Oct. 31, 1950 G. MAGRATH 2,528,066

BOBBIN CLUTCH

Filed Jan. 24, 1946 2 Sheets-Sheet 1

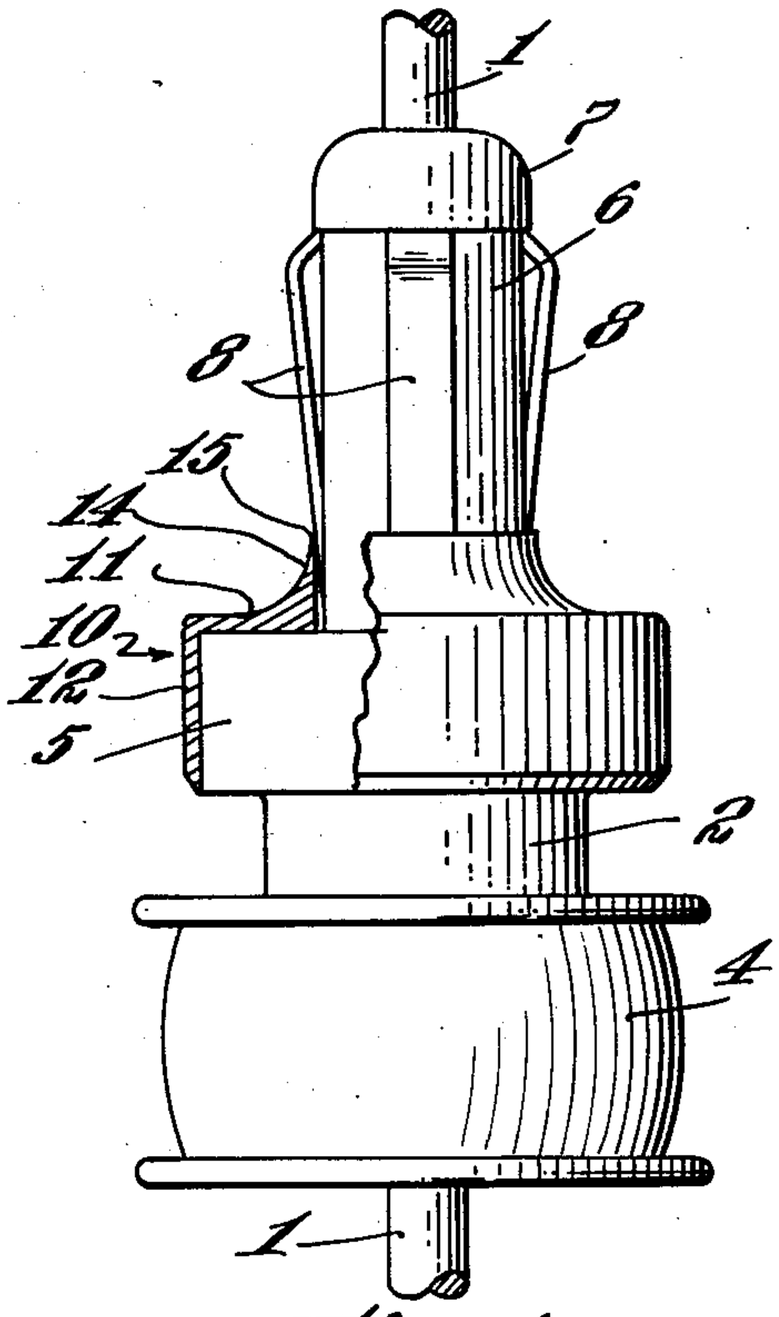

Fig. 1

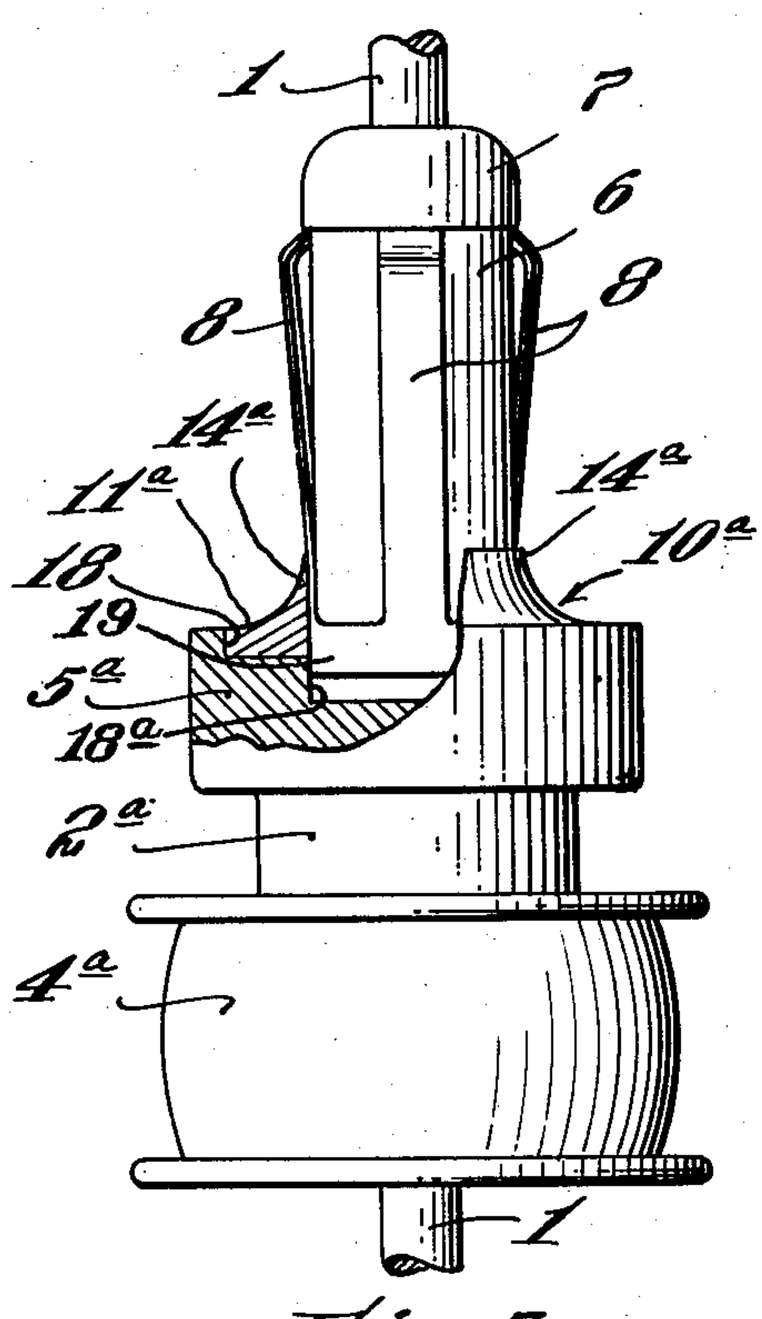

