

Feb. 24, 1953

P. MEANS

2,629,276

EXPANDER PLIERS

Filed May 8, 1952

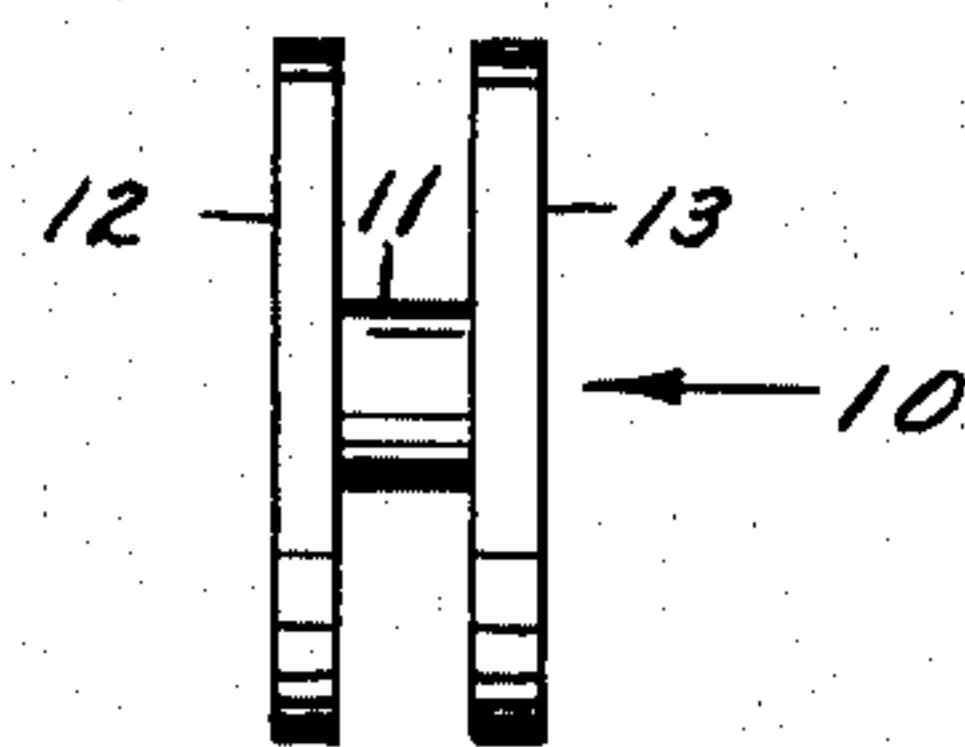
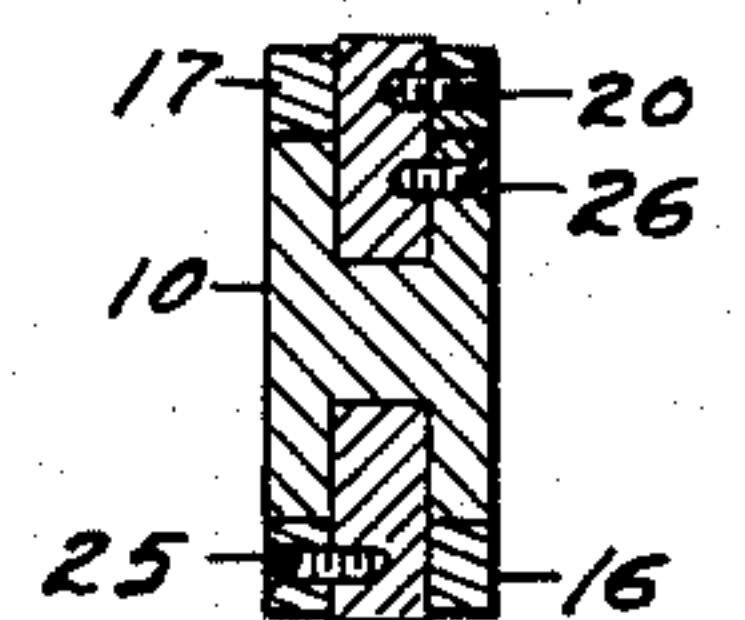
