Dec. 13, 1949 W. A. ANDERSON 2,491,356

KNOB SECURING DEVICE

Filed Dec. 30, 1946

Fig. 1

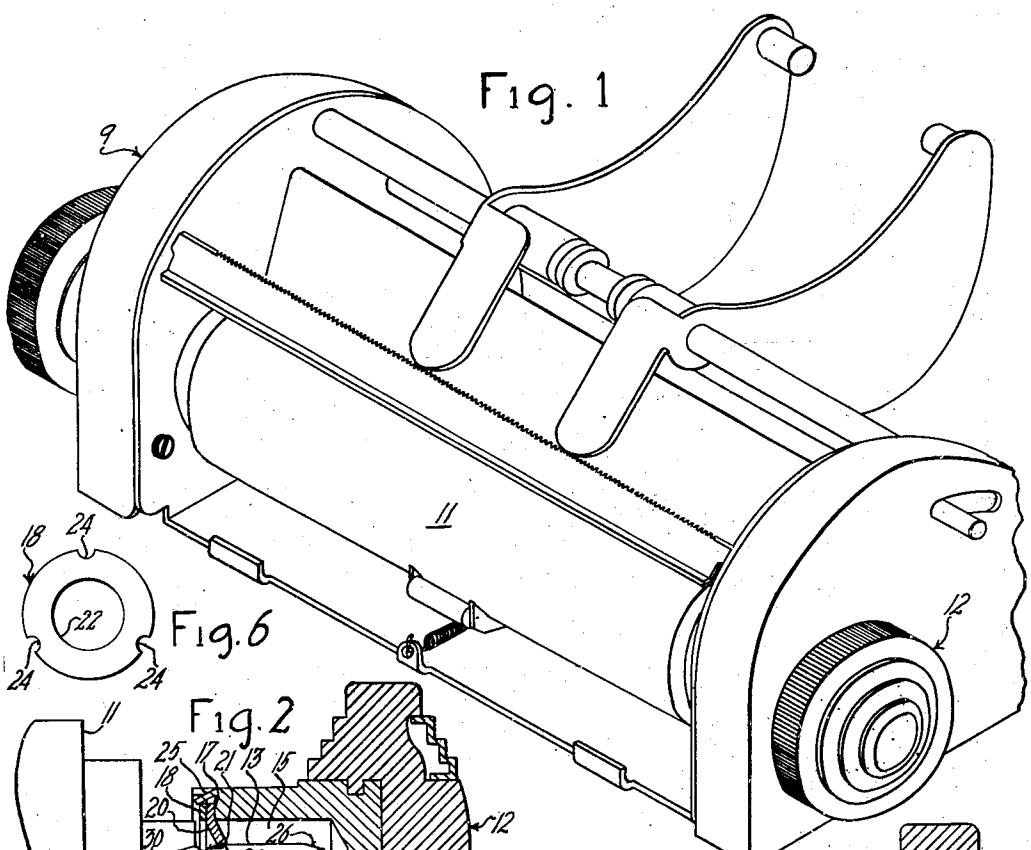


Fig. 6

Fig. 2

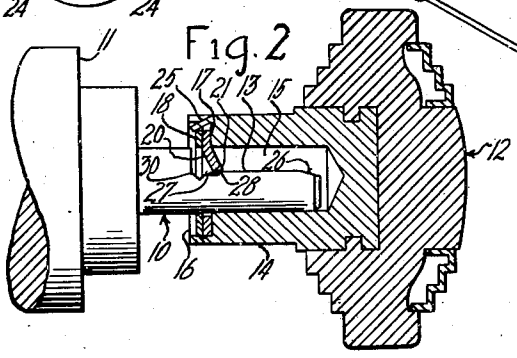


Fig. 4

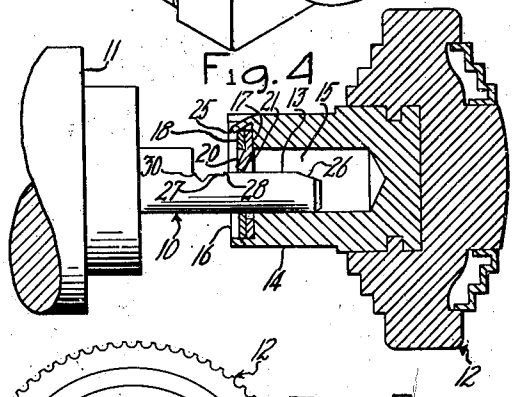


Fig. 3

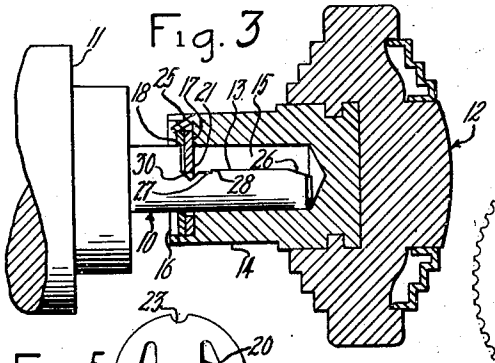


Fig. 5

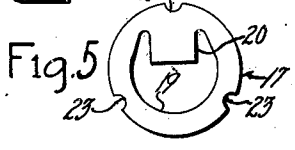
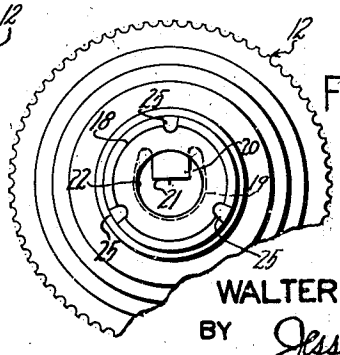


Fig. 7



INVENTOR
WALTER A. ANDERSON
BY Jesse A. Holton
ATTORNEY

Patented Dec. 13, 1949 2,491,356

UNITED STATES PATENT OFFICE

2,491,356

KNOB SECURING DEVICE

Walter A. Anderson, Bridgeport, Conn., assignor to Underwood Corporation, New York, N. Y., a corporation of Delaware

Application December 30, 1946, Serial No. 719,297

5 Claims. (Cl. 287—53)

1

This invention relates to improved means for securing a hand knob, or the like, on its shaft, and more particularly to means for enabling easy attachment and removal of the knob.

The primary object of the present invention resides in the provision of improved knob-securing means whereby a hand knob is easily installed and rigidly secured on a shaft, and may be easily removed therefrom.

A further object of the invention is to provide a locking means whereby the hand knob is easily installed on and removed from its supporting shaft without requiring the use of tools or special skill.

A still further object is to provide a knob-securing means which may be used, for example, with a hardened steel shaft and will nevertheless afford a firm and positive hold on the shaft.

