

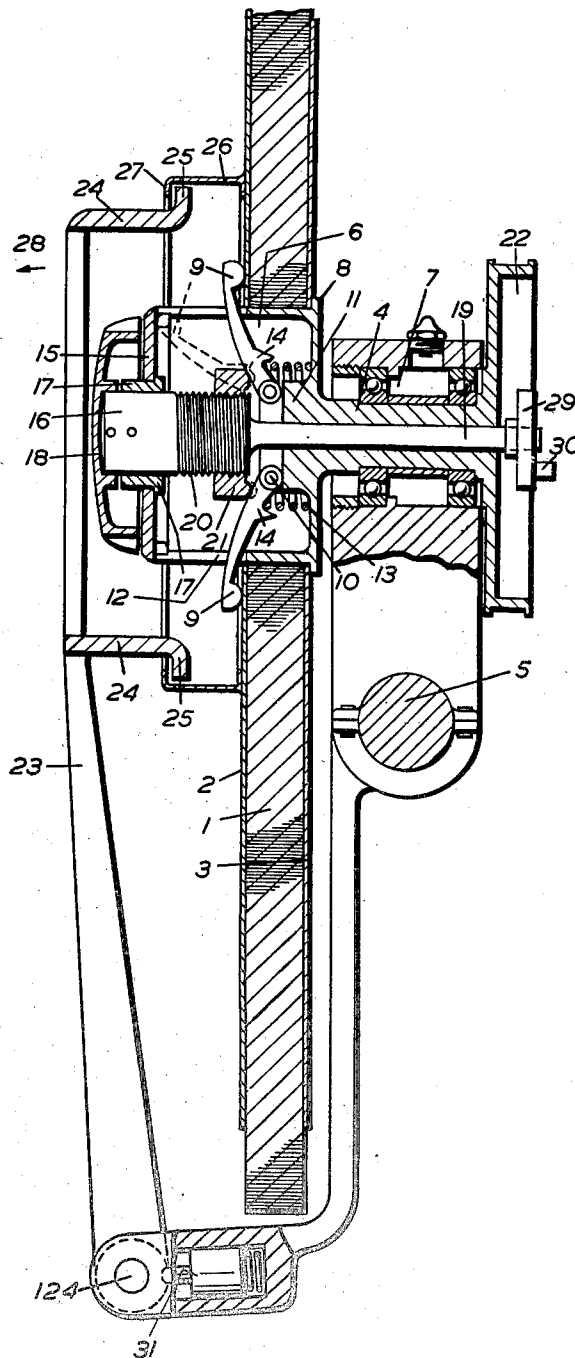
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MOUNTING FOR REELS, BOBBINS, AND THE LIKE

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MOUNTING FOR REELS, BOBBINS, AND
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The invention is concerned with a carrier spindle for a reel, bobbin or other such container for yarn wire or other long flexible material. It is particularly concerned with a carrier spindle having clamping means adapted to hold the container firmly in place by pressure against a fixed abutment on the spindle while being readily releasable to facilitate loading and unloading by the movement of the container over one end of the spindle. The invention is described with reference to the mounting of a flat spiral coil or pad of paper tape in a machine for lapping paper about an electric conductor. From this description it will be apparent how the invention is applicable to the general class of containers mentioned above.

In such machines a paper coil is usually held between discs on a spindle rotatably mounted in a frame which is itself adapted to be rotated about the path of movement of a conductor through the machine. The clamping arrangements usually comprise one or more nuts and washers which together with one of the discs require to be completely removed from the spindle every time a coil is replenished. The elements of the clamp are liable to be mislaid, and their complete removal and replacement require the expenditure of an appreciable time in the operation of a cable-lapping machine. In the improved arrangement the clamp is permanently attached to the spindle thereby eliminating the above-mentioned disadvantages.