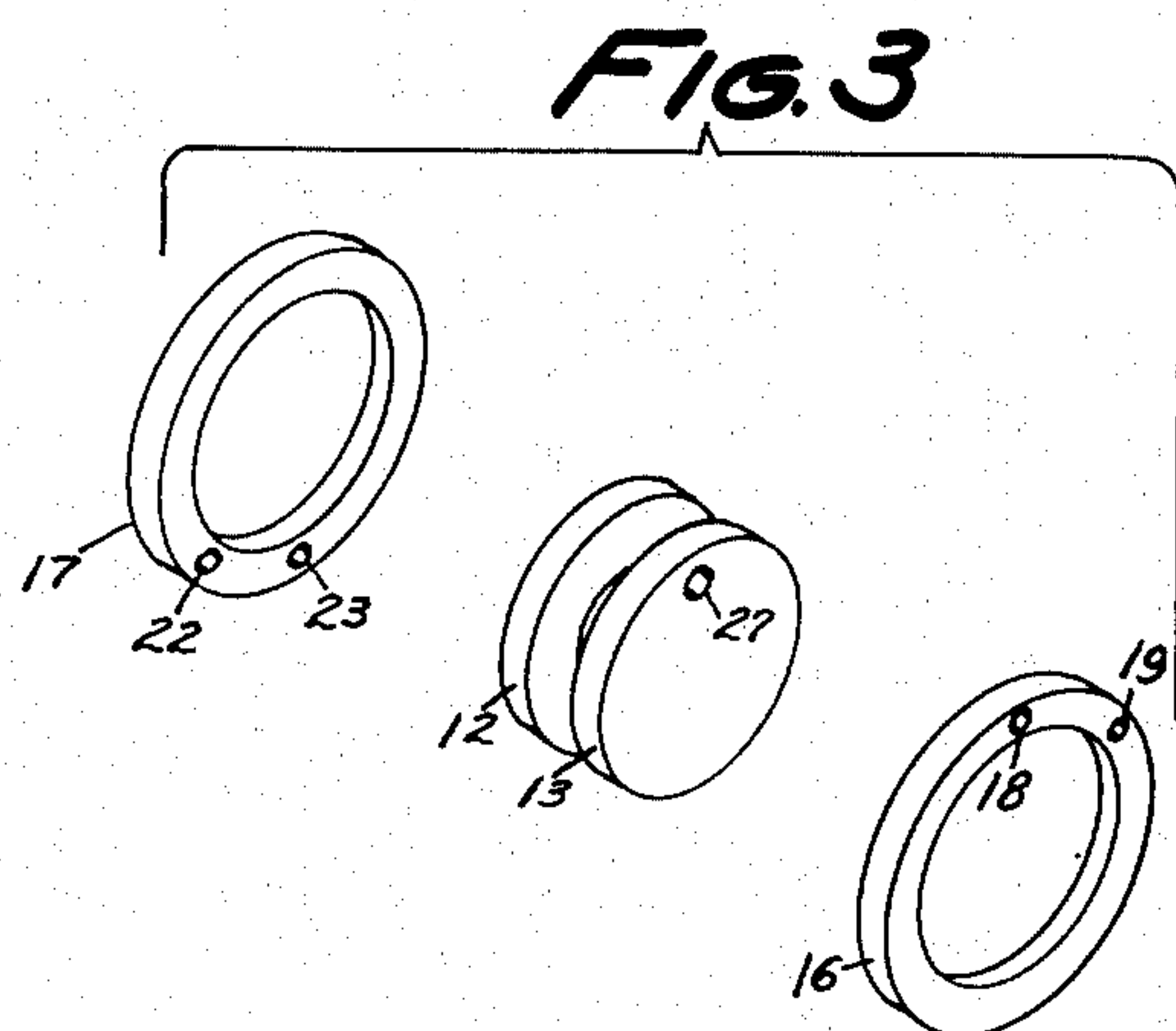
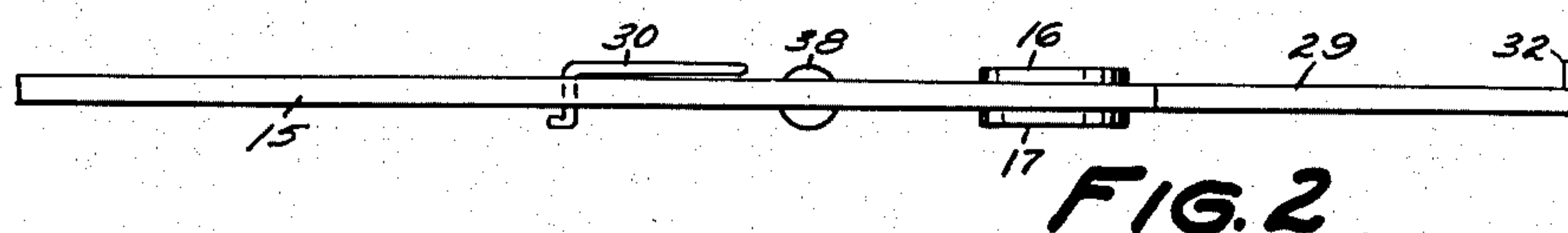
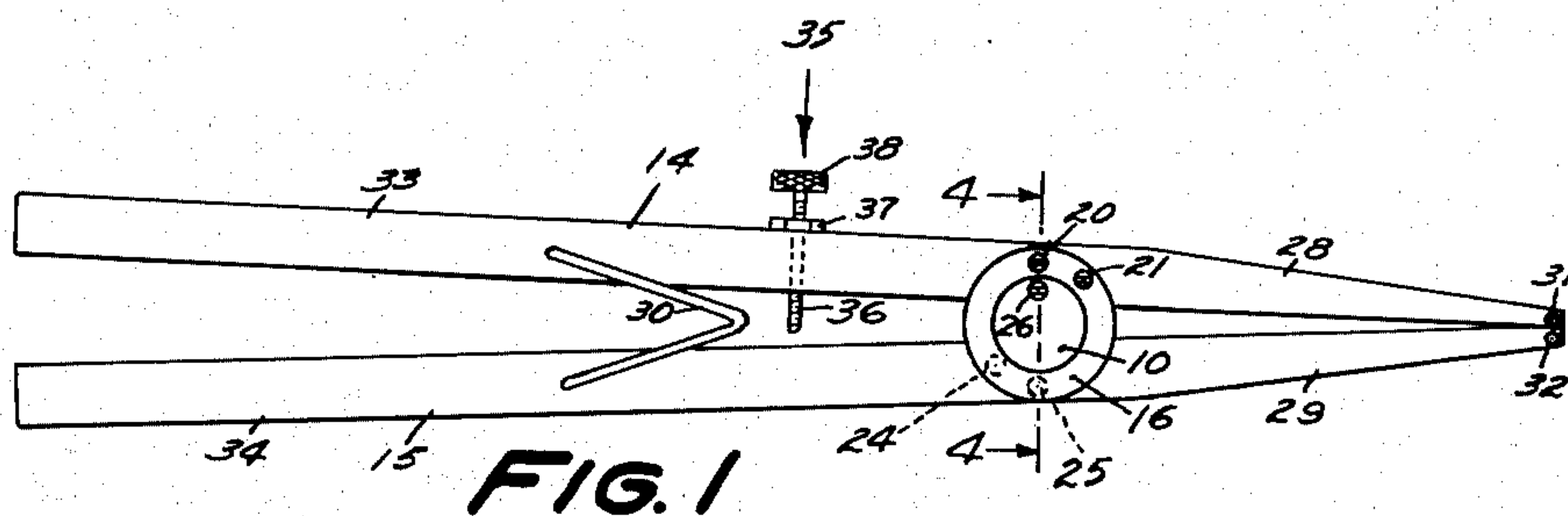