With these and incidental objects in view, the invention consists in certain novel features of construction and combination of parts, the important elements of which are set forth in appended claims, and a preferred embodiment of which is hereinafter described with reference to the drawings.

In the drawings,

Figure 1 is a perspective view of a paper feeding means such as used in adding machines and in which hand knobs embodying the present invention are employed,

Figure 2 is a front elevation partly in section illustrating the hand knob in the normal or operating position on its shaft,

Figure 3 is a view similar to Figure 2 but illustrating the hand knob in position on the shaft preparatory to removing the knob therefrom,

Figure 4 is a view similar to Figure 3 but illustrating the knob in process of being removed from the shaft,

Figures 5 and 6 are detail views showing certain of the parts comprising the knob-securing device, and

Figure 7 is an end elevation of the hand knob apart from the shaft and illustrating the securing parts assembled therein.

In the preferred embodiment disclosed herein the present invention is illustrated as embodied in the hand knobs for manually rotating the paper-feeding means of a listing adding machine such as shown in my Patent No. 2,267,886.

Referring to Figure 1 of the drawing the paper-feeding means comprises a frame 9 in which is journalled a shaft 10, Figures 2, 3 and 4, carrying a cylindrical platen 11. Associated with the

2

platen is a line-spacing detent means, not shown, which operates, under substantially strong spring tension, to locate and firmly retain the platen in line-space position, and to prevent overthrow of the platen during the automatic rotation thereof by mechanism disclosed in said patent.

