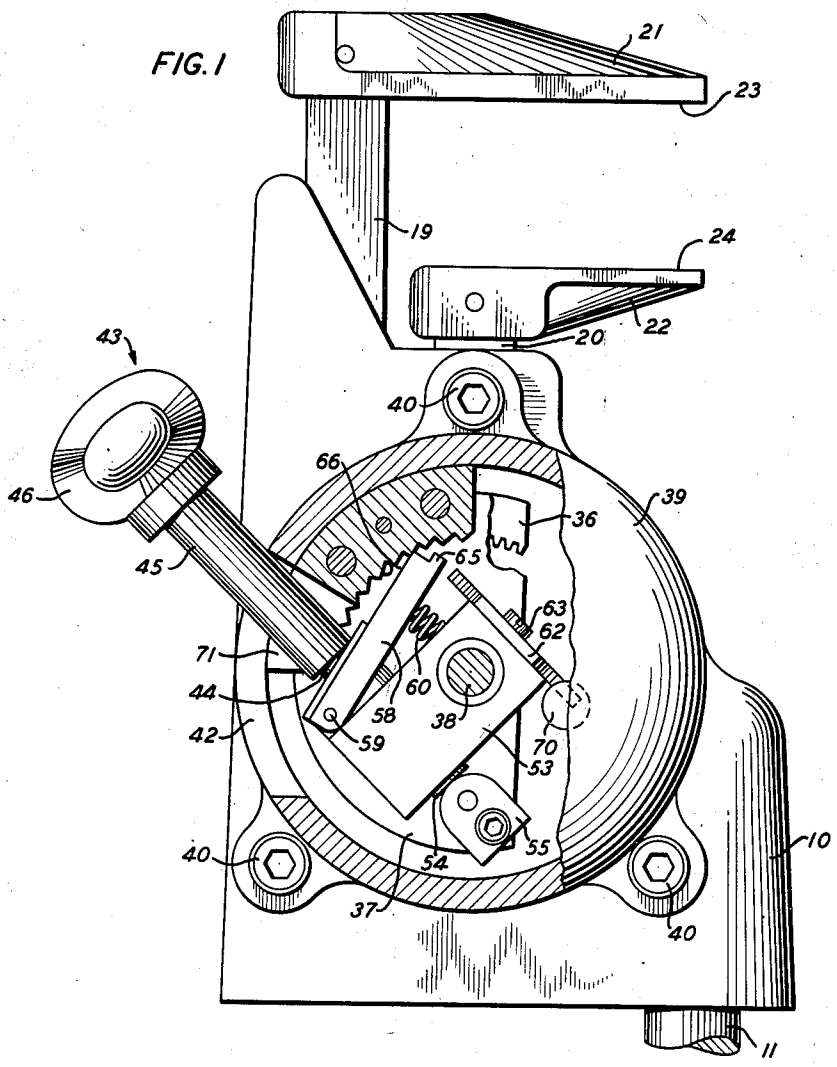
Sept. 2, 1952 M. O. BENNERT ET AL 2,608,892