FIG. 5

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UNITED STATES PATENT OFFICE

2,629,276

EXPANDER PLIERS

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Application May 8, 1952, Serial No. 286,703

6 Claims. (Cl. 81—48)

(Granted under Title 35, U. S. Code (1952),
sec. 266)

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The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

This invention relates generally to expander pliers, and particularly to expander pliers having novel pivotal means.

The purpose of this invention is to provide a snap ring spreader pliers having laterally projecting nibs as distinguished from longitudinally extending nibs, thereby providing an expander pliers that permits its use in situations where the pliers with longitudinal nibs are inaccessible and inoperative.

It is an object of this invention to provide snap ring spreader pliers having laterally disposed nibs.

It is another object of this invention to provide plier pivotal means constructed and arranged to permit the plier arms to be disposed in a common plane.

It is a further object of this invention to provide pivotal means of unusually increased bearing surfaces.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description and considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and therein:

Fig. 1 shows a plan view of a preferred embodiment of the invention.

Fig. 2 shows a side elevation of the apparatus shown in Fig. 1.

Fig. 3 is an exploded isometric view of the pivotal means used in the invention.

Fig. 4 is a cross-sectional view taken along line 4—4 of Fig. 1.

Fig. 5 is a front elevation of the spool-like element forming the basic component in the pivotal means of the invention.

Referring now to the drawings wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in Fig. 5 a spool-like element, generally indicated as 10, having a cylindrical body 11 and laterally extending circular end flanges 12 and 13.

A pair of companion lever arms 14 and 15 are snugly received between the flanges 12 and 13, and in abutting engagement with the body portion 11 on diametrically opposite sides thereof. Said arms and spool element comprise a first-class

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lever, the spool serving as a fulcrum common to the oppositely disposed lever arms.

A pair of companion collars 16 and 17 surround the circular flanges 13 and 12, respectively. These collars slideably engage with the outer periphery of said circular flanges.

