with the carriages, but their relation to each other, that is to say the working of the bobbin in the carriage, remains in principle the same.

Among the features which the various types of carriages have in common is an opening which is substantially circular but provided at the inner edge of the lower half with a projecting portion or rib known as the "verge". This opening in the carriage is termed the "cage" and the bobbin, which is circular, is loosely retained in this cage by engaging on the verge and by a retaining spring in the upper part engaging the bobbin by means of a shaped projection or nib and pressing it toward the verge.

The bobbins are commonly made with two disk like sides united by rivets through the center portion called the "middle" and recessed from the periphery of this "middle" to the perimeters of the disks to form an annular space to receive the thread. The perimeters of the sides are cut away sufficiently on the inner side to form lips which do not meet, and thus form an entrance or "open way" to the annular thread space, so that the thread may be wound into the bobbin or removed therefrom. This space or "way" also forms the track portion by which the bobbin engages the "verge" of the carriage.

In all these known constructions the lips of the bobbins have been faced square toward each other and parallel. To accommodate these the "verge" of the carriage has necessarily been formed with parallel sides and the carriage has been recessed on each side to form the "verge". The re-

cessing leaves square shoulders at the base of the verge on each other side which receives the outer faces of the lips of the bobbin as the latter turns in the "cage", and its "openway" between the lips covers and loosely fits the verge. These well known forms are open to serious objections which the present invention is designed to obviate. Some of these objections are: As the bobbins are wound and filled the sides are forced apart and to bring the same back to their normal position the bobbins are placed under pressure, and in time the lips of the bobbin come in contact one with the other. Such bobbins are then extremely difficult or altogether impossible to wind, as there is no "way" for the thread between the lips. If complete contact of the lips has not taken place but they are partially closed, then, as the bobbin is being unwound in use, the lips press so tightly on the verge and on the nib of the spring that the friction becomes excessive and either causes frequent breakage of the thread or produces bad fabric. The lips of the bobbin become damaged from various causes; and the bobbins are then unusable as the slightest damage impedes or completely checks the necessary running on the verge or the passage of the nib of the spring.

The holding capacity of the bobbin depends of course upon the size of the "middle" but in use, as the thread is wound off the bobbin the speed of the bobbin increases in proportion to the amount of thread removed; at the same time the point where the "thread" leaves the bobbin comes nearer the middle of the bobbin so that the angle of pull or the leverage of the pull is decreased and an increased tension must be put on the thread to overcome the friction. It will thus be seen that the size of the middle must depend in practice on the maximum tension that the thread can withstand. Hitherto there existed no means of accommodating this tension. Bobbins of the ordinary type (due to the fact that the lips are parallel) always present great difficulties in winding; as there is practically no lead or guide to the thread; for these same reasons the placing of the bobbin in position in the cage of the carriage is extremely difficult, and likely to cause the bending of or other damage to the verge. The present

type of verge is necessarily very delicate in formation and easily damaged, and as a verge cannot be replaced considerable waste is thereby caused.

5 In accordance with the present invention I form the "open way" of the bobbin and the verge of the carriage and also preferably the nib of the spring so that the engaging portions of each are coacting inclines or
10 curves, so arranged that upon closing or partial closing of the lips of the bobbin, these surfaces may still satisfactorily engage by automatically altering their relative position. I may employ various sections
15 for the verge of the carriages and for the lips of the bobbin to present these automatically adjusting inclines or curves, such as a conical section for the verge with the lips of the bobbin faced with corresponding
20 inclines to ride on the sides of the verge; or I may make the verge with convex sides in cross section or with concave sides, correspondingly curving the surfaces of the lips so that they will coact with the
25 verge. It is preferred that the nib of the spring should correspond in form to the verge. I may in some instances remove the verge altogether and groove the carriage shaping the groove wedge like in cross section
30 or with convex or concave sides; in these cases the lips of the bobbins are faced on their outer sides with inclines, convex or concave surfaces so as to work in the before mentioned relation with the surfaces
35 of the groove in the carriage. In some cases by using bobbins with their "open ways" formed in accordance with my invention I may, by beveling the "verge" fit up old types of carriages with my invention.
40

On the drawings: Figure 1 is an elevation showing one type of carriage with a bobbin in place therein and with my invention applied. Fig. 2, is a section of the
45 same on line 2—2. Fig. 3, is an enlarged section showing one example of the construction of the verge and the bobbin which is to ride upon it. Fig. 4, is a section of this construction but showing a different
50 working relation between the two parts. Fig. 5, shows a modified construction in which coacting curves are used. Figs. 6 and 7 show further modifications but in these one of the advantages aimed at by my invention is not obtained. Fig. 8 shows my
55 invention as it may be applied to old carriages by beveling the sides of the parallel "verge" and providing bobbins made in accordance with the invention.
60

On these drawings in the general views Figs. 1 and 2, *a* is a carriage of one particular type which is well known and serves here simply as an example. The bobbin is represented by *b* and the opening or cage
65 in the carriage by the letter *c*. The bobbin

is made up of two disks riveted together at their center which forms the "middle" *d* and cut away beyond that to leave the lips *e*. The verge of the carriage is referred to by *f* and the well known retaining spring
70 which retains the bobbin in the verge is represented at *g*, Figs. 1 and 2. As previously set forth it is with the bobbin in its relation to the verge and the nib of the retaining spring that my invention is concerned and I accordingly show these parts
75 on a larger scale at Fig. 3. The verge *f* is formed as a cone in vertical section, its sides presenting inclines *h, h*. The lips *e* of the bobbin are shaped so that the open "way" or track of the bobbin presents inclines *i, i*, which correspond to those *h, h*, of the verge. The nib *j* of the retaining spring which projects into the "way" or track of the bobbin so as to retain the latter properly
85 on the verge is similarly shaped in cross section as will be seen from Figs. 2 and 3 so that the bobbin and the nib may smoothly cooperate even if the bobbin way or track is partially closed.
90

As shown at Figs. 2 and 3 the verge is so formed that the bobbin takes its bearing on the inclined sides thereof; but as shown at Fig. 4 the verge is shorter and the peripheries of the lips of the bobbin may
95 then rest upon the shoulders *k* at each side.