APPARATUS FOR SUPPORTING CORES IN TOROIDAL COIL WINDING MACHINES

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FIG. 1



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FIG. 2

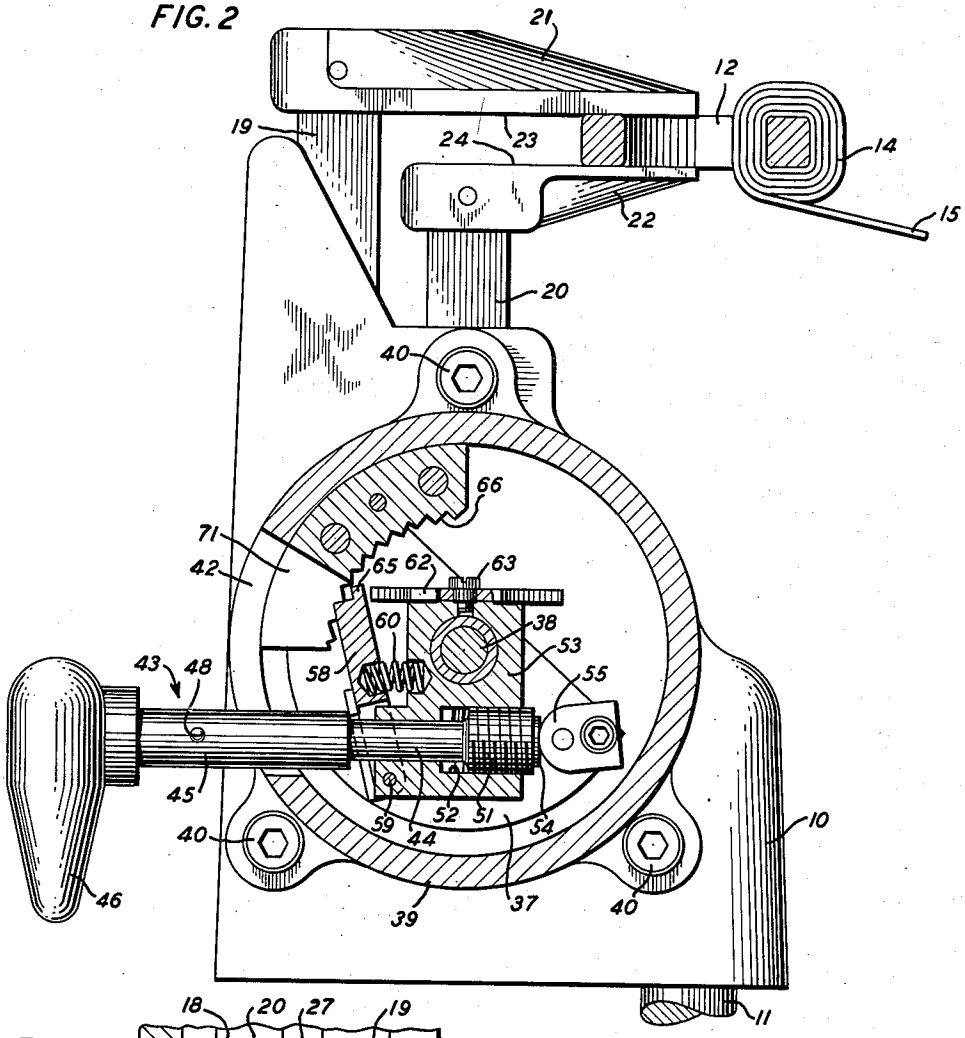
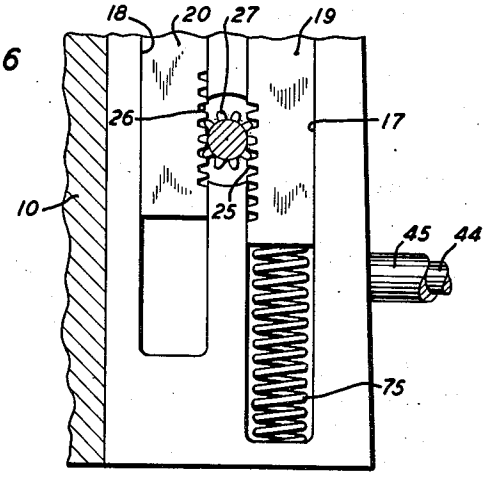


