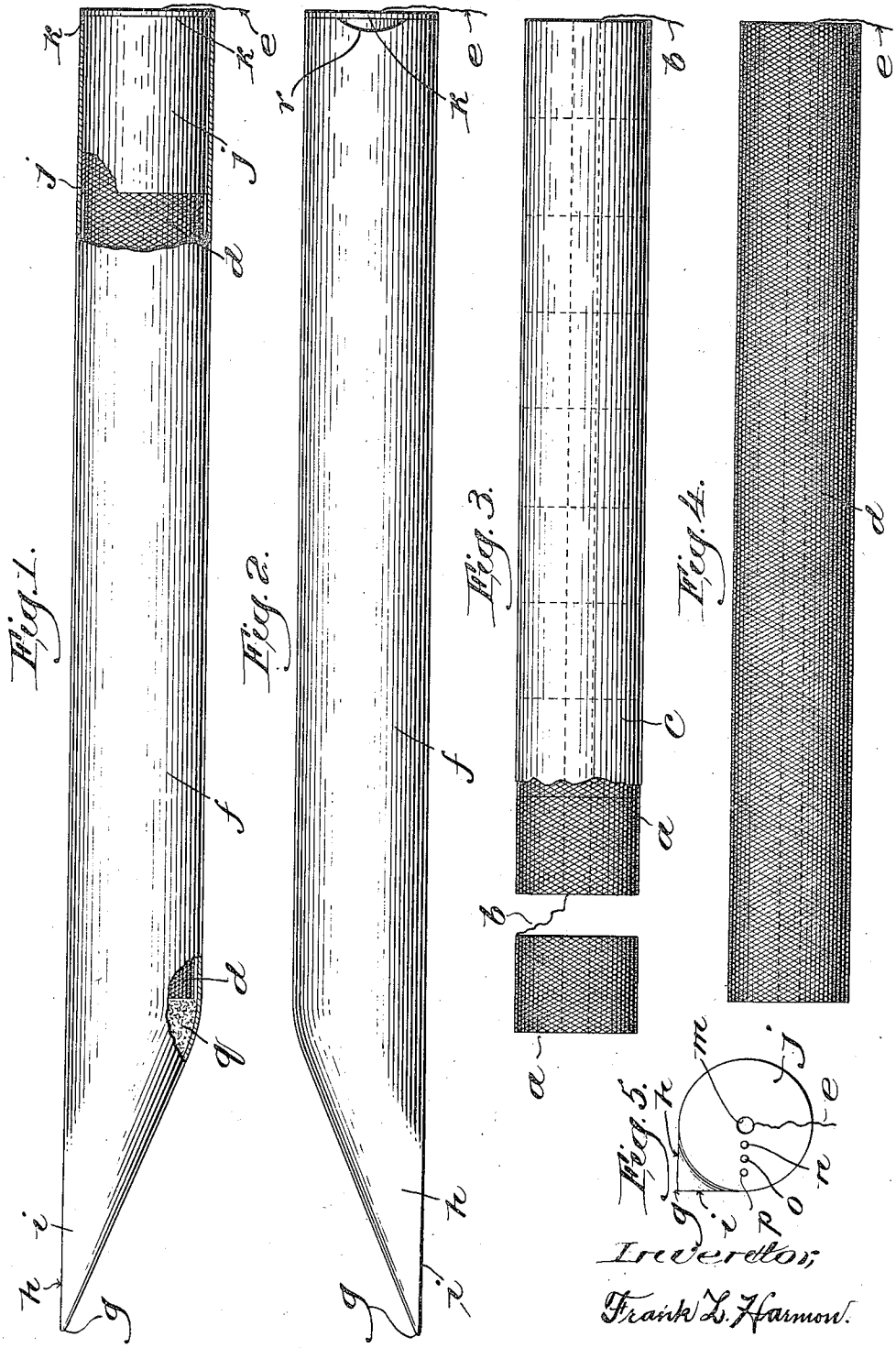
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F. L. HARMON

BOBBIN AND SHUTTLE COMBINATION

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FRANK L. HARMON, OF BEVERLY, MASSACHUSETTS.

BOBBIN AND SHUTTLE COMBINATION.

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To all whom it may concern:

Be it known that I, FRANK L. HARMON, of Beverly, in the county of Essex and State of Massachusetts, have invented a new and useful Bobbin and Shuttle Combination, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to an improved bobbin, and shuttle, and to a combination thereof, adapted for reliable use to use the longest bobbin thread line possible in dry thread machine sewing with upper thread loops of a given dimension. This combination embodies as a central feature, a bobbin, the thread mass of which is made self-sustaining, and a rigid entity, by having the coils thereof crossed, and bound together with a small amount of suitable adhesive sizing, which is used moist on the line and dried between the coils thereof in the bobbin-making process, and which is of such nature when dry, or in its normal condition, as to be tough and strong enough to cause the coils to be torn from the thread mass one by one, and cause little or no dust to fly from the line, and cause a proper degree of bobbin thread tension while the bobbin is used in machine sewing. Such bobbin structure is adapted for internal and external bobbin uses i. e. for unwinding either from the inside outward, or from the outside inward, to use a relatively great length of thread line with upper thread loops of a given dimension, and with a given exterior dimension of shuttle, for the reasons,—(1) that the self-sustaining character of the dry thread mass adapts it for reliable internal bobbin use, which adapts it to be used in machine sewing when it is one inch in diameter and eight and a half inches long, for example, and adapts it for use stationarily in the shuttle, which adapts it to be closely packed within the shuttle, and to completely fill the shuttle body, and adapts it to be completely used up in dry thread machine sewing without possibility of its collapse or the tangling of its line, and,—(2) adapts the bobbin for reliable external bobbin use instead of spool bobbins in ordinary machines when the bobbins are made in proper form and dimensions to fit their shuttles, or bobbin cases, and to contain as much more thread line than the disk spool bobbins now used therein, as the cubic contents of the disk spools.

