

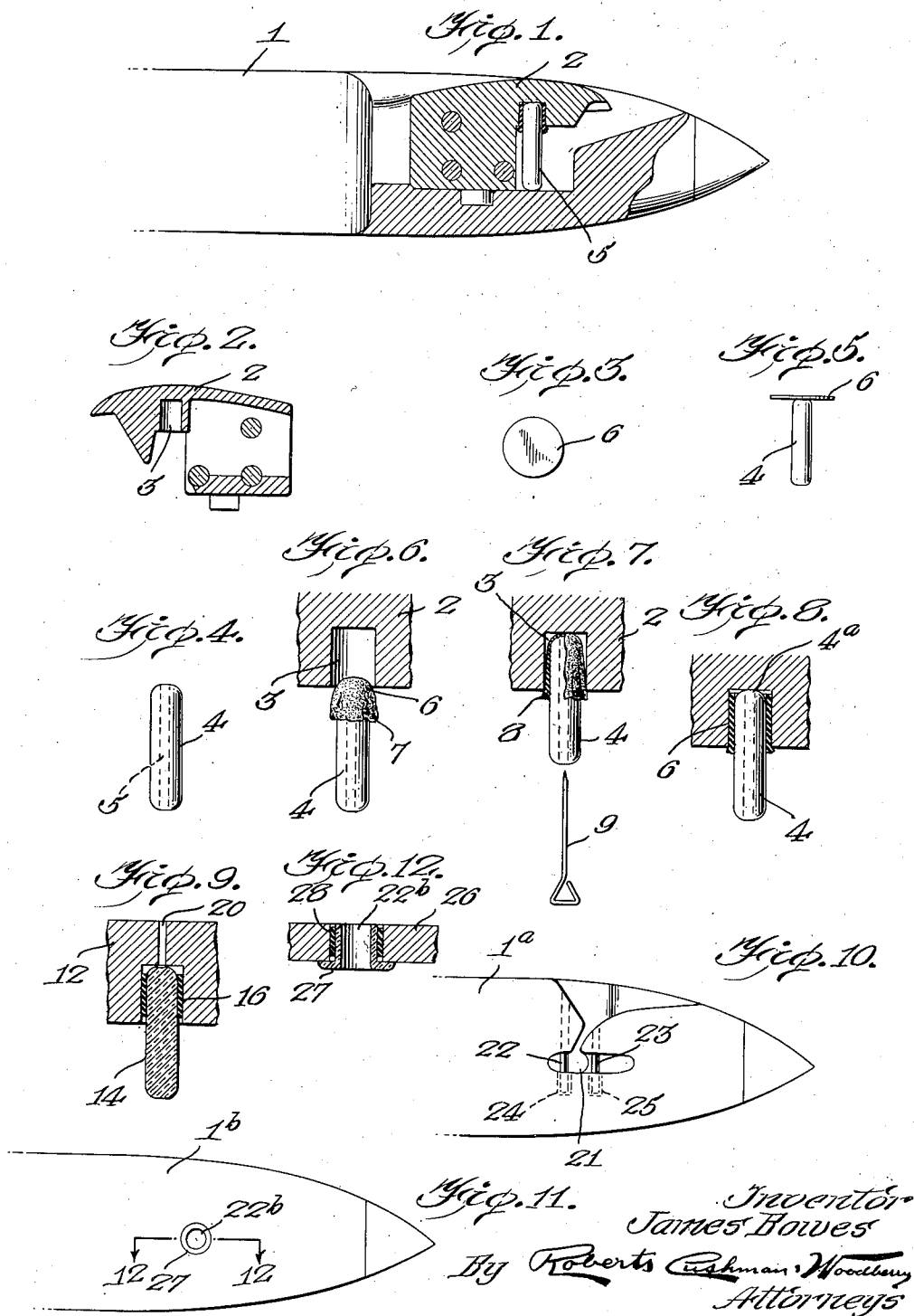
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METHOD OF MOUNTING AN ARTICLE IN AN OPENING

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METHOD OF MOUNTING AN ARTICLE IN AN OPENING

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This invention pertains to a method of mounting and firmly securing an article, for instance, a pin, sleeve, bushing, plug, or the like, in an opening or socket and to a part 5 having an article so mounted and secured therein, and is more particularly useful when such pin, sleeve, or other article is of a material which can not readily be worked or machined, or when it is fragile or brittle as, for 10 example, glass or porcelain, or when it is of small diameter, or is in an inaccessible location such that usual types of retaining means can not be employed, or where a minimum cost of production is an important factor,—the 15 present process being especially useful when an article (pin, sleeve or the like) is to be seated in a socket, bore or opening closed at its inner end. As an example of the utility of my invention I have chosen herein to illustrate it as applied to the mounting of a porcelain thread guide in a weaving shuttle, but it is to be understood that the invention is of broader utility and generally applicable to the mounting of pins, plugs, or other articles in sockets or openings. 25

In the accompanying drawings I have illustrated several specific uses of my invention by way of example and have indicated in a general way certain steps which, taken in sequence, constitute my complete and preferred process, but I contemplate that other and equivalent steps may be substituted for some of those here shown and that under some circumstances one or more of these steps may be omitted without departing from the invention. 35