FIG. 6



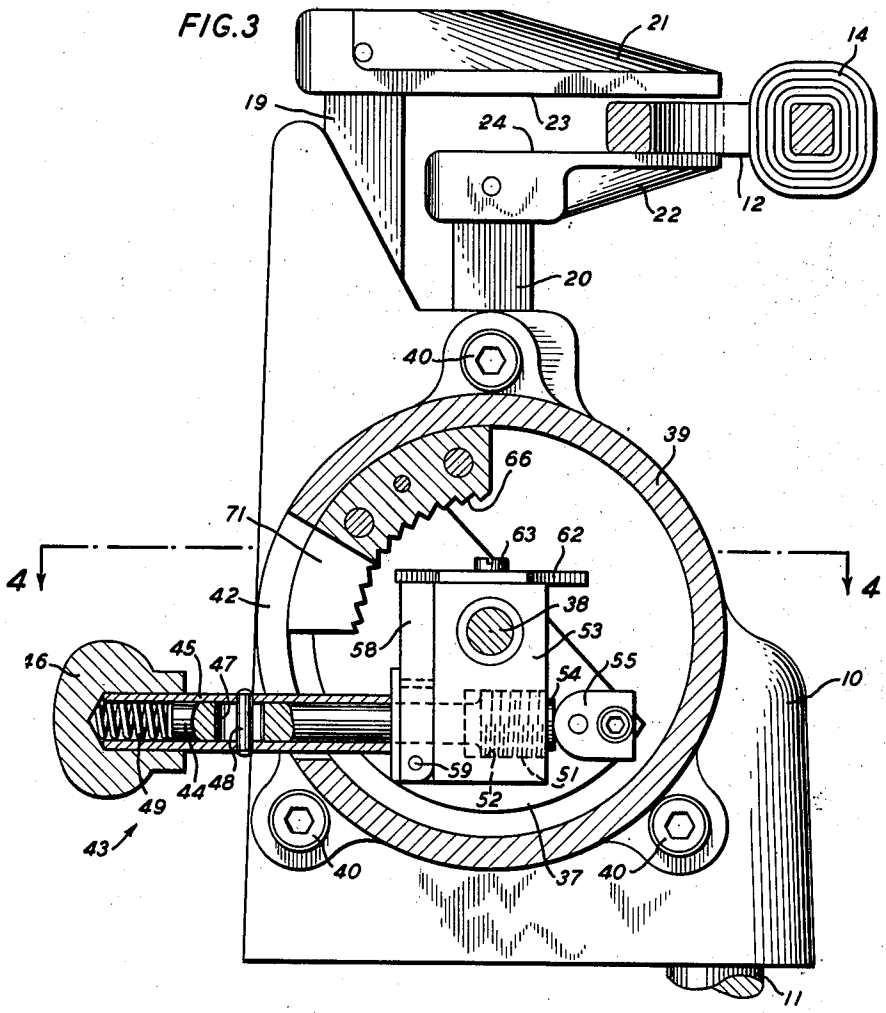
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APPARATUS FOR SUPPORTING CORES IN TOROIDAL COIL WINDING MACHINES

