Sept. 24, 1929. E. F. HATHAWAY 1,729,267

ART OF MANUFACTURING YARN SPOOLS

Filed April 11, 1927

Fig. 1.

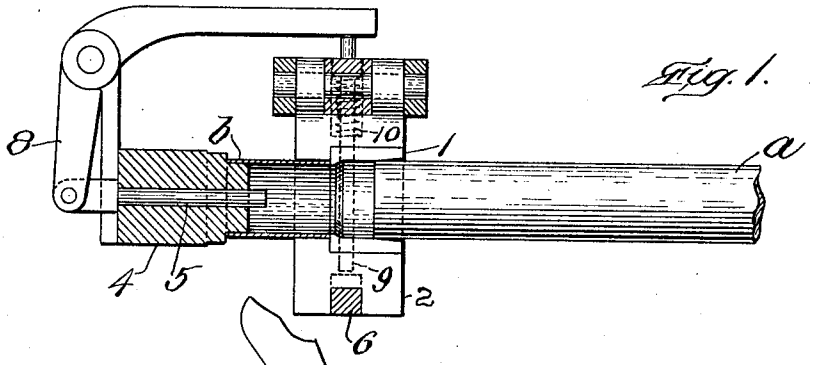


Fig. 2.

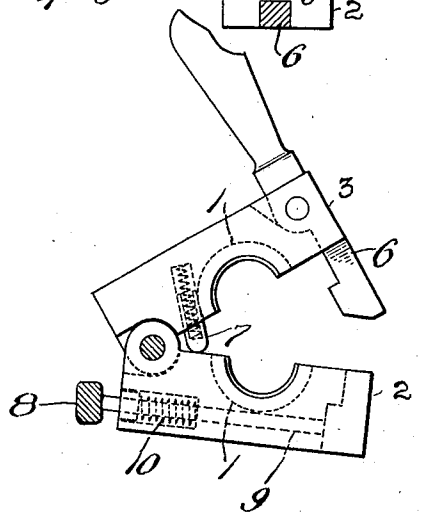
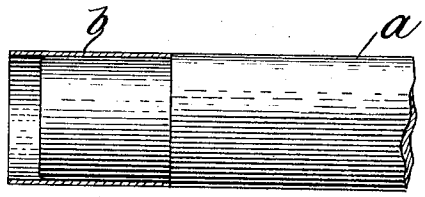


Fig. 3.



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UNITED STATES PATENT OFFICE

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ART OF MANUFACTURING YARN SPOOLS

Application filed April 11, 1927. Serial No. 182,764.

This invention relates to the production of yarn-spools of the type characterized by a roller or barrel, usually made of wood, to whose ends are affixed metallic ferrules which form attaching means for securing the disk-like heads to the barrel.

This type of roller, while much used on account of its lightness and strength, nevertheless is subject to the serious objection that the ferrules are likely to work loose and thus make the spool more or less unfitted for satisfactory service. The indenting or upsetting of the metal ferrule into the wood, and even the driving of pins through the metallic ferrule into the wood have not proved altogether satisfactory remedies for this trouble.

By the present improvement I am able to produce a ferrule that does not require penetration of the wood by upset portions of the ferrule or by anchoring pins which often split the wood of the roller, and my invention, generally speaking, comprises a method of applying the ferrule without resort to such expedients by subjecting the end portions of the roller to a reducing compression that reduces the diameter of the roller sufficiently to allow it to be forced into a non-expansible ferrule whose interior diameter is substantially smaller than the normal diameter of the roller or barrel, so that the natural expansion of the wood thereafter is sufficiently great to maintain a very tight gripping engagement between the ferrule and the confined end of the inserted roller.

For the convenient and expeditious practice of this process I have invented a simple form of apparatus which forms the subject matter of another application and is not herein claimed. Nevertheless, for the purpose of illustrating how the process may be conveniently carried out I have shown in the drawings enough of such apparatus to illustrate how the process may be economically and conveniently practiced.

In said drawings:

Figure 1 is a sectional plan view showing a simple form of compressing die mounted in a suitable support in combination with a thrust anvil to receive and support the end thrust of the ferrule being applied.

Figure 2 is an end elevation of the compressing die mounted in pivotal supporting jaws in open position for the removal of the roller after the ferrule has been applied.