In the drawings,

Fig. 1 is a fragmentary elevation, partly in vertical section, showing the present invention applied to the eye of a self-threading shuttle; 40

Fig. 2 is a vertical section showing certain details of the metallic shuttle eye removed from the shuttle;

Fig. 3 is a plan view of an elastic disk useful in the practice of my invention; 45

Fig. 4 is a side elevation to large scale showing the guide pin removed from the shuttle eye; 50

Fig. 5 is a view to somewhat smaller scale

showing a guide pin associated with the disk of Fig. 3;

Fig. 6 is a fragmentary vertical section showing a part, for example a metallic shuttle eye, having a cavity therein and indicating one of the steps of my process of mounting the guide post therein. 55

Fig. 7 is a view similar to Fig. 6 but partly broken away showing a later step in the process; 60

Fig. 8 is a similar view but showing the completion of the process of mounting the post in the opening;

Fig. 9 is a section similar to Fig. 6 but showing a modified arrangement particularly adapted for the mounting of a solid post in the opening; 65

Fig. 10 is a fragmentary side elevation of one end of a shuttle showing the invention applied to mounting the lateral guide posts in a shuttle; 70

Fig. 11 is a fragmentary side elevation of one end of a shuttle which is not of self-threading type; and

Fig. 12 is a fragmentary section on the line 75 12—12 of Fig. 11.

By way of example and without thereby intending to limit the application of the present invention I have shown it as employed in securing a tubular thread guide post in a metallic shuttle eye. In Fig. 1 a shuttle of ordinary type is indicated at 1 having a metallic eye portion 2 which is mounted in the shuttle body in any desired manner forming no part of the present invention. In accordance with usual practice this shuttle eye 2 is furnished with a socket 3 at its forward central portion, such socket being intended to hold the usual thread-guide post. Preferably this socket is closed at its upper end, leaving the upper surface of the member 2 smooth and free from interruptions which might tend to chafe or abrade the yarn. Since the constant drag of the tensioned yarn is found to cut guide posts of metal, it has been necessary to adopt some other material, such for example as porcelain or glass, in constructing the thread-guide post, but by reason of the brittle character of such material it is difficult securely to mount it in 100

the socket in the thread eye of the shuttle so that it will not gradually work loose and drop out. I am aware that various methods of securing such porcelain or glass posts in metallic shuttle eyes have been proposed, some of which required the socket to be extended upwardly through the upper surface of the eye 2, but, as above indicated, such an arrangement is undesirable, and in accordance with the present invention I provide means whereby such a porcelain or glass post may be securely mounted in a socket closed at one end and without necessitating undue complication of parts or substantially increasing the cost of production.

The thread-guide post 4, preferably of tubular form, has the passage 5 extending longitudinally from end to end thereof. This post is of an external diameter slightly less than the diameter of the socket 3 in which it is to be seated. I provide a piece of elastic sheet material, such for example as rubber, preferably in the form of a disk 6 and of a normal thickness somewhat greater than the width of the clearance space between the post and the wall of the socket when the post is disposed axially therein. Preferably, I secure the disk 6 to one end of the post 4 by means of adhesive, although it is not essential that this step be practiced. Having applied the end of the post to the disk, with or without the interposition of adhesive, I may next draw the marginal portion of the disk down around the post as shown at 7 in Fig. 6. While this step is not essential, it is helpful in performing the next operation which consists in thrusting that end of the post to which the disk is applied upwardly into the socket opening 3. To facilitate the entrance of the post with its enveloping disk into the socket opening, I may, if desired, apply some lubricating material to the outer side of the disk, and I find that merely moistening this surface with water provides sufficient lubrication, particularly if the elastic disk be of rubber. The post, with its enveloping disk, is thrust up into the socket, but during this movement the lower marginal portion of the disk is pinched between the post and the wall of the socket, as indicated at 8 in Fig. 7, and as the post moves inwardly the central portion of the disk which embraces the end of the post is drawn out, decreased in thickness, and placed under substantial tension. When the post has been thrust into the socket substantially as far as it will go, I take a suitable implement such, for example, as that shown at 9 and pass it through the axial opening 5 in the post and puncture that portion of the disk which covers the inner end of the post. This puncturing of the disk, which is under substantial tension as above described, permits the inner end 4^a of the post to protrude through the disk whereupon the disk retracts, taking the form of a sleeve embracing the

post. During such retraction the elastic material tends to resume its original thickness but as it is confined within the space between the post and the wall of the socket, it is unable completely to resume its original thickness and thus remains under stress, pressing radially in all directions against the wall of the socket. If any portion of the elastic material now remain projecting from the lower end of the socket, it may be trimmed off if desired, although I prefer to make the disk 6 of such a diameter, as determined by experiment, that but little of this material will remain protruding from the socket after the post is seated therein.

I have found that when the disk is punctured and retracts, as above described, it exerts a very distinct tendency to pull the post toward the inner end of the socket. When thus mounted the post is very firmly held in position so that it requires great force to move it longitudinally from the socket and at the same time the elastic material surrounding the post provides a cushion allowing the post to rock or yield slightly when subjected to vibration, thus greatly decreasing the possibility of breakage and prolonging the life of the post almost indefinitely.