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FIG. 3



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APPARATUS FOR SUPPORTING CORES IN TOROIDAL COIL WINDING MACHINES

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FIG. 4

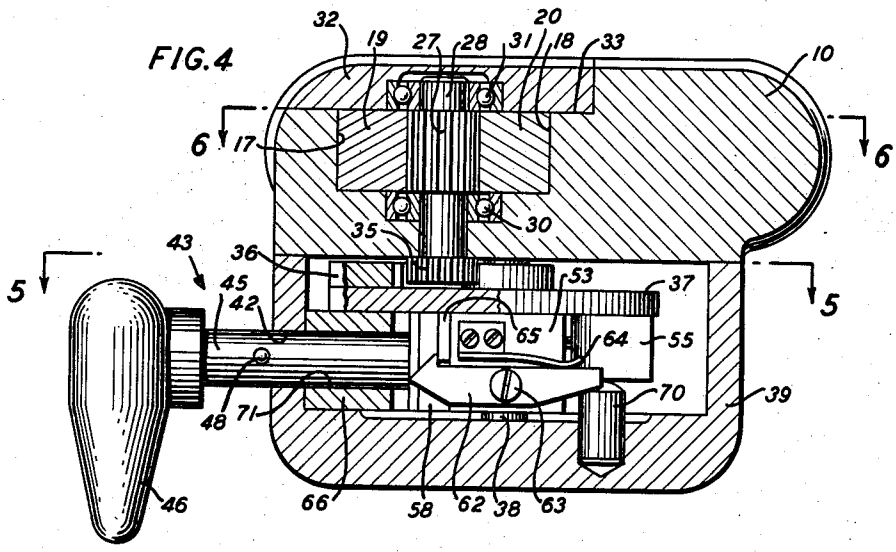
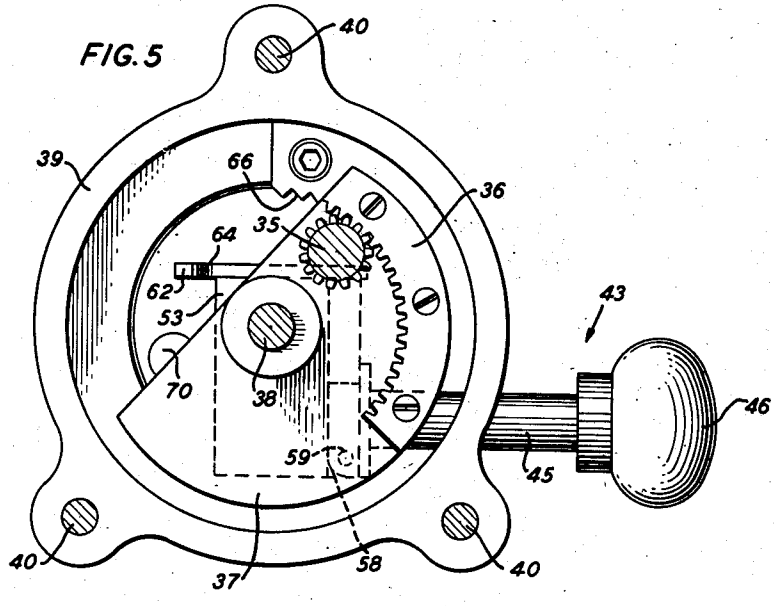


FIG. 5



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APPARATUS FOR SUPPORTING CORES IN TOROIDAL COIL WINDING MACHINES

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5 Claims. (Cl. 81—17)

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This invention relates to article supporting apparatus, and more particularly to apparatus for supporting cores in toroidal coil winding machines.

In toroidal coil winding machines, it is customary for the toroidal core to be supported at a given position with respect to the shuttle and flyer of the winding machine and to move between given limits about the center of the core during the winding of a given number of convolutions on one portion of the core after which, during a subsequent winding operation, similar windings are formed on a diametrically opposite portion of the core. During the two winding operations to complete the coil, the unit, for supporting the core in the first instance and the core with one series of convolutions in the second instance, must grip the core and hold it in the predetermined position relative to the shuttle and flyer. Therefore, the number of toroidal coils produced in a working day depends largely upon the time required for initially gripping the core for the first winding operation, releasing the core, gripping it for the second operation, and finally releasing the completed article.

An object of the invention is to provide an article holding apparatus which may be operated rapidly with a minimum amount of effort to grip and support an article in a given position and to substantially instantaneously release the article.

With this and other objects in view, the invention comprises an article holding apparatus having clamping jaws supported by parallel rack-like members movable relative to each other by a pinion interposed between the members whereby like movements may be imparted to the jaws relative to a given clamping position. A hand lever is movable between its normal and operated position to rotate the pinion to move the jaws into close engagement with the article, additional mechanism being actuated by rocking movement of the lever to cause the jaws to firmly clamp the article in a given position.

