Oct. 9, 1928. 1,687,329

F. F. FILLOON

MANDREL

Filed June 10, 1925

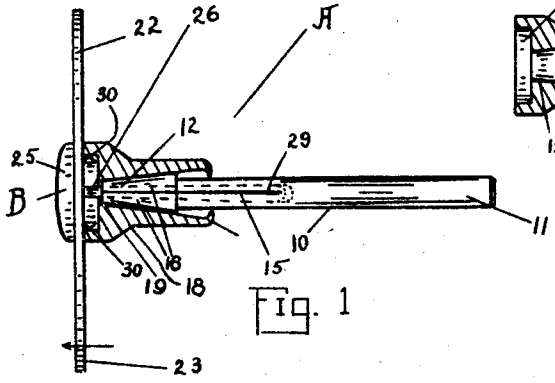


Fig. 1

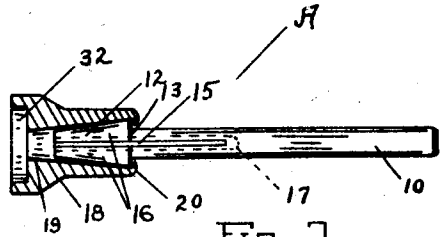


Fig. 2

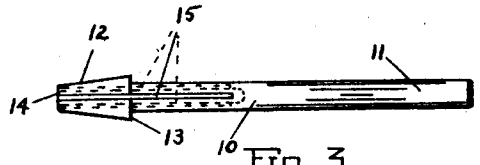


Fig. 3

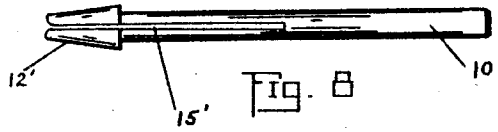


Fig. 8

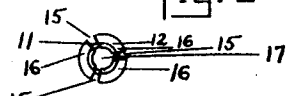


Fig. 4

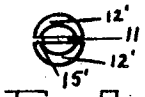


Fig. 9

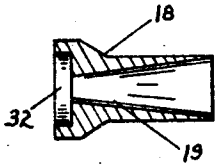


Fig. 5

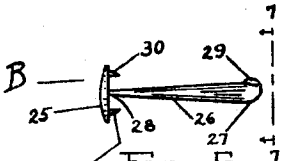


Fig. 6

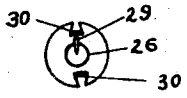


Fig. 7

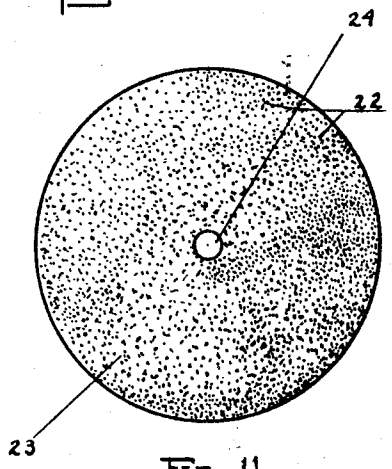


Fig. 11



Fig. 10

Inventor

Forest F. Filloon

By

Attorney

Patented Oct. 9, 1928. 1,687,329

UNITED STATES PATENT OFFICE.

FOREST F. FILLOON, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO MINNESOTA MINING AND MANUFACTURING COMPANY, OF ST. PAUL, MINNESOTA, A CORPORATION OF MINNESOTA.

MANDREL.

Application filed June 10, 1925. Serial No. 36,168.

My invention relates to dental mandrels wherein it is desired to provide a mandrel for holding the dental disks in a manner so that when in use the disks will not become loose accidentally or by the vibration in the operation of the mandrel while the dentist is working on one's teeth. While some mandrels are designed to prevent loosening of the disks when in use by the dentist, yet they do not have the positive locking means which is adapted to hold the disk holding pin locked in position while in use until it is released by a separate manual operation, as I have designed my mandrel to operate.

A feature of the invention resides in a dental mandrel wherein a clutching jaw action is provided which engages the pin of the disk holding head to firmly grip the same and prevent it from disengagement until the locking collar is released on the mandrel proper.

It is also a feature of the invention to provide a disk engaging pin which is adapted to hold the disk against rotating in relation to the mandrel and causing the same to rotate with the mandrel in operation.