The improved carrier spindle comprises a barrel providing a cylindrical seating surface for the coil and having at one end a radial flange forming a fixed abutment against which the coil is to be clamped. Two or more arms are pivotally mounted within the barrel at points which are uniformly spaced about its axis, so that each arm is movable in a plane containing the spindle axis. The arms are adapted to move between limiting positions, in one of which the ends extend beyond the seating surface and in the other they are collapsed towards the axis with their ends lying below that surface. In the collapsed position they provide no obstruction to movement of a coil on and off the seating surface, while in the other position they are adapted to bear against the disc on the outside of the coil to clamp the coil against the radial flange.

The arms are conveniently biased into the collapsed position by means of springs. A collar coaxial with and mounted within the barrel is movable along the axis, preferably by the rotation of a screw threaded spindle with which the

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collar engages. The collar is adapted to bear against the arms to turn them into the clamping position when it is moved in one direction, and to release them by its movement in the opposite direction. Preferably, the collar is internally threaded and is held against rotation, being provided with endwise movement by rotation of the threaded spindle engaging within the collar and which is itself held against endwise movement. The threaded spindle is provided with a suitable handle at the outer end, and both the handle and the collar are smaller in diameter than the seating.

The surface of the collar which engages the arms is preferably knurled, or otherwise roughened, or provided with radial grooves to engage the arms and thereby restrain the collar against rotation. The threaded spindle is conveniently supported in a bearing formed in a flange closing the outer end of the barrel, and between this flange and the seating surface for the coil there are conveniently provided longitudinal slots for the passage of the arms.

It is convenient to carry the movable disc on an arm pivotally attached to the frame in such a way that the disc may be moved out of the way when the clamp is released without being completely disconnected from the apparatus and be readily returned into position after the coil has been replenished and before the clamp is reapplied. In the preferred arrangement this disc is formed on the outside with a co-axial rim having at its outer edge an inwardly projecting flange beneath which the ends of a forked lever freely engage without interfering with the rotation of the coil.

The threaded spindle may conveniently be associated with a tripping device which will operate during the releasing or clamping movement to reset controlling mechanism, for instance, an automatic tension-controlling device, requiring to be returned to an initial condition with the introduction of a fresh coil. Preferably the tripping device is in the form of a disc formed on the end of the spindle and provided with a cam or projection which will be brought into an operative position as the spindle is turned.

The invention is further described with reference to the accompanying drawing which illustrates in cross-section a carrier incorporating the improved clamping means.

In the arrangement shown a coil 1 of paper strip is adapted to be held between two discs 2, 3 on a spindle 4 mounted on a carrier arm 5. The spindle 4 is supported so as to be rotatable in a

roller bearing 7. The carrier arm 5 forms part of a frame which, in the usual manner, may be rotated about the path of movement of a conductor through a machine in which the conductor may be wrapped with a number of layers of paper tape, each tape being drawn from a coil such as the coil 1. This invention is concerned only with that part of such a machine which is illustrated in the drawing.

The discs 2, 3 and the coil 1 are centrally apertured to fit on the cylindrical seating surface of a barrel 6. This barrel 6 is formed by an enlargement of the spindle 4. A radial flange 8 projecting beyond the surface of, and formed integral with the barrel 6 at its inner end forms a fixed abutment against which the coil 1 is to be clamped. Two diametrically opposed clamping arms 9, 9 are pivotally mounted within the barrel 6. The pivots 10, 10 for the arms 9, 9 are provided at diametrically opposite points on a boss 11 formed integral with the spindle 4 and projecting into the barrel 6. Each arm 9 is movable in a plane containing the axis of the spindle 4, between a clamping position and a collapsed position. In the illustration the arms 9, 9 are shown in the clamping position in full line and in the collapsed position in broken line. In the clamping position, the ends of the arms 9 extend beyond the exterior seating surface of the barrel 6 so that the coil 1 and the discs 2, 3 may be clamped between the ends of the arms 9 on one side and the radial flange 8 on the other. In the collapsed position the arms 9 have been turned towards the axis of the barrel 6 so that their ends lie below the surface of the barrel where they do not obstruct the sliding movement of the coil 1 and discs 2, 3 along the barrel surface. Longitudinal slots 12 permit free passage of the arms 9 through the barrel wall. A helical compression spring 13, co-axial with the barrel and wholly within it, bears at one end against the inner end wall of the barrel and at the other against the arms 9, thus tending to move the arms into the collapsed position. Small projections 14 on the arms 9 ensure effective engagement between the arms and the spring.