More specifically, the hand lever is carried by a supporting member mounted for rocking movement on a shaft in conjunction with a rocking element. As the lever is rocked in one direction, the inner end of the lever pushes the rocking element about the shaft in synchronism with the supporting member, while the member carries a pawl movable relative to a fixed position ratchet to hold the supporting member, the lever, and the rocking element in the positions they have attained when the clamping jaws reach the article to be clamped. A threaded inner end of the lever,

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disposed in a threaded aperture of the member causes longitudinal movement of the lever to cause additional rocking movement of the rocking element. The rocking element carries a gear segment to drive a pinion, which is mounted on a shaft with the pinion interposed between the rack-like members of the clamping jaws, to move the clamping jaws into clamping engagement with the article.

The lever also includes a tubular portion movable longitudinally on the threaded portion to engage the pawl to move it out of engagement with the ratchet to substantially instantaneously release the mechanism holding the jaws in clamping engagement with the article whereby the jaws may be readily moved free of the article. A latch is also provided to hold the pawl away from the ratchet until the mechanism has been returned to the normal position with the clamping jaws open, after which the latch is released to free the pawl for another clamping operation.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawings, wherein

Fig. 1 is a front elevational view of the apparatus shown in its normal position, portions thereof being shown in section;

Fig. 2 is a front elevational view of the apparatus shown in clamping position, portions thereof being shown in section;

Fig. 3 is a front elevational view of the apparatus shown about to be released from the clamping position for movement into the open position, portions thereof being shown in section;

Fig. 4 is a horizontal sectional view taken along the line 4—4 of Fig. 3;

Fig. 5 is a vertical sectional view taken along the line 5—5 of Fig. 4; and

Fig. 6 (sheet 2) is a fragmentary sectional view taken along the line 6—6 of Fig. 4.

Referring now to the drawings, the apparatus includes a main member 10 mounted on a vertical shaft 11 for rocking movement about the axis of the shaft which will be in alignment with the centerline of an article or core 12 about which coils 14 of insulated wire 15 will be wound by the conventional toroidal coil winding machine unit (not shown). The member 10 has parallel apertures 17 and 18 therein at spaced positions, as illustrated in Figs. 4 and 6, to receive reciprocable members 19 and 20 for supporting clamping jaws 21 and 22. The clamping jaws are of the contours shown having parallel inner surfaces 23 and 24

to engage opposing faces of the core 12 to firmly grip the core during the initial winding operation or to grip the first winding on the core during the second winding operation. The members 19 and 20 have rack-like teeth 25 and 26 formed in their inner surfaces engaging a pinion 27 interposed between the members and mounted on or formed integral with a shaft 28 (Fig. 4). The shaft 28 is journalled in a bearing 30 supported in the main member 10 and a bearing 31 supported in a cover 32 closing a cutaway portion 33 which extends into the apertures 17 and 18. The shaft 28 has another pinion 35 mounted on or formed integral with its inner end which engages the teeth of a gear segment 36 mounted on a rocking element 37. The shaft 28 with its pinions 27 and 35 may be defined as a pinion element engaging the rack-like members 19 and 20 and also the gear segment 36. The rocking element 37 is mounted for rocking movement on a shaft 38, which is spaced from the shaft 28 and the pinion 35 as shown in Figs. 4 and 5 and has its ends supported in apertures (not shown) in the main member 10 and a housing 39. The housing 39 is secured to the main member by suitable means such as machine screws 40 and has a peripheral slot 42 therein to allow for the movement of a hand lever indicated generally at 43.

The hand lever 43 includes an inner member 44, an outer member or sleeve 45 and a handle 46. An elongate aperture 47 (Fig. 3) in the inner member 44 receives a pin 48 carried by the sleeve or outer member 45 whereby the sleeve may be moved longitudinally of the inner member yet to be connected to the inner member whereby rotation of the sleeve will cause rotation of the inner member. A spring 49 disposed in the sleeve 45 between the handle 46 and the end of the inner member 44 normally urges the sleeve and handle outwardly a distance limited by the pin 48. The innermost end of the inner member 44 is enlarged and provided with double or high pitch threads 51. This threaded end is receivable in a similarly threaded aperture 52 of a support 53 which is mounted for rocking movement on the shaft 38. The outer end 54 of the inner member 44 of the lever engages a lug 55 mounted on the rocking element 37 providing operative connection between the support 53 and the rocking element.