I have designed a simple effective mandrel which is particularly adapted to hold polishing and grinding disks for dental purposes, such as thin paper or suitably prepared disks with a grinding surface on one side. This grinding surface is held in the mandrel toward the inner side, ordinarily, and my invention includes means for holding the disks so that it will not work itself loose in the operation of the dental clutch which rotates the mandrel and disk, and thus the disk is held so tightly in my mandrel that it can be entirely torn away without the disk holding clutch means becoming loose, leaving the portion of the disk firmly clamped in my mandrel head which would be torn from the center of the same if force enough is exerted against the disk, thus insuring firm and absolute holding of the dental disk in operation.

It is also a feature of my invention to provide a disk holding means which is self-centering thereby holding the disk against wobbling or being pushed off center in use.

These features together with other objects and details of construction will be more fully set forth in the specification and claims.

In the drawings forming part of this specification;

Figure 1 is a side view of my mandrel as it would appear in use, partly illustrated in cross section.

Figure 2 is a side view of my mandrel, partly illustrated in cross section with the disk holding pin and head removed.

Figure 3 is a side view of the mandrel rod with the locking collar removed from the same.

Figure 4 is an end view of the mandrel rod showing the slotted construction of the same.

Figure 5 is a cross sectional side view of the locking collar removed from the mandrel rod.

Figure 6 illustrates the disk pin removed from the mandrel.

Figure 7 is an end view on the line 7—7 of Figure 6.

Figure 8 illustrates an alternative form of the mandrel rod.

Figure 9 is an end view of the mandrel rod illustrated in Figure 8.

Figure 10 is the disk pin used with the mandrel rod illustrated in Figure 8.

Figure 11 illustrates an ordinary circular dental disk.

In the drawings, the mandrel A is formed with a mandrel rod 10 which is provided with a shank 11 of a rod-like nature, which fits into the hand clutch, not illustrated in the drawings and which is of ordinary construction, as used by dentists for holding their drills and polishing tools used in working on teeth. It is quite important that these tools held in the dental hand clutch are of a uniform nature in dimension and size and I have carefully considered this in designing and developing my mandrel so that it will be most practical for use in the ordinary standard dental hand clutch. The shank 11 fits into this clutch and is locked firmly therein in the ordinary and well known manner.

The mandrel rod 10 is formed of a suitable length and is provided with a tapered end portion 12 which is formed with an annular shoulder 13 on the inner enlarged end and the outer edge 14 is slit at 15 to provide gripping jaws 16.

The slits 15 extend longitudinally into the mandrel rod 10 and the rod 10 is drilled to form a recess or hole 17 extending back into the rod slightly beyond the length of the slits 15, the slits 15 extending through into the opening or hole 17. This provides the

gripping jaws 16 with suitable flexibility to permit them to be compressed together and of such a nature as to spring apart into open position when the tapered end 12 is not compressed together. In this manner I provide spring gripping jaws 16 which are adapted to operate as will be hereinafter described.

A locking collar 18 having a tapered inner recess 19 which is adapted to conform with the taper of the end 12 of the mandrel rod 10, is adapted to be placed over the portion 12 of the rod and is beaded or turned in at 20 to form an annular shoulder which is adapted to engage the annular shoulder 13. The recess 19 of the collar 18 is somewhat longer than the length of the portion 12 of the rod 10 so that after the shoulder 20 is formed on the locking collar 18, the collar can be moved back and forth over the head or tapered end 12 of the mandrel 10 to cause the tapered recess 19 of the collar to compress or release the jaws 16 of the mandrel A.

The collar 18 is so formed that when it is moved into backward position, the gripping jaws 16 will be compressed tightly together and the collar will firmly lock the jaws in this position. The collar 18 engages the jaws 16 frictionally so as to firmly and rigidly hold the jaws in closed position, as illustrated in Figure 1. When the collar 18 is engaged and pulled outward into the position illustrated in Figure 2, the gripping jaws 16 are released and expand into open position.

The dental disk 22 illustrated in Figure 11 is formed with a cutting or polishing surface 23 on one side and is provided with an opening 24 in the center of the same so that it can be attached to the mandrel A.

I provide a disk holding pin B which is formed with a round disk like head 25 and a tapered pin 26 secured to and extending from one side of the same. This pin 26 is tapered or wedge shaped so that the outer free end 27 of the pin is enlarged, while the inner end 28 which connects with the head 25 is small in diameter, and in fact the pin is almost conical shaped. It is desirable that the pin 26 is of a shape to simulate the taper of the portion 12 and the recess 19 of the collar 18.