Fig. 3

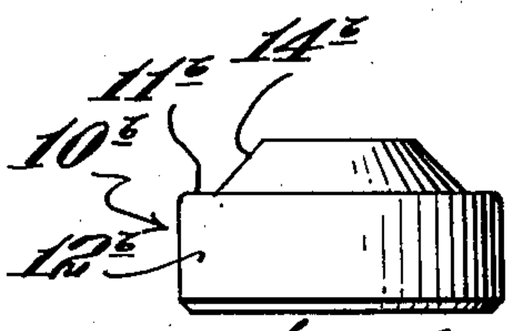

Fig. 4

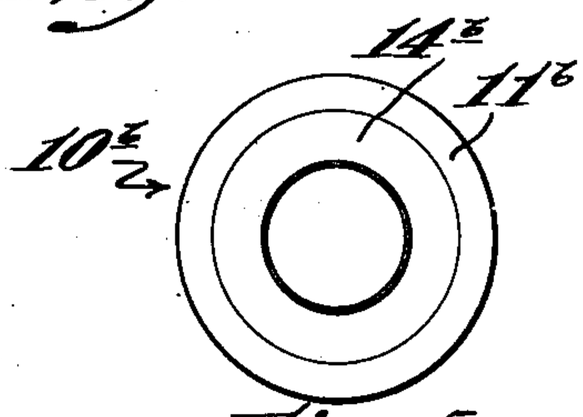

Fig. 5

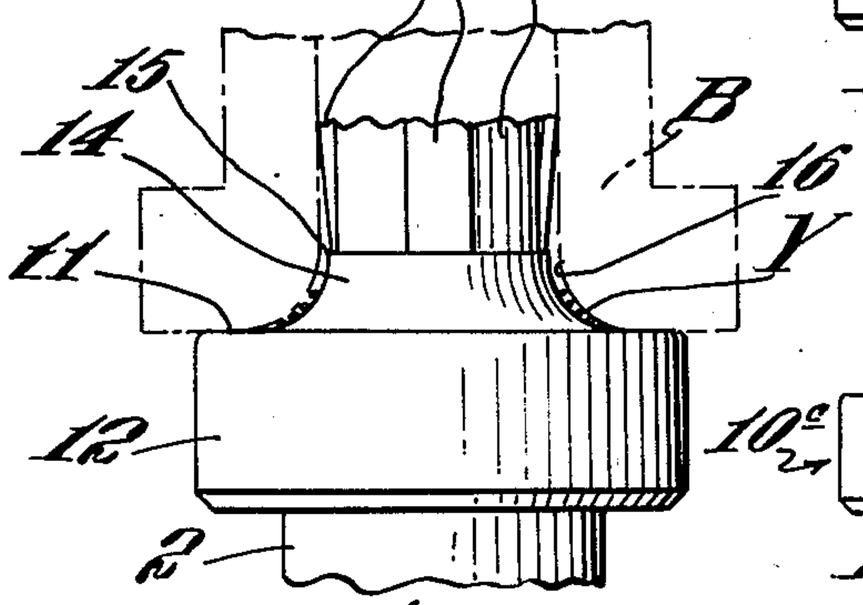

Fig. 2