The support 53 pivotally supports a pawl 58 at 59, the pawl being normally urged counterclockwise about its pivot by a spring 60 Figs. 1 and 2, but is movable clockwise into the position shown in Fig. 3 during inward movement of the sleeve 45 and handle 46 of the lever 43. A latch 62 pivotally carried at 63 by the support 53 is normally urged clockwise (Fig. 4) by a spring 64, carried by the support 53, to engage a projection 65 of the pawl to hold the pawl away from a fixed position ratchet 66. The pawl is equal in width to the ratchet and free to engage the teeth of the ratchet when released by the latch. A pin 70 mounted at a fixed position in the housing 39 is positioned to be engaged by the latch 62 when returned to its upper or normal position to release the pawl for a subsequent clamping operation. The ratchet is fixedly mounted in the housing 39 and has a cutaway portion 71 adjacent the slot 42 in the housing to straddle the lever 43 when the lever is moved into its normal position.

Considering now the operation of the apparatus, attention is first directed to Fig. 1 which illustrates the apparatus in its open position. In this position, the latch 62 has been engaged by the pin 70 releasing the pawl 58 for engagement with the ratchet 66 under the force of its spring 60. The article or core 12 is then positioned between the clamping jaws 21 and 22, after which the lever 43 may be moved downwardly until the jaws either contact or almost contact the article, after which the lever may be rotated to complete the clamping operation. During the first movement of the lever 43, the support 53 moves about the axis of the shaft 38, and the inner end 54 of the member 44 of the lever engages the lug 55, thus rocking element 37 a given distance counterclockwise and causing the gear segment 36 to rotate its pinion 35. Rotation of the pinion 35 will cause like rotation of the shaft 28 and the pinion 27 to impart simultaneous movements in opposite directions to the reciprocable supports 19 and 20 and their clamping jaws 21 and 22 until said clamping jaws are moved into positions closely adjacent the article. During this rocking movement of the lever with its associated mechanism, the pawl 58 travels downwardly relative to the ratchet 66 and finds a tooth of the ratchet to engage as illustrated in Fig. 2. The pawl, therefore, holds the supporting member 53 against clockwise movement and during rotation of the hand lever for the position shown, for example, in Fig. 1 to the position shown in Fig. 2, the threaded portion 51 will cause longitudinal movement of the lever to the right (Fig. 2) causing further rocking movement of the element 37 to apply an additional driving force through the gear segment 36, the pinion 35, the shaft 28 and the pinion 27 to the members 19 and 20, to force their clamping jaws into intimate engagement with the article 12. The core or article is therefore firmly gripped at a given position by the clamping jaws where it will remain during the completion of the first winding operation.

To release the clamping jaws from their clamping positions, all the operator need do is move the handle 46 with its sleeve 45 inwardly a distance sufficient to move the pawl 58 against the force of its spring into the position shown in Fig. 3 where the pawl is held by the latch 62. A spring 75 positioned beneath the reciprocable member 19 causes it to move upwardly while at the same time, the member 20 with its clamping jaw 22 will move downwardly, aided by gravity and assisted by the rotating pinion 27, until the clamping jaws are in the position shown in Fig. 1. As the mechanism approaches the position shown in Fig. 1, the latch 62 will engage the rounded inner end of the pin 70, moving the latch against the force of its spring 64 to release the pawl 58, allowing it to move under the force of its spring 60 into engagement with the ratchet 66.