Collar 16 is provided with a pair of spaced bores 18 and 19 to receive counter-sunk head screws 20 and 21 which threadedly engage with registering threaded bores in arm 14, thereby securing said collar to said arm.

Collar 17 is likewise provided with a pair of bores 22 and 23 to receive counter-sunk head screws 24 and 25 which threadedly engage with registering threaded bores in arm 15, thereby fixing collar 17 to arm 15.

The pivotal means are now securely assembled to the lever arms with the spool 10 free to rotate about its own axis.

The spool can be held rotatively-rigid by providing a bore 27 in flange 13 to receive counter-sunk head screw 26 which threadedly engages with a registering threaded bore in arm 14, thereby securing said spool to arm 14.

The resistance arm portions 28 and 29 are provided with a pair of laterally projecting companion nibs 31 and 32, respectively. Said nibs are fixed to the ends of said resistance arms by any means, such as spot welding.

The effort arm portions 33 and 34 are bored to receive in engagement therewith a V-shaped wire spring 30 paralleling the plane of the lever arms. Said springs are initially tensioned to normally urge the effort arms away from each other which are space limited from each other by the juxtapositionment of the ends of the resistance arms.

Stop means generally indicated at 35 are provided to limit the expandibility of the pliers. Said limiting means are adjusted to allow the spreader pliers to operate within the stress-strain limits of a snap ring, or the like, that is being acted on. The limiting means comprises an elongated screw 36 threadedly engaged in a bore in the effort arm 33 and fixed in a preselected position by means of lock nut 37. A knurled head 38 is provided on the screw 36 to provide for manual manipulation of the screw 36.

Operation.—Normally, the initially tensioned spring 30 urges the resistance arm ends into closed juxtaposition thereby spacing the nibs 31 and 32 a minimum predetermined distance from each other. In use, said nibs are inserted into the ear of a snap spring (not shown), and the effort arms 33 and 34 forced together, thereby

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spreading the snap ring and readying it for an application or removal operation. In the absence of securing screw 26, lever arm 14 and its attached collar 16 pivots about the body 11 and revolves about the flange 13, respectively. In similar fashion lever arm 15 and its attached collar 17 pivot about the opposite side of body 11 and revolves about the flange 12, respectively. This arrangement allows the spool element to "float" and rotate about its own axis freely.

It is obvious that if the securing screw 26 is used to fix the spool element 10 rigidly to lever arm 14, collar 16 and its securing screws can be dispensed with or maintained as desired. In this event, pivoting will take place between the body of the spool element and arm 15, and between collar 17 and flange periphery 12.

The characteristic features of this invention reside in the provision of laterally projecting nibs and the novel pivotal means.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. Pliers, comprising: a spool-like element having a cylindrical body portion and laterally extending circular end flanges; a pair of lever arms received between said flanges and disposed on opposite sides of said body, said spool body serving as a common fulcrum to said arms in first-class lever arrangement; a collar surrounding each of said flange and fixed to said arms, respectively; spring means operative to bias the resistance arm portions of said lever arms to a closed position; corresponding laterally projecting nibs on the ends of said resistance arms; and adjustable means operative to limit the separability of the nibs.

2. Pliers, comprising: a spool-like element having a body and end flanges; a pair of lever arms received between said flanges and disposed on opposite sides of said body; a collar surrounding each of said flanges and fixed to said arms respectively; and companion laterally projecting nibs mounted on said lever arms.

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3. A pivotal joint, comprising: a spool-like element having a body and end flanges; arm members received between said flanges; and a collar surrounding each of said flanges and fixed to said arms, respectively.

4. Pliers, comprising: a spool-like element having a cylindrical body portion and laterally extending circular end flanges; a pair of lever arms received between said flanges and disposed on opposite sides of said body, said spool body serving as a common fulcrum to said arms in first-class lever arrangement; a collar surrounding one of said flanges and fixed to one of said arms; means for fixing the other of said flanges to the other of said arms; spring means operative to bias the resistance arm portions of said lever arms to a closed position; corresponding laterally projecting nibs mounted on the ends of said resistance arms; and adjustable means operative to limit separability of the nibs.

5. Pliers, comprising: a spool-like element having a body and end flanges; a pair of lever arms received between said flanges and disposed on opposite sides of said body; a collar surrounding one of said flanges and fixed to one of said arms; means fixing the other of said flanges to the other of said arms; and companion laterally projecting nibs mounted on said lever arms.

6. A pivotal joint, comprising: a spool-like element having a body and end flanges; arm members received between said flanges; a collar surrounding one of said flanges and fixed to one of said arms; and means fixing the other of said flanges to the other of said arms.

PERCY MEANS.

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