Under some circumstances it may be desired to mount a solid post or plug in an opening, and as indicated in Fig. 9 my present process may be practiced under such circumstances and without substantial change. As shown in this view, the part having the socket opening is indicated at 12, the solid post is shown at 14, and the elastic material which holds the post in position is shown at 16. While it is not necessary to puncture the disk, since in any event it tends to draw inwardly from the outer end of the socket and thus to resume its normal thickness, I prefer to provide a small passage 20, which may be of very much smaller diameter than the socket proper, leading into the inner end of the socket, and through this passage the puncturing tool 9 may be entered to break the tensioned elastic material.

In Fig. 10 I have shown a shuttle 1^a having the usual lateral guide opening 21 and the guide posts 22 and 23 at opposite sides of this opening. In this instance these guide posts are mounted in sockets 24 and 25 at the lower part of the shuttle and may be secured in these sockets by the same method of procedure as above described with respect to the post 4.

In Figs. 11 and 12 I have indicated a shuttle 1^b of non-self-threading character having the lateral thread opening 22^b provided with the porcelain sleeve 27 which is held in place by means of the elastic material 28. This sleeve 27 may be mounted in position by following the method above described with respect to the post 4, and when thus mounted remains firmly in place even when subjected

to the heavy and oft repeated vibrations to which a shuttle and its parts are exposed.

Obviously, I may substitute glue, rubber cement or other adhesive material for water as a lubricant to facilitate insertion of the disk and post, and such an adhesive upon setting, adds to the permanency of union of the parts.

While the invention has here been shown as related to the construction of a weaving shuttle, it is obvious that it is not so limited but is readily applicable to the mounting of articles of the general type described in openings in any part or member.

I claim:

1. That method of mounting a cylindrical article in an opening of slightly greater diameter which comprises as steps preparing a piece of elastic sheet material greater in area than the opening and of a normal thickness greater than the clearance between the article and the wall of the opening, engaging one end of the article with the central part of the piece of material, advancing the article and material into the opening while tensioning the material whereby to stretch it and thin it, and releasing the tension upon the material while holding the article in advanced position in the opening.

2. That method of mounting an elongate cylindrical article in an opening of slightly greater diameter than the article which comprises as steps preparing from a sheet of stretchable elastic material a disk of a diameter substantially larger than the opening and of a normal thickness greater than the clearance between the article and the wall of the opening, securing the disk by means of adhesive to one end of the article, pushing said end with the disk into the opening while tensioning the disk and thereby decreasing its thickness, and releasing said tension while holding the article in the opening.

3. That method of mounting a cylindrical article in an opening of slightly greater diameter which comprises as steps preparing a piece of elastic sheet material greater in area than the opening and of a normal thickness greater than the clearance between the article and the wall of the opening, engaging one end of the article with the central part of the piece of material, advancing the article and material into the opening while tensioning the material whereby to stretch it and thin it, and puncturing the material at its central part to release the tension.

4. That method of mounting an elongate cylindrical article in an opening of slightly greater diameter than the article which comprises as steps preparing from a sheet of stretchable elastic material a disk of a diameter substantially larger than the opening and of a normal thickness greater than the clearance between the article and the wall of the opening, securing the disk by means of

adhesive to one end of the article, pushing said end with the disk into the opening while tensioning the disk and thereby decreasing its thickness, and perforating the disk at its center to permit it to retract from the inner end of the article and resume substantially its normal thickness.

5. That method of mounting an elongate tubular article in an opening of slightly greater diameter than the article and substantially closed at its bottom which comprises as steps preparing from elastic sheet material a disk of a diameter greater than that of the opening and of a normal thickness greater than the clearance between the article and the wall of the opening, applying one end of the tubular article to the center of the disk and pushing the disk and article into the opening until the disk nears the bottom of the opening, and passing a suitable implement inwardly through the tubular article and puncturing the central portion of the disk.

6. That method of mounting a non-metallic guide post in an opening in a metallic shuttle eye, said opening being substantially closed at its bottom, which comprises as steps preparing a disk of elastic material of a diameter greater than that of the opening and of a thickness greater than the clearance between the wall of the opening and the post when centrally disposed therein, applying the end of the post to the central part of the disk, pushing the disk into the opening by means of the post until the disk substantially touches the bottom of the opening, the edge of the disk being pinched between the wall of the opening and the post so that the central part of the disk is stretched and thinned, and puncturing the taut central portion of the disk to permit its marginal portion to resume substantially its normal thickness.

7. That method of mounting an elongate cylindrical article in an opening of slightly greater diameter than the article which comprises as steps preparing from elastic sheet rubber a disk greater in diameter than that of the opening and of a normal thickness greater than the clearance between the article and the wall of the opening, attaching the middle part of the disk to one end of the article, moistening the outer surface of the disk, and advancing the article and disk into the opening.

Signed by me at Lawrence, Mass., this first day of December, 1927.

JAMES BOWES.