To enable manual rotation of the platen 11 for inserting and line-spacing the paper, a hand knob 12 is provided at each end of the platen shaft 10. The knobs 12 are secured to the shaft 10 with such firmness and rigidity as will provide the power required to rotate the platen against the resistance offered by the detent means, and without play.

The shaft 10 is formed to provide a flat area 13 leaving a predetermined thickness as measured between that area and the opposite periphery of the shaft. A hub 14 of the knob has an axial bore 15 to fit the shaft 10 and is recessed axially or counterbored as at 16 to receive members 17 and 18. The member 17, Figure 5, is constructed of a resiliently flexible material such as spring steel and is provided with cut-out portion 19 of such size as clears the shaft 10, and has a lug 20 extending into the aperture sufficiently to leave a space between its leading edge 21 and the opposite point of the bore 16, when assembled in the hub slightly less than the mentioned thickness of the shaft 10 at the area 13. The member 18, Figure 6, is constructed of a substantially rigid material and is provided with a circular aperture 22 of a diameter substantially equal to that of the shaft 11. The members 17 and 18 may be secured in the knob hub 14 by any suitable means. In the construction shown the recess 16 has a depth slightly greater than the combined thickness of the members 17 and 18. The members 17 and 18 may be the same outside diameter and fit snugly in recess 16, and are provided with notches 23 and 24, respectively. With the notches aligned, the members 17 and 18 are inserted in the recess 16 with the member 17 bottoming therein, and ears such as at 25 are swaged or bent from the rim of the recess 16 to fit into said notches and to overlap the face of the member 18. By this assembly the members 17, 18 are concentrically aligned so that the apertures 19 and 22 therein will receive the shaft 10, aperture 22 forming a continuation of the bore 15. The ears 25 prevent rotation of members 17, 18 in the recess and retain them securely against lateral displacement in the hub.

The knob 12 is installed on the shaft 10 by aligning the leading edge 21 of lug 20 with the

flat area 13 of the shaft and pressing the knob to the desired position on the shaft. In pressing the knob onto the shaft, the lug 20 is forced to flex laterally as shown in Figure 2. To facilitate the starting of the knob onto the shaft, during which the lug is flexed, the flat portion 13 of the shaft may be bevelled as at 26 to a slight degree.

The present invention provides means whereby the knob is quickly and easily located in a prescribed position on the shaft, and is secured there in such manner as will resist its removal. To this end the flat portion 13 of the shaft is provided with a step 27, leaving a shoulder 28 thereon which the leading edge 21 of the flexed lug engages to prevent the removal of the knob, as illustrated in Figure 2.

To permit removal of the knob, the shaft 10 is provided with a transverse recess or V-groove 30 adjacent the inner end of the step portion 27. To begin removal, the knob is pressed toward the left from its operating position against the shoulder 28, as shown in Figure 2, to the position shown in Figure 3 wherein the lug 20 enters the groove 30. This relaxes the holding tension of the flexed lug 20 on the shaft and enables the lug to straighten to its normal flat condition. After lug 20 enters groove 30, the knob is then moved rightwardly toward the end of the shaft and the lug is thereby forced to climb the angular side of groove 30 and to flex leftwardly as shown in Figure 4. This opposite flexing enables the lug 20 to ride easily over the shoulder 28 in the shaft and facilitates easy removal of the knob.