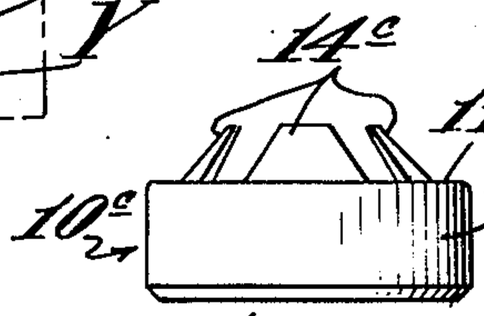

Fig. 6

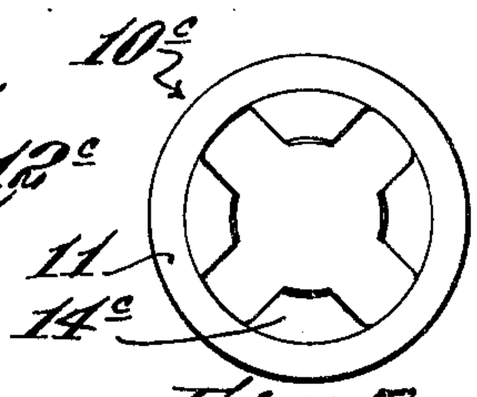

Fig. 7

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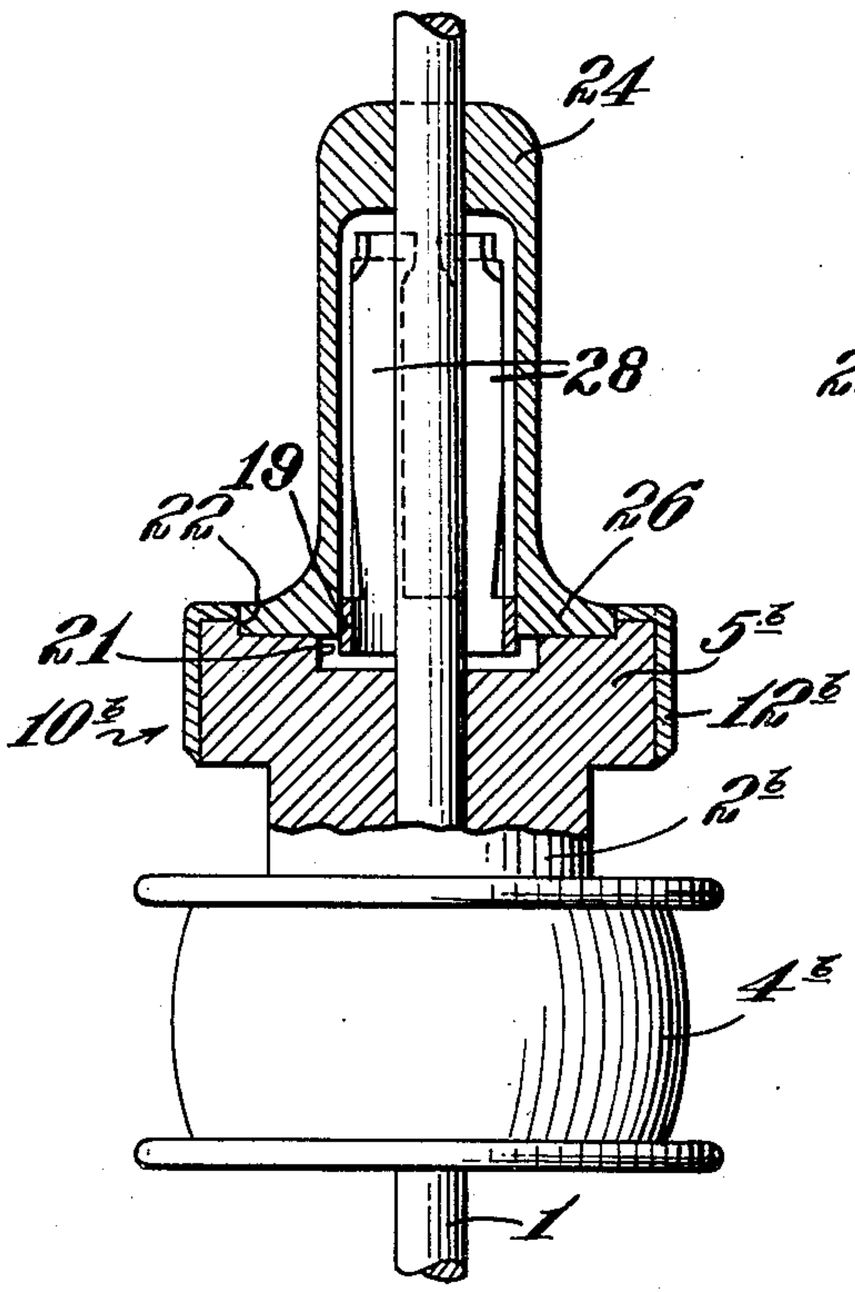