The enlarged end 27 of the pin is provided with an outwardly projecting key portion 29 which is adapted to engage in one of the slots 15 of the mandrel rod 10 when the pin 26 is inserted into the opening 17 of the same. This holds the pin 26 with the head 25 against rotation when the same is placed in engagement with the recess in the mandrel rod 10. The key 29 fits into the lower extremity of the slots 15 and this portion of the slots is not compressed like the outer end of the edge 14 of the mandrel rod.

The disk holding pin B is provided with disk engaging prongs 30 which may be cut from the body of the head to form little sharp prongs 30 which engage and penetrate through the disk 22 when the disk pin B is passed through the center opening 24 in the disk, so as to firmly engage the dental disk 22 and rigidly clamp it to the mandrel A. I provide a recess 32 in the collar 18 to receive the points of the prongs 30 and to protect the same when the disk pin is attached to the mandrel rod 10.

In operation the pin B is removed from the mandrel A, as illustrated in Figure 2 and in Figure 6, then the disks 22 can be slipped over the pin 26 of the disk holding pin B and with the collar 18 engaged by the fingers of the operator and held in released position, the pin 26 is inserted into the opening 17 with the key 29 engaging in one of the slots 15. As the pin 26 is pushed into the hole 17 when the prongs 30 have pierced the disk 22, the collar 16 is permitted to operate back on to the head 12 and to frictionally engage the same, which is formed with a long taper, as illustrated, so as to lock the disk 22 firmly and rigidly to the mandrel A. Simultaneously with this operation the pin 26 is wedged and locked tightly in the opening 17 by the compression of the jaws 16 about the same to lock and firmly hold the pin against movement. This operation can be carried out either when the mandrel rod 10 is held in the dental hand clutch or when it is out of the same so that the dentist can readily and quickly place the disk rigidly attached to the mandrel A. In fact, the operation is so simple and effective that in practical use I have found that my mandrel is to be preferred for its simplicity and effectiveness in operation.

When the disk 22 is held in this manner as illustrated in Figure 1, locked to the mandrel A, it cannot come loose in operation either by the rotary movement of the mandrel or the vibrations in operation, and as the pull on the disk 22 is in the direction of the arrow illustrated in Figure 1 against the inner surface 23 of the disk, it is quite important to consider that my mandrel is very effective in operation. When the dentist desires to replace the old disk 22 with a new one it is only necessary for him to engage the collar 18 and pull slightly outward on the same, the annular shoulder 20 limiting the movement of the collar in coming in engagement with the shoulder 13, and when in this position, as illustrated in Figure 2, the pin B with the old disk 22 can be easily removed and a new disk inserted in place over the pin B. This operation is quick and effective and thus I provide a dental mandrel which is very desirable in practical use and which is meeting with marked approval of the dental profession.

In Figure 8 I have illustrated the mandrel rod 10 with a single slit 15′ which extends through the rod from one side to the other and in which it is not altogether necessary to form the rod with the hole 17. In this

construction I provide the disk holding pin C which is similar to the pin B with a flat pin shank 26′ which fits into the slot 15′ of the rod 10 in the same manner as the round pin 26 fits in the opening 17. In this construction it is not necessary to provide a key 29 as the flat nature of the pin 26′ is sufficient to hold the disk engaging pin C from rotating. As in this construction the collar 18 is of the same formation and operates exactly in the same manner to release the pin C as is true of the operation of the pin B in the mandrel A. Thus in practically every respect the mandrel rod 10 in Figure 8 with the pin C in Figure 10 operates as is true of the mandrel illustrated in Figure 1 to hold the disks 22 in locked position until the collar 18 is released on the taper end 12.

In accordance with the patent statutes I have described the principles of operation of my dental mandrel and while I have illustrated a particular formation of the same in the drawings, I desire to have it understood that these are only suggestive and that the invention can be carried out by other means and applied to uses other than those set forth within the scope of the following claims.

I claim:

1. A dental mandrel consisting of a hollow rod, split jaws to form grippers, a tapered outer surface on said jaws converging toward the end of the rod upon which the jaws are placed, an annular shoulder on said rod, a collar having a hollow tapered core adapted to cooperate with the tapered surface of said jaws to compress the same, shoulders formed on said collar adapted to engage the annular shoulder on the rod for limiting the movement of said collar with relation to the jaws and a disk supporting tapered pin and head adapted to be locked or released by said collar operating to engage said jaws.

2. A dental disk holder comprising, a hollow rod, tapered gripping jaws formed on said rod, a disk holding member having a head portion and a pin adapted to be engaged by said jaws, and disk piercing points formed on said head, a collar for contracting said jaws, said collar having a recess formed in its head for the reception of the disk piercing points.

FOREST F. FILLOON.