At Fig. 5 the verge and the bobbin track are formed of corresponding curves for the engaging surfaces in place of inclines. The nib of the retaining spring will correspond
100 in cross section.

At Fig. 6 the verge as a projection is dispensed with and a recess is formed in its place in the carriage. The sides of this recess provide the inclines and the bobbin is
105 provided with surfaces on its sides to correspond therewith. The accommodating relationship between the bobbin and its carriage is thus obtained.

Fig. 7 shows an arrangement similar to Fig. 6 but with coacting curves instead of
110 inclines.

With both the forms seen at Figs. 6 and 7 only part of the advantages which are obtainable by my invention are secured.
115

As represented at Fig. 8 it is possible to adapt a carriage having an ordinary verge for use with my invention by beveling the top of the verge at each side. This will then accommodate a bobbin of my improved type
120 but will not be so satisfactory an arrangement as a carriage constructed fully in accordance with this invention.

From the construction shown at Figs. 1, 2, and 3, which is preferred and the examples of modifications given in the latter figures the invention will be clearly comprehended. Now with the improved construction, suppose the bobbin lips to be closed or partially closed, the bobbin may still work in the cage
130

without undue friction, as owing to the formation of the engaging surfaces as co-acting inclines, or curves, the bobbin automatically adjusts itself to the verge by rising 5 slightly and the working relation is not disturbed. This is also the case with the nib of the spring as the "way" of the bobbin and the "nib" may change their relative position and still be in working relation and the nib 10 does not present abrupt shoulders or angles that would check the running of the bobbin. This is also the case if the lips of the bobbin are slightly damaged as the bobbin adjusts itself to the verge, or the groove in the carriage, as the damaged part comes into contact therewith and no undue friction is 15 caused. As the bobbin is unwound the thread circle reduces in diameter and the speed of the bobbin and tension on the thread increases; with my construction the bobbin accommodates the increased tension by easing itself on the verge and reducing friction, thus the tension is reduced to a normal strain, and breakage of the thread prevented; also this enables smaller middles to be 20 used and consequently increases the holding capacity of the bobbin. Owing to this improved construction the verge is stronger as it is thicker at the base; it may in fact gradually taper into the actual thickness of the carriage; thus the present danger of damage to the verge either while in actual use, or when the bobbin is separated from its carriage, or when they are being assembled 25 again, is eliminated. Further the improved construction gives greater durability to the engaging parts of a bobbin carriage and its bobbin. In the cases where the bobbin lips are shaped with conical or curved "ways" the outer portion is always wider than the inner part and consequently if by pressure the lips are closed, it is the inner parts which meet and the outer are left open, thus always leaving a guide or way for the thread. It is 30 thus always possible to wind the bobbin and moreover owing to this guiding provision for the thread, winding is much more easily and quickly performed. Further, owing to this construction, bobbins are more easily 35 mounted in the carriage so that, apart from the verge being stronger to resist damage, the latter is less likely to accrue to it owing to this greater ease of insertion. I may with my improved construction of the verge, 40 radius or incline each end so that from the

open part of the cage *c* a lead onto the verge is provided and all shoulders are avoided.

With this invention carried out as set forth at Figs. 1, 2, and 3, I find the carriage is less costly in manufacture as there 60 is no need to recess out the carriage to sharp square angles at the sides of the verge as is done with the old parallel construction so that the tools used in the manufacture last many times as long as hitherto. 65

What I claim and desire to secure by Letters Patent then is:

1. In bobbin carriages and bobbins, a carriage having a cage in which the bobbin runs, a "verge" within said cage, a bobbin 70 having a thread slot between peripheral lips, said bobbin engaging said verge by means of said lips, and a retaining spring holding said bobbin in proper working position on said verge, the engaging portions of 75 said bobbin and said verge being co-acting inclines which upon partial closing of the lips of said bobbin automatically alter their relative position so that a satisfactory engagement still takes place. 80

2. In bobbin carriages and bobbins a carriage having a cage in which the bobbin runs, a verge within said cage, a bobbin having a thread slot between peripheral lips, said bobbin engaging said verge by means of 85 said lips, and a retaining spring holding said bobbin in proper working position on said verge by means of a nib, the engaging portions of said bobbin and said verge and said nib of the retaining spring being co- 90 acting inclines as set forth.

3. In bobbin carriages and bobbins a carriage having a cage in which the bobbin runs, a recess in said carriage for a portion of the extent of said cage, a bobbin having 95 a thread slot and intumed lips, said bobbin working in the recess in said carriage, the outer sides of its lips engaging the walls thereof, the engaging surfaces of said carriage and said bobbin being formed as co- 100 acting inclines, and retaining means for holding said bobbin in place, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLIAM BRUCE MITCHELL.

Witnesses:

F. GILBERT BRETTELL,
E. SIMS BRETTELL.