Fig. 8

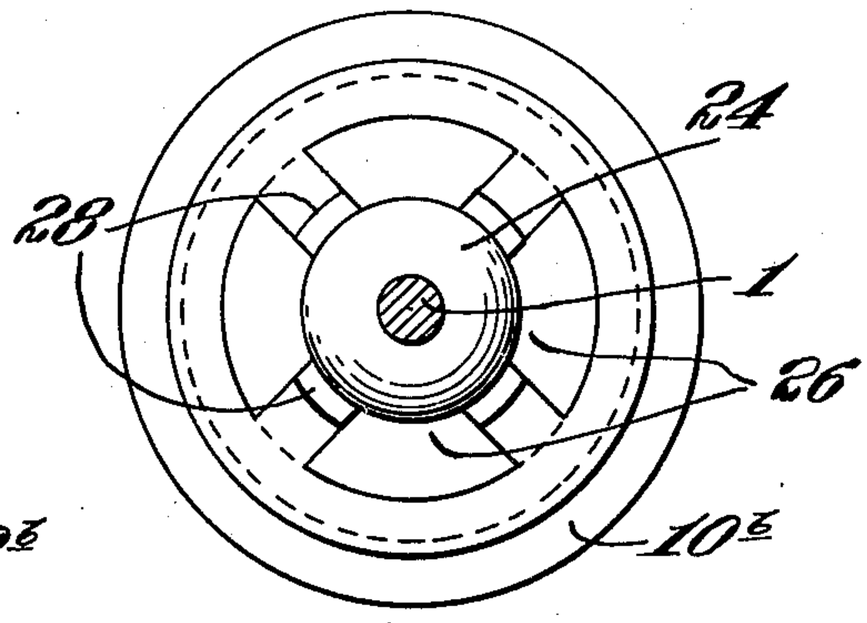

Fig. 9

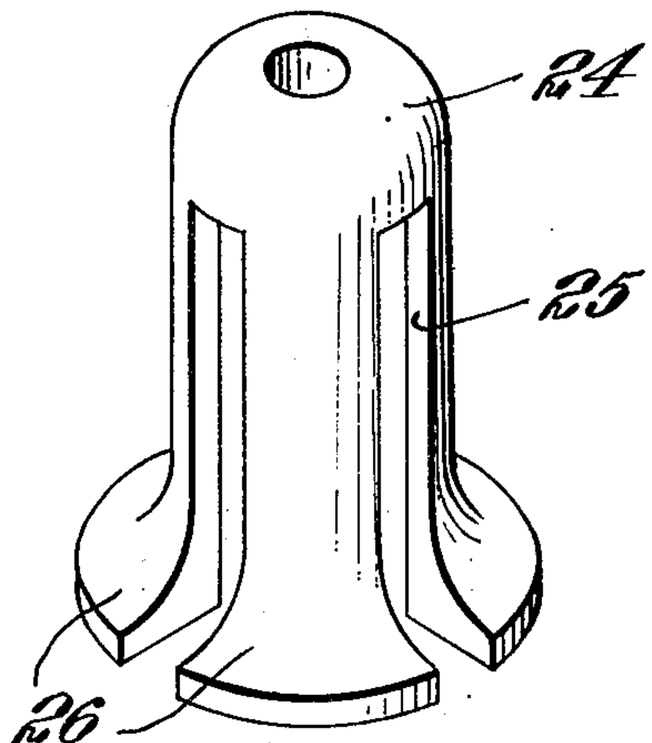

Fig. 10

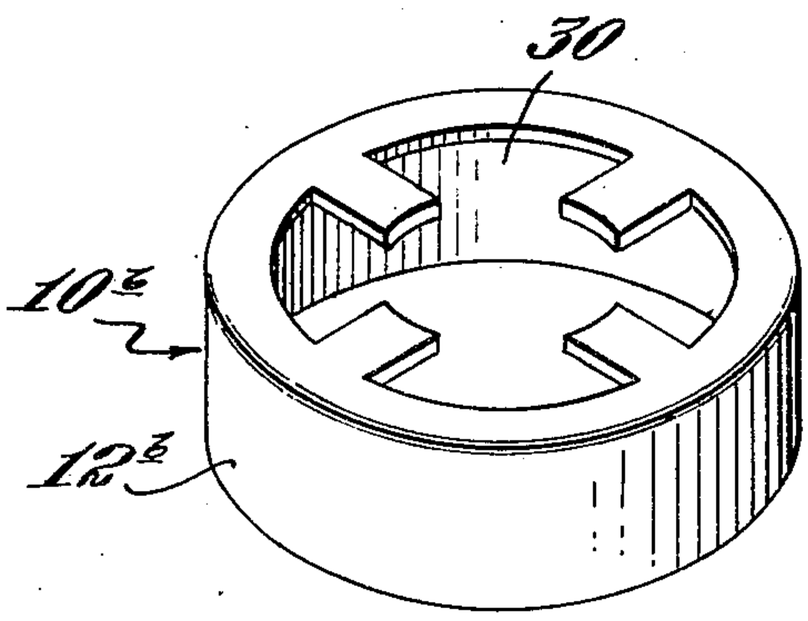

Fig. 11

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BOBBIN CLUTCH

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10 Claims. (Cl. 242—46.4)

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This invention relates to an improved bobbin clutch of the type embodying resilient clutching fingers engageable with the interior wall of a bobbin to hold it in position during the spinning operation.

In spinning operations it is the usual practice to doff a loaded bobbin and replace it with an empty bobbin without stopping the spinning frame or severing the yarn to connect it with the empty bobbin, and during the interval between these operations the yarn or thread becomes wound about the spindle. After repeated replacements an accumulation of yarn builds up about the lower end of the bobbin clutch to such an extent as to impair, if not render inoperative, the action of the clutching fingers and in some instances prevent proper seating of the bobbin. The accumulation of yarn is apt to be so tightly wound about the clutch that it is in many cases practically impossible to remove it without stopping the spinning frame with consequent loss of production.

The principal objects of the present invention are to provide a simple, a reliable and efficient construction which permits such accumulations of yarn to be readily removed from the spindle without stopping the spinning frame, thereby overcoming the aforementioned difficulties, and to provide a construction which prevents small fragments of yarn, dirt, etc., from working under the clutch fingers where they eventually would interfere with the proper operation. Further objects will be apparent from a consideration of the following description and from the accompanying drawings, wherein:

Fig. 1 is an elevation, with parts broken away and shown in section, of a spindle having the bobbin seat constructed in accordance with the present invention;

Fig. 2 is a fragmentary view illustrating the manner in which the yarn accumulates about the bobbin seat;

Fig. 3 is a view similar to Fig. 1 but showing a modified form of bobbin seat;

Figs. 4 and 5 are elevation and plan views, respectively, of another modified form of bobbin seat;

Figs. 6 and 7 are elevation and plan views, respectively, of a further modification;

Fig. 8 is a view, similar to Fig. 1, but showing a spindle of modified construction;

Fig. 9 is a top plan view of the spindle shown in Fig. 8;

Fig. 10 is a perspective view of the case member of the spindle shown in Fig. 8; and

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Fig. 11 is a perspective view of the cap member used in conjunction with the case member shown in Fig. 10.