It will be seen from the foregoing that the improved knob-securing means enables quick and easy installation and removal of the knob, and assures a secure lock against unintended removal. With the knob installed in its prescribed position, the lug 20 is spring-pressed forcefully against step 27, with the edge 21 of the lug lodged securely against shoulder 28. The knob is thus securely retained in the prescribed position against removal. The seating of lug edge 21 against step 27, under the strong pressure of the flexed lug, secures the knob against rotation on the shaft with a force adequate to assure transmission of a strong rotative force to the shaft without developing any looseness or play. The provision of the recess or groove 30 into which the lug 20 may enter so as to become unflexed and subsequently oppositely flexed, assures easy removal of the knob from the shaft, and without the use of tools. Further, the provision of the stepped form 27, 28 against which the locking lug 20 engages, dispenses with the necessity for using a relatively soft shaft into which the usual locking members were intended to bite. This feature enables the use of a tough material for the shaft, such as case-hardened steel, which therefore resists mutilation and thus assures a firmer grip of the locking means onto the shaft. Another advantage obtaining from the improved construction is that of concealing from casual view any clue as to the means by which the knob is secured, and thus prevents tampering and unauthorized removal of the knob.

What is claimed is:

1. Means for securing a body member in a prescribed position non-rotatively on a round shaft, the body member having a bore fitting the shaft, said means comprising a resiliently flexible element having a lug disposed to project into the bore substantially at right angles to the axis thereof, said lug presenting a leading edge disposed transversely of the bore, said shaft having a flat, axially parallel portion and having at a prescribed longitudinal position a transverse shoulder adjacent the flat portion, the lug of said resilient element being adapted, upon inserting the shaft into the bore, to flex laterally and press against said shaft, the leading edge of said lug being adapted to lodge against said shoulder to define the prescribed and non-rotative position of the body member on the shaft.

2. Means for releasably securing a body member in a prescribed position on a shaft, the body member having a bore to slidably fit the shaft, said means comprising a resiliently flexible element disposed to project transversely into the bore and adapted to flex in opposite directions axially of the bore, said shaft having at a prescribed longitudinal position a reduced portion forming a transverse shoulder, the flexible element being arranged upon inserting the shaft into the bore, to flex laterally and press on said shaft, said element being adapted to lodge against said shoulder to define the prescribed position of the body member on the shaft, and said shaft having a transverse recess of a depth ample to permit said flexed element to relax and thereby allow said element to become oppositely flexed upon sliding the body member in the opposite direction on the shaft.

3. Means for releasably securing a body member on a shaft, the body member having a bore to slidably fit the shaft, said means comprising a resiliently flexible element disposed to project transversely into the bore and adapted to flex in opposite directions axially of the bore, said shaft having a length portion of lesser thickness than that of the body of the shaft and providing a face, the flexible element projecting into the bore slightly beyond the area assumed by said face when the shaft is in place in the bore, said shaft also having a further reduced portion forming a shoulder adjacent an end of said length portion, said flexible element pressing against said shoulder with the body member in its prescribed position lengthwise of the shaft.

4. Means for releasably securing a knob in a prescribed position on a shaft, the knob having a bore to slidably fit the shaft, said means comprising a resiliently flexible element disposed to project transversely into the bore and adapted to flex in opposite directions axially of the bore, and said shaft having three adjoining length portions of successively reduced thickness and forming a shoulder between the first and second length portions and a recess at the third length portion, the first length portion causing said resilient element to flex in one direction upon inserting the shaft into the bore, the shoulder lodging said element in the prescribed position of knob and the recess permitting said element to become relaxed and subsequently oppositely flexed incident to withdrawing the shaft from the bore.

5. Means for releasably securing a knob in a prescribed position on a shaft, the knob having a bore to slidably fit the shaft and having a counterbore, said means comprising a disk of resiliently flexible material having an interior cut-out area forming a flexible lug; means securing said disk in fixed position in the counterbore, the lug projecting transversely into the shaft-fitting bore, and said shaft having three adjoining length portions of successively reduced thick-

ness and forming a shoulder between the first and second length portions and a recess at the third length portion, the first portion causing said lug to flex in one direction upon inserting the shaft into the bore, the shoulder receiving the free edge of the lug with the lug flexed against the second length portion and the recess permitting said flexed lug to become relaxed and subsequently oppositely flexed incident to withdrawing the shaft from the bore.

WALTER A. ANDERSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,387,888	Holt	Aug. 16, 1921
1,440,207	Burns	Dec. 26, 1922