TAPE TRANSPORT HUB

BACKGROUND OF THE INVENTION

This invention relates to a tape transport. It relates more particularly to a hub for supporting a reel of tape in a tape transport.

Tape transports are used in date processing systems to advance magnetic or paper tapes past read and write heads. The tapes are carried on reels which are rotated in one direction or the other by a capstan in the tape transport.

Conventionally, the reels are mounted on splined shafts which project through axial passages in the reels. Usually also a locking device is included at the end of the shaft to prevent the reel from accidentally sliding off the shaft. While these locking devices perform their function, they also make it more difficult to change tapes. That is, to change a tape, the shaft must be disengaged and the tape reel worked loose from the shaft. Then the new reel must be aligned properly, slid onto the shaft and locked. In some instances, this becomes a burdensome and time-consuming task.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide an improved hub for mounting a tape reel in a tape transport.

Another object of the invention is to provide a tape transport hub which facilitates changing tapes.

Yet another object of the invention is to provide a self-locking hub for mounting tape reels.

Other objects will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

Briefly, the hub comprises a plurality of radially extending fingers which are arranged around the hub axis. Each finger is composed of a pair of flexible, resilient mirror image segments which are turned or bowed toward one another in the plane of the hub.

The tape reel used with the present hub is in the form of an annulus with an axial passage which is slightly smaller than the hub. When the hub is stationary, the reel can be slid easily onto the hub slightly bending the segments in each pair toward one another so the reel is held on the hub. Moreover, when the hub or reel is rotating in either direction, the finger segments extend and frictionally engage the wall of the axial passage so as to securely lock the reel on the hub.

More particularly, when the hub (or reel) is rotated in one direction, the frictional drag exerted by the reel on the hub fingers causes one segment of each finger to straighten out so that the segment moves away from the hub axis into nonslip engagement with the reel. When the hub (or reel) is rotated in the other direction, the other segment of each finger grips the reel in the same way. Thus, whenever the hub (or reel) is moving, the reel is securely locked to the hub. Yet, when the hub (or reel) is stationary, the reel can be placed on or taken from the hub without requiring special angular alignment with the hub or the lock. The resilient finger segments alone hold the reel on the hub. This allows easy loading and unloading of the reel, yet assures that the reel will not disengage from the hub when stationary.

BRIEF DESCRIPTION OF THE DRAWING

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

FIG. 1 is a fragmentary perspective view of a tape transport embodying the principles of this invention;

FIG. 2 is a perspective view on a larger scale showing the tape transport hub in greater detail, and

FIG. 3 is a side elevational view of the hub.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1 of the drawing, the elements of the subject tape transport are mounted in a housing **10**. The transport includes a takeup section indicated generally at **12** and a letoff section indicated generally at **14**. Sections **12** and **14** each include a hub **16** and a tape reel **18** mounted on the hub. One reel **18** is shown removed from its hub **16** for illustrative purposes.

Reels **18** carry a length of magnetic tape **22** which is threaded through a protective enclosure **24** containing the usual capstan, read and write heads and the like. Hubs **16** are rotated in one direction or the other by means of rotary shafts **26** (FIG. 3) which constitute the hub **16** axles.

Turning now to FIG. 2, each hub **16** is made of rigid impact-resistant plastic or the like and comprises an array of bifurcated fingers shown generally at **30** which extend radially out from a central core **32** or more specifically the hub axis A. Core **32** has an axial passage **34** which receives the end of a shaft **26**. In the illustrated embodiment, there are six fingers **30** distributed at equal angles about core **32**, i.e. every 60°.

Each finger **30** is made up of two mirror image segments **30*a*** and **30*b*** which are separated by a relatively wide slit **36**, and are bowed or turned toward one another. As best seen in FIGS. 2 and 3, each finger segment **30*a*** has a vanelike section **38*a*** which lies parallel to the hub axis. Section **38*a*** is formed with a relatively thin neck **42*a*** adjacent core **32** which extends radially out from axis A and provides a hingelike connection and a thicker, or enlarged, central portion **44*a*** which is bent or bowed clockwise so that it makes an angle with neck **42*a***. Actually, portion **44*a*** is generally tangent to the wall of passage **34**. Portion **44*a*** gradually tapers in the thickness direction so that its tip **46*a*** is relatively thin.

A flat flange **48*a*** extending out to the side and beyond the tip **46*a*** of portion **44*a*** at the rear face of the hub acts as a stop for reel **18** as will be described in detail later. Finger segment **30*b*** is a mirror image of segment **30*a*** and includes all of the aforesaid parts. That is, it has vane portion **38*b*** with an inner narrow radially extending neck **42*b*** and a relatively thick portion **44*b*** which tapers to a relatively narrow tip **46*b***. Portion **38*b*** is bowed or bent counterclockwise so that it is generally tangent to passage **34** in core **32**. Also, a flange **48*b*** extends out to the side and beyond the tip **46*b*** of portion **44*b***.

The finger segments **30*a*** and **30*b*** are relatively flexible and resilient. That is, when a force is applied to the segment tips **46*a***, **46*b*** in the plane of the hub (i.e. clockwise or counterwise), the segments bend or deflect at their relatively thin necks **42*a***, **42*b***. When this force is removed, the segments return to their normal undeflected positions shown in FIG. 2.

Due to the bowed or bent shape of each finger segment **3*a***, **30*b***, when they are deflected in the foregoing manner, the distances between their tips **46*a***, **46*b*** and hub axis A change.

More particularly, when a segment **30*a*** is deflected counterclockwise (FIG. 2), it tends to straighten out so that its tip **46*a*** moves further away from axis A. In other words, the effective length of the segment **30*a*** increases. The same elongation occurs to a segment **30*b*** when it is deflected clockwise. On the other hand, when a segment **30*a*** is deflected clockwise, the angle between its neck **42*a*** and portion **44*a*** tends to decrease so that its tip **46*a*** draws closer to hub axis A. In the same manner, the effective length of a segment **30*b*** decreases where it is deflected counterclockwise (FIG. 2).

Referring again to FIG. 1, each reel **18** has a central axial passage **50** which is larger than those usually found in present-day tape reels. More particularly, the diameter of passage **50** is slightly less than the diameter of the hub as measured between the undeflected finger segment tips **46*a***, **46*b*** on the opposite sides of the hub axis A.

When mounting reel **18** on the hub, the reel is slid axially onto the fingers **30** so that the segment sections **38*a***, **38*b*** extend into the reel passage **50**. The front edges **56*a*** and **56*b*** of segment tips **46*a*** and **46*b***, respectively, are beveled to