In accordance with the present invention, a spinning spindle of conventional construction, having a blade, a whirl mounted on the blade and a plurality of clutching members, with or without an associated case, circumposed about the blade above the whirl, is provided at the junction of the upper end of the whirl and lower end of the clutching members and/or case with means constituting an upstanding neck member defining an upwardly convergent surface, the upper end of which is contiguous to the lower portions of the clutching members and case so that accumulations of yarn wound about said clutching members may be forced downwardly about said neck. The upper end of the whirl is shaped or provided with a part which may be integral or separate, but which provides or defines a flat, relatively wide peripheral marginal portion constituting a bobbin seat, and the neck member adjoins the bobbin seat and may be separate from or integral with the bobbin seat and/or the case, as hereinafter illustrated. In any event the outer face of the neck member is upwardly convergent with its upper end terminating in a feathered edge and/or merging with the outer surfaces of the clutching members and case so as to present, in effect, a continuation thereof, free from such irregularities as would interfere with or prevent accumulations of yarn wound about the clutch members from being forced downwardly about the neck.

Referring to Figs. 1 and 2, the embodiment shown therein comprises a blade 1 having a whirl 2 mounted thereon, the whirl including a driving member 4 and a cylindrical head 5 on which a bobbin may be seated. A case 6, including a cap or head 7, has a pressed fit about the blade and is formed with a plurality of slots 7*a* through which resilient clutching fingers 8 project so as to engage the bore of a bobbin. The clutching fingers 8 are carried by an annular base member seated on the upper face of the whirl in engagement with the lower ends of the case 6, as in my copending application identified below, and in general the construction and arrangement of the parts thus described may be the same as or similar to the construction and arrangement shown in my prior patents, for example, Reissue No. 17,964, dated February 10, 1931, No. 2,249,150, dated July 15, 1941, or in my copending application Serial No. 611,621, filed August 20, 1945, now Patent No. 2,471,574, dated May 31, 1949, to which

reference may be had for a more detailed disclosure.

A bobbin seat 10, having an annular body portion 11 and a depending flange or skirt 12 snugly fitting about the head 5, is formed with an upwardly converging neck 14, the lower part of the inner periphery of which surrounds the annular base of the spring and the upper end of which terminates in a feathered edge 15 which surrounds and merges with the surface of the lower ends of the clutching fingers 8 so as to present, in effect, a continuation thereof. The contour of the converging surface of the neck, relative to that of the bore of the bobbin or bobbin ferrule, is preferably such as to provide a slight clearance space, as indicated at 16 in Fig. 2, to accommodate small accumulations of yarn Y and thus avoid improper seating of the bobbin B. The lower end of the skirt portion 12 is chamfered and rolled inwardly about the lower edge of the head of the whirl so as to secure the parts together.

The body portion 11 thus provides a seat for the bobbin B with the neck 14 projecting a short distance into its bore, the clutching fingers 8 being operative frictionally to hold the bobbin in place. With this construction and arrangement convolutions of yarn accumulating about the fingers 8 may either work or be forced downwardly about the neck 14 which expands them, as illustrated in Fig. 2, sufficiently to permit the easy removal of yarn after lifting the bobbin off without stopping the spindle, as distinguished from prior constructions wherein the junction of the outer face of the whirl and the clutching segments or case define a square shouldered area of lesser diameter than that through the clutching fingers and about which such accumulations become so tightly packed that it is quite difficult, if not practically impossible, to remove them without stopping the spindle.

The embodiment as shown in Fig. 3 is similar in all material particulars to that of Figs. 1 and 2, except that the upper end of head 5^a of the whirl is formed with an outer central recess 18 which receives the body portion 11^a of bobbin seat 10^a and an inner central recess 18^a which receives the lower end of the annular base 19 of the spring. The neck 14^a may be the same as that of the previously described embodiment and the bobbin seat operates as above described.

In Figs. 4 and 5 I have shown a modified form of bobbin seat 10^b which comprises a body portion 11^b having a depending skirt 12^b and an upstanding neck 14^b of frusto-conical shape. The bobbin seat 10^b may be fitted about the head of a whirl as in the embodiment of Figs. 1 and 2 to operate in the same manner.

Figs. 6 and 7 illustrate another modified bobbin seat 10^c wherein the neck portion is defined by a plurality of converging spaced sections 14^c, the upper ends of which may engage either the clutching fingers 8 or the sections of the case 6 between the clutching fingers. In any event the sections 14^c collectively function in the manner above described and the spaces between them provide recesses in which the thumb and fingernails or the end of a pointed instrument may be inserted to facilitate the removal of accumulations of yarn.