Figure 3 is a detail view of the finished roller with its ferrule affixed, according to this invention, ready for application to the usual spool head or disk.

In the practice of the process the wooden roller *a*, to be used, is of substantially larger diameter than the internal diameter of the ferrule *b*, which it is desired to secure in proper position on said roller in order that there may be a very substantial reduction of diameter of the end portion of the roller by inward compression on all sides until the end of the roller may be forced inside of the substantially cylindrical and non-expansible ferrule, thereby utilizing the natural expansion of the wood, after such compression, to retain a powerful gripping engagement with the confining or surrounding ferrule.

The disruption or splitting of the ferrule, when the compressed end of the roller is forced into its interior, is completely prevented by supporting or confining the ferrule exteriorly while the roller end is being forced into it.

As it is important to secure the best results that the end of the roller should be forced into the ferrule, while the roller end is in its compressed condition, I prefer to effect the compression by forcing the roller endwise into a surrounding die with a converging compressing wall whose diameter at the smaller end corresponds to the diameter of the ferrule that is to be applied. Moreover, in order to support or confine the ferrule against any bursting action I mount the semi-annular die sections 1, in a counterbored recess in supporting jaws 2 and 3 that are preferably pivoted together to allow the sectional die to be opened after the ferrule has been applied.

In the practice of this process I provide, at a suitable distance from the die-supporting jaws 2 and 3, an anvil or thrust member 4 of annular stepped form to provide a boss for penetrating the outer end of the ferrule, and an adjacent shoulder for sustaining the end thrust thereof.

For convenience the jaws 2 and 3, carrying the respective halves of the convergent compressing die, are releasably locked together by a locking latch 6, pivoted on the upper jaw and having releasable interlocking engagement with a shoulder on the lower jaw.

When the jaws containing the die sections are locked together with a ferrule *b* inserted in juxtaposition to the small end of the die 1, and in position to thrust against the anvil 4, the wooden roller *a* is inserted in the larger or flared end of the dies 1 and is forced endwise, by any suitable means, axially through the die whose converging interior wall serves to compress the end of the roller to substantially the diameter of the interior of the ferrule so that the roller, with its end in this compressed condition, can be forced through the die into the substantially cylindrical ferrule. When the roller has been forced into the ferrule for the desired distance, usually with its end somewhat inside the end of the ferrule, the die may be opened for the convenient removal of the assembled roller and ferrule. For convenience this release and opening of the die may be effected by means of a suitable releasing and opening mechanism which unlocks the latch 6 and allows the jaws 2 and 3 to open under the influence of a spring-pressed thrust plunger 7 mounted in the lower jaw 2, as shown in Figure 2. The release of the latch may be effected, in any suitable manner, as by a central plunger 5, connected with an angle arm 8 whose free end pushes forward a latch-releasing and engaging plunger 9 against the pressure of a retracting spring 10.

While I have described the compressing reduction of the end of the roller as being effected by an endwise movement of the roller in relation to the die and associated ferrule, it will be understood that I do not confine myself to this particular method of effecting the diameter-reducing compression of the end of the roller. While the actual amount of reducing compression exerted upon the periphery of the end portion of the roller may be varied according to the porosity and character of the wood of which the roller is made, nevertheless, it will be understood that there should be sufficient compression of the material to more than compensate for any natural shrinkage to which the roller may be subjected under conditions of use. If this be observed the result will be to always maintain a thoroughly tight and firm grip of the ferrule upon the roller so that no trouble will be experienced by the working loose of the ferrule from the roller or barrel under normal conditions of service.

What I claim is:

1. The improvement in the art of manufacturing yarn spools and the like which consists in forcing a wooden roller endwise through a compressing medium into a tubular ferrule and releasing the compression through the action of the roller itself when the advanced end of the roller has penetrated to within a predetermined distance from the farther end of the ferrule.

2. The improvement in the manufacture of yarn spools and the like which consists in forcing a wooden roller endwise through peripheral compressing means into an axially aligned tubular ferrule to a predetermined distance short of the farther end of the ferrule, while confining exteriorly the receiving end of the ferrule to prevent expansion and disruption of the ferrule and releasing said roller and ferrule from compression and confinement by the action of the roller.

In witness whereof, I have subscribed the above specification.

EDGAR F. HATHAWAY.