Supported rotatably in an outer end wall 15 of the barrel is a clamping spindle 16. The clamping spindle 16 is fastened to a bearing collar 17 where it passes through the end wall 15, the bearing collar 17 serving to hold the spindle 16 against endwise movement. Outside the barrel 6 a handle 18 is fixed to the end of the clamping spindle, the dimensions of the handle being such that it does not extend beyond the external surface of the barrel. The clamping spindle 16 extends within and co-axially with the barrel and is provided with an extended portion 19 of smaller diameter which passes completely through the centre of the main spindle 4 and is rotatable therein. The main portion of the clamping spindle 16 within the barrel is provided with an external screw thread 20. Mounted on the clamping spindle 16 within the barrel is a collar 21, internally screw-threaded to engage the thread 20 on the spindle, and of comparatively small axial dimension so that when held against rotation the collar will move backwards and forwards within the barrel along the clamping spindle as the spindle is turned by means of the handle 18. The collar 21 bears against the arms 9 as the clamping spindle 16 is turned in one direction, and causes the arms 9 to be turned outwards, against the force of the spring 13, into the clamping position. By turning the

spindle 16 in the other direction the collar 21 will move away from the arms 9 thus permitting the arms to be collapsed by the spring.

The surface of the collar 21 which engages the arms 9 is radially slotted to receive the arms 9. The slots are wide enough to permit free movement of the arms 9 whilst at the same time the engagement of the arms against the sides of the slots holds the collar 21 against rotation with the clamping spindle 16.

To put a coil 1 in place, the arms 9 being collapsed, the inner disc 3 is first put onto the barrel, followed by the coil 1 and the outer disc 2. By turning the handle 18, the arms 9 are then moved into the clamping position until the coil 1 and the discs 2, 3 are tightly held between the ends of the arms 9 and the flange 8. As tape is removed from the coil 1 in the usual manner of operation of the machine, the coil together with the barrel and associated clamping arrangements rotates in the bearing 7. This rotation is controlled by a brake applied in a convenient manner to a hollow brake drum 22 formed on the main spindle 4. Spent coils are removed, for replenishment, by turning the handle 18 to release the clamping pressure and allow the ends of the levers 9 to collapse below the surface of the barrel so that unloading and reloading movements are not impeded.

The inner disc 3 will not usually be removed from the barrel 6. An arrangement is provided whereby the outer disc 2 is not completely disconnected from the apparatus during reloading operations. This comprises a lever 23 attached at a pivot 24 to the machine frame at a point well clear of the coil. The free end of the lever 23 is provided with two arms 24 in the form of a fork, the ends 25 being turned radially outwards as shown in the drawing. The removable disc 2 is formed with a co-axial rim 26 having an inwardly projecting rim 27. When the coil 1 is clamped in position, the ends 25 of the lever 23 are located under the rim 27 but do not interfere with the rotation of the coil 1 and disc 2. When the disc 2 is released and removed it is supported by engagement of the ends 25 of the lever 23 under the rim; the lever is turned about the pivot 24 in the direction of the arrow 28 and carries with it the disc 2 to a position where it does not interfere with the reloading operation. At the same time the disc 2, being still maintained attached to the apparatus, is readily available for replacement. A spring-loaded catch 31 serves to hold the lever 23 in position when a coil is in place.