The construction shown in Figs. 8 to 11 embodies the same operating principle as that of the previously described embodiments and comprises a blade 1 having a whirl 2^b mounted thereon, the whirl being formed with a driving

member 4^b and a head 5^b, the central portion of which is formed with inner and outer concentric stepped recesses 21 and 22, respectively. A flanged one-piece case 24 is mounted on the blade and is formed with a plurality of circumferentially spaced slots 25 (Fig. 10). The lower ends 26 of the case between the slots 25 flare outwardly and snugly fit the outer recess 22, the flared ends 26 collectively constituting, in effect, an upstanding neck-like member at the junction of the upper face of the whirl and the lower end of the case. The curvature of the upwardly converging surface of the neck-like member is such as to permit the bobbin to be seated on the upper end of the whirl with a slight clearance between its upwardly converging surface and the lower end of the bobbin, and in all material particulars corresponds structurally and functionally to the necks 14 and 14^a of the previously described embodiments.

A plurality of clutching members 28 circumposed about the blade 1 project through the slots 25 so as to engage the bore of a bobbin seated on the whirl, and the lower ends of these members extend into the inner recess 21. If desired, a cap or bobbin seat 10^b (Fig. 11) may be provided, such cap having a depending skirt 12^b fitting about the upper end of the whirl and being formed with a central opening 30 shaped to fit closely about the lower ends of the clutching members 28 and case 24, as shown in Fig. 9.

It will be observed that the upper part of the neck-like member defined by the flared ends 26 of the case are contiguous to the lower parts of the clutching members 28 so that accumulations of yarn wound about the clutching members may be forced downwardly about the neck-like member; and that the cap or bobbin seat effectively seals off the recesses 21 and 22, thereby preventing yarn, dirt, etc., from collecting about these parts.

While I have shown and described different desirable embodiments of the invention, it is to be understood that this disclosure is for the purpose of illustration, and that various changes in shape, proportion and arrangement of parts, as well as the substitution of equivalent elements for those herein shown and described, may be made without departing from the spirit and scope of the present invention as set forth in the appended claims.

I claim:

1. A spindle comprising a blade, a whirl mounted on the blade, the upper end of the whirl having a flat relatively wide peripheral marginal portion providing a seat for a bobbin, a generally cylindrical case secured to said blade above said whirl, said case having a plurality of circumferentially spaced slots, the lower end of said case between said slots flaring outwardly so as to provide at the junction of said case and said peripheral marginal portion of said whirl a neck member having an upwardly convergent outer surface, and clutching members projecting outwardly through said slots for engaging the bore of the bobbin, the convergent end of said neck member being contiguous to the lower portions of said clutching members so that accumulations of yarn wound about said clutching members may be forced downwardly about said neck member.

2. A spindle comprising a blade, a whirl mounted on the blade, the upper end of the whirl having a flat relatively wide peripheral marginal portion providing a seat for a bobbin

and its central portion being formed with inner and outer concentric stepped recesses, a generally cylindrical case secured to said blade above said whirl, said case having a plurality of circumferentially spaced slots, the lower end of said case between said slots flaring outwardly and extending into the outer recess of said whirl so as to provide at the junction of said case and peripheral marginal portion of said whirl a neck member having an upwardly convergent outer surface, and clutching members projecting outwardly through said slots for engaging the bore of a bobbin, the lower ends of said clutching members extending into the inner recess and the upper end of said neck member being contiguous to the lower portions of said clutching members so that accumulations of yarn wound about said clutching members may be forced downwardly about said neck member.

3. A spindle comprising a blade, a whirl mounted on the blade, the whirl having a cylindrical head, and clutching means including a generally cylindrical case extending about the blade and formed with a plurality of circumferentially spaced slots, spring fingers having parts projecting through said slots so as to engage the bore of a bobbin, and an annular member providing a flat relatively wide bobbin seat having a depending flange circumposed about the cylindrical head of said whirl, the inner periphery of said bobbin seat encircling the lower end portions of said clutching fingers and adjoining the lower ends of said case so as to define an upwardly convergent surface merging with the lower portions of said clutching fingers and case.