This invention will be better understood from the following detail description taken in connection with the accompanying drawings and the distinctive features of novelty pointed out in the appended claims.

Referring to the drawings:

Figs. 1 and 2 are plan views of a pair of said bobbins and shuttle combinations adapted for use in a two needle machine.

Fig. 3 is an elevation of a multiple form of self-sustaining bobbin comprising a wrapper cemented to, and around it to hold the multiple bobbin units together.

Fig. 4 is an elevation of the bobbin form shown in Fig. 2; and

Fig. 5 is an end view of one of the combinations shown in Figs. 1 and 2.

Referring first to the form shown in Fig. 3, the bobbin *a* of the line *b* comprises ten bobbin units, the thread line *b* extending from the center of each bobbin unit to its periphery and thence to the center of the next bobbin unit throughout the series. It also embodies, as shown, a wrapper *c* cemented to and around it to hold the bobbin units together.

In the form shown in Fig. 4, the bobbin *d* has the same length of line *e* as the series of bobbin units above described. Each bobbin *d* is held from movement in each shuttle *f* by a felt pad *g* and a shuttle cap *j* pressed into the end of the shuttle between the wall thereof and the bobbin, this cap being removable by the use of one's thumb nail acting on the shuttle cap flange *k*, the end of the shuttle *f* being slightly cut away for the purpose. The thread lines *e* extend through their exits *m*, near the tension holes *n*, *o*, and *p*. The shuttle points *g* formed by the flat sides *h* and *i* are elevated as high as the shuttle bodies to adapt them for use with short needles. The shuttle bodies are cylindrical to fit the bobbins *d* as snug as possible, and the shuttles *f* are so formed that the bobbins *d* fill the spaces in the shuttle bodies full of close wound thread line, and so that the shuttle walls can be used only one sixty fourth of an inch thick to cause the circumference of the combination to be as small as possible to adapt the combination for use with two inch loops in machine sewing, while the bobbin and shuttle combination,

by virtue of the bobbin and shuttle structures, are so light that they are adapted for use at great speed when the bobbins *d* therein are each one inch in diameter and eight and a half inches long, and when each has enough cubic thread contents to contain fifteen hundred yards of thread line, and when the circumference of each combination shows that it is small enough to be used with two inch loops in machine sewing,—when the well known vertical hook center bobbin combination uses a disk spool bobbin containing only about fifty yards of thread line, with two inch loops, and is adapted to use substantially no more lengths of bobbin thread line continuously with any loops, which shows that my bobbin and shuttle combination structure is adapted for continuous bobbin use to sew thirty times more than said old combination if my bobbin is adapted for reliable internal bobbin use in my shuttle. To show that it is, I only have to recite the new process for making it, as follows:

The sizing of the thread lines *e* with very thick, tough sizing, made of one part gum tragacanth and two parts of potato dextrine and used while the sizing is in a moist condition, the stripping of nearly all of the sizing off from the lines, the pressing of sizing into the lines, the winding of the lines into the bobbins *d* on a winding support, the stretching of the lines greatly in winding, the holding of the lines from rebounding and spoiling the bobbins, by the winding support till the sizing and bobbins can be dried, the drying of the sizing and bobbins while their lines are held from rebound,—all to construct the bobbins so that when they are removed from their winding support they will be self-sustaining thread masses, and rigid entities adapted for internal bobbin uses in the shuttles *f*.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A self-sustaining thread mass composed of crossed coils, and dry and set sizing between said coils binding them together as a rigid entity and adapting said thread mass for reliable internal, or external bobbin uses while it is in a dry and normal condition.

2. A self-sustaining thread mass of crossed coils, comprising a plurality of bobbin units wound of a single thread line extending from the center of each bobbin unit to its periphery and between them, and dry sizing set between said coils binding them together as a rigid entity and adapting said thread mass for reliable internal, and external bobbin uses while it is in a dry and normal condition.

3. The combination of a self-sustaining thread mass of crossed coils, dry sizing set between them binding them together as a rigid entity and adapting said thread mass for reliable internal bobbin use when in a dry and normal condition; and a shuttle structure in which said bobbin is used, adapted to co-operate with upper thread loops relatively small as compared with the length of thread line in said bobbin thread mass.

4. A cylindrical self-sustaining thread mass of crossed coils and dry sizing set between them and binding them together into a rigid entity adapted for reliable internal sewing machine bobbin use when in its dry and normal condition,—in combination with a cylindrical shuttle structure enclosing said thread mass, and closely fitting its periphery and ends, and holding said thread mass stationary in said shuttle, and having a thin uniform thickness of wall,—said bobbin and shuttle structures mutually contributing to adapt the combination for the use of an unusual length of bobbin thread line with upper thread loops of a given dimension.

5. A self-sustaining thread mass composed of stretched, and cross-wound thread coils, and dry sizing in the coils, and between them, and the coils prevented from rebound, and held together in their relative wound position, by said dry sizing, and the thread mass being thereby adapted by the dry sizing, for reliable internal, and external, sewing machine bobbin uses while in its dry and normal conditions.

FRANK L. HARMON.