The threaded spindle 16 is associated with a tripping device, which will operate during the releasing or clamping movement to reset a controlling mechanism requiring to be returned to an initial condition with the introduction of a fresh coil 1. The tripping device comprises a disc 29 formed on the end of the spindle which is remote from the handle 18 and provided with an eccentric projection 30. The projection 30 is located within the brake drum 22 with which an automatic tension-controlling device will be associated. As the spindle is rotated during the replenishment of the coil, the projection 30 is moved and its motion may be used to reset such a device in the initial condition. The tension-controlling device forms no part of this invention and is not illustrated.

What I claim is:

1. A reel-mounting spindle with a reel-seating surface provided by a longitudinally slotted ex-

ternal cylindrical surface of a hollow barrel portion of the spindle, a flange integral with the spindle and extending radially from the reel-seating surface, a central rod extending axially through and rotatable about its axis in the barrel portion, restraining means holding the rod against axial displacement, at least two clamping-arm supporting pivots fixed to the spindle and symmetrically arranged about the rod beneath the reel-seating surface, a clamping arm attached at one end to each pivot and movable between a collapsed position wholly below the reel-seating surface and a clamping position in which the other end extends radially outwards through a slot in the reel-seating surface, a screw thread on the rod within the barrel portion, an internally screw-threaded non-rotatable collar engaging said screw-thread and bearing against each arm, the arm-engaging surface of the collar being radially slotted to receive the arms, and a knob of diameter not greater than the barrel diameter fixed to one end of the rod which extends outside one end of the barrel, said knob providing for the rod to be rotated in one direction to raise the arms into a position to clamp a reel between them and the flange and in the other direction to permit the arms to collapse below the reel-seating surface.

2. A reel-mounting spindle with a reel-seating surface provided by a longitudinally slotted external cylindrical surface of a hollow barrel portion of the spindle, a flange integral with the spindle and extending radially from the reel-seating surface, a central rod extending axially through and rotatable about its axis in the barrel portion, restraining means holding the rod against axial displacement, at least two clamping-arm supporting pivots fixed to the spindle and symmetrically arranged about the rod beneath the reel-seating surface, a clamping arm attached at one end to each pivot and movable between a collapsed position wholly below the reel-seating surface and a clamping position in which the other end extends radially outwards through a slot in the reel-seating surface, an enlargement on said other end of each arm and projecting towards the flange when the arm is in the radially extending position, a screw thread on the rod within the barrel position, and an internally screw-threaded non-rotatable collar engaging said screw thread, said collar bearing against each arm and being radially slotted to receive the arms, and a knob of diameter not greater than the barrel diameter fixed to one end of the rod

which extends outside one end of the barrel, said knob providing for the rod to be rotated in one direction to raise the arms into a position to clamp a reel between said enlargements and the flange, and in the other direction to permit the arms to collapse below the reel-seating surface.

3. A reel-mounting spindle with a reel-seating surface provided by a longitudinally slotted external cylindrical surface of a hollow barrel portion of the spindle, a flange integral with the spindle and extending radially from the reel-seating surface, a central rod extending axially through and rotatable about its axis in the barrel portion, restraining means holding the rod against axial displacement, at least two clamping-arm supporting pivots fixed to the spindle and symmetrically arranged about the rod beneath the reel-seating surface, a clamping arm attached at one end to each pivot and movable between a collapsed position wholly below the reel-seating surface and a clamping position in which the other end extends radially outwards through a slot in the reel-seating surface, a screw thread on the rod within the barrel portion, an internally screw-threaded non-rotatable collar engaging said screw-thread and bearing against each arm, the arm-engaging surface of the collar being radially slotted to receive the arms, a knob of diameter not greater than the barrel diameter fixed to one end of the rod which extends outside one end of the barrel, and a mechanism-tripping member mounted eccentrically on the other end of the rod extending through the other end of the barrel, said knob providing for the rod to be rotated in one direction to raise the arms into a position to clamp a reel between them and the flange and in the other direction to permit the arms to collapse below the reel-seating surface.

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