4. A spindle comprising a blade, a whirl mounted on a blade, the upper end of said whirl having a flat relatively wide peripheral marginal portion providing a seat for a bobbin, a generally cylindrical case secured to said blade above said whirl, said case having a plurality of circumferentially spaced slots, a spring extending about said blade and held in position by said case, said spring having clutching members projecting outwardly through said slots for engaging the bore of the bobbin, and annular means at the junction of said case and bobbin seat defining an upstanding neck member having an upwardly convergent outer face, the upper end of said neck member merging with the lower portions of said case and said clutching members so that accumulations of yarn wound about said clutching members may be forced downwardly about said neck.

5. A spindle comprising a blade, a whirl mounted on said blade, the upper face of said whirl having a flat relatively wide peripheral marginal portion providing a bobbin seat and a central recess, a generally cylindrical case secured to said blade above said whirl, the lower end of said case projecting into said central recess, a plurality of resilient clutching members circumferentially distributed about said blade and projecting through the slots in said case for yieldingly engaging the bore of a bobbin, and an annular member seated on said whirl and formed with an upstanding neck circumposed about the lower ends of said case and said clutching members so as to project into the lower end of a bobbin seated on said whirl, the outer face of said neck being upwardly convergent with its upper end merging with the outer surfaces of said case and said clutching members so as to present, in effect, a continuation thereof, whereby yarn wound about said clutching members may be forced downwardly about said neck.

6. A spindle comprising a blade, a whirl mounted on the blade, the upper end of said whirl having a flat relatively wide peripheral marginal portion providing a bobbin seat and the central portion being formed with inner and outer concentric stepped recesses, a generally cylindrical case secured to said blade above said whirl, said case having a plurality of circumferentially spaced openings, the lower end of said case extending into the inner recess, clutching members projecting outwardly through said openings so as to be engageable with the bore of a bobbin, and an annular member seated in the outer recess and shaped to define an upstanding neck having an upwardly convergent outer face, the upper end of said neck merging with said case and said clutching members so that accumulations of yarn wound about said clutching members may be forced downwardly about said neck.

7. A spindle comprising a blade, a whirl mounted on said blade, the whirl having a cylindrical head, a generally cylindrical case extending about said blade and formed with a plurality of circumferentially spaced openings, clutching members projecting through said openings so as to engage the bore of a bobbin, and an annular member having a depending flange fitting about said cylindrical head, the outer peripheral marginal portion of said annular member providing a flat relatively wide bobbin seat and the inner peripheral portion of said annular member having an upwardly convergent outer surface merging with the lower end portions of said case and clutching members so that accumulations of yarn wound around said clutching members may be forced downwardly about said convergent outer surface.

8. A spindle comprising a blade, a whirl mounted on said blade, the whirl having a cylindrical head, the upper face of the head having a flat, relatively wide peripheral marginal portion providing a bobbin seat and a central recess, a generally cylindrical case extending about said blade and having a plurality of circumferentially spaced slots, a circumferential flange seated within said central recess and extending about and merging with the lower end of said case, the exposed surface of said circumferential flange being shaped so as to define an upwardly convergent surface which provides a clearance space beneath the wall at the lower end of the bore of a bobbin seated on said bobbin seat, and clutching means including a spring member and clutching fingers projecting through said slots so as to engage the bore of a bobbin seated on said bobbin seat at a point above said clearance, said clutching fingers and associated parts cooperating to hold the bobbin firmly in position.

9. A spindle comprising a blade, a whirl mounted on said blade and having a flat, relatively wide peripheral marginal portion providing a bobbin seat, a generally cylindrical case secured to said blade above said whirl, said case having a plurality of circumferentially spaced slots, clutching members projecting through said slots so as to be engageable with the bore of a bobbin, and means at the upper end of said whirl between said seat and the lower ends of said case and said clutching members defining an upstanding neck having an upwardly convergent outer surface, the upper end of said neck merging with said case and said clutching members so that accumulations of yarn wound about said

clutching members may be forced downwardly about said neck.

10. A spindle comprising a blade, a whirl mounted on said blade, the upper end of said whirl having a part which provides a flat, relatively wide peripheral marginal portion constituting a bobbin seat, a generally cylindrical case secured to said blade above said whirl, said case having a plurality of circumferentially spaced openings, clutching members projecting outwardly through said openings so as to be engageable with the bore of a bobbin seated on said bobbin seat, resilient means extending about said blade for urging said clutching members outwardly, and means adjoining said bobbin seat and providing an upstanding neck having an upwardly convergent outer face, the upper end of said neck merging with said case and said clutching members so that accumulations of yarn wound about said clutching members may be forced downwardly about said neck.

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