It is to be understood that the above described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. An article supporting apparatus comprising relatively movable clamping jaws, reciprocable rack-like elements for supporting the jaws, a pinion engaging the elements, a shaft supporting the pinion for rotation about its axis, a gear mounted on the shaft, a gear segment mounted for rocking movement about its axis and operatively engaging the gear, a hand lever having a threaded member positioned to engage and move the gear segment, a sleeve movable longitudinally

thereon and a handle carried by the sleeve, a support mounted for rocking movement about the axis of the gear segment and having a threaded aperture to receive the threaded member of the hand lever, whereby movement of the hand lever to rock the support will rock the gear segment, to rotate the mechanism including the gear, shaft and pinion to move the rack-like elements and their clamping jaws to position the clamping jaws closely adjacent an article to be clamped therebetween, and means to hold the support in the rocked position, whereby rotation of the hand lever will cause the threaded member to move relative to the support to cause additional movement of the gear segment and the mechanism to move the rack-like elements and the clamping jaws to firmly clamp the article between the jaws.

2. An article supporting apparatus comprising relatively movable clamping jaws, reciprocable rack-like elements for supporting the jaws, a pinion element engaging the elements, a shaft supporting the pinion for rotation about its axis, a gear mounted on the shaft, a gear segment mounted for rocking movement about its axis and operatively engaging the gear, a hand lever having a threaded member positioned to engage and move the gear segment, a sleeve movable longitudinally thereon and a handle carried by the sleeve, a support mounted for rocking movement about the axis of the gear segment and having a threaded aperture to receive and support the threaded member of the hand lever, whereby movement of the hand lever to rock the support will rock the gear segment, to rotate the mechanism including the gear, shaft and pinion to move the rack-like elements and their clamping jaws to position the clamping jaws closely adjacent an article to be clamped therebetween, a fixed position ratchet having a series of teeth, and a pawl pivotally mounted on the support to engage the teeth of the ratchet to hold the support in the rocked position whereby rotation of the hand lever will cause the threaded member to move relative to the support to cause additional movement of the gear segment and said mechanism to cause the rack-like elements and the clamping jaws to firmly clamp the article between the jaws.

3. An article supporting apparatus comprising relatively movable clamping jaws, reciprocable rack-like elements for supporting the jaws, a pinion element engaging the elements, a shaft supporting the pinion for rotation about its axis, a gear mounted on the shaft, a gear segment mounted for rocking movement about its axis and operatively engaging the gear, a hand lever having a threaded member positioned to engage and move the gear segment, a sleeve movable longitudinally thereon and a handle carried by the sleeve, a support mounted for rocking movement about the axis of the gear segment and having a threaded aperture to receive the threaded member of the hand lever, whereby movement of the hand lever to rock the support will rock the gear segment, to rotate the mechanism including the gear, shaft and pinion to move the rack-like elements and their clamping jaws to position the clamping jaws closely adjacent an article to be clamped therebetween, a fixed position ratchet having a series of teeth, and a pawl pivotally mounted on the support to engage the teeth of the ratchet to hold the support in the rocked position whereby rotation of the hand lever will cause the threaded member to move relative to the support to cause additional movement of the gear segment and the mechanism to move the rack-like elements and the clamping jaws to firmly clamp the article between the jaws, the pawl being movable free of the ratchet to free the clamping jaws of the article by movement of the sleeve of the hand lever longitudinally of the threaded member.

4. An article supporting apparatus comprising relatively movable clamping jaws, reciprocable rack-like elements for supporting the jaws, a pinion engaging the elements, a shaft supporting the pinion for rotation about its axis, a gear mounted on the shaft, a gear segment mounted for rocking movement about its axis and operatively engaging the gear, a hand lever having a threaded member positioned to engage and move the gear segment, a sleeve movable longitudinally thereon and a handle carried by the sleeve, a support mounted for rocking movement about the axis of the gear segment and having a threaded aperture to receive the threaded member of the hand lever, whereby movement of the hand lever to rock the support will rock the gear segment, to rotate the mechanism including the gear, shaft and pinion to move the rack-like elements and their clamping jaws to position the clamping jaws closely adjacent an article to be clamped therebetween, a fixed position ratchet having a series of teeth, a pawl pivotally mounted on the support to engage the teeth of the ratchet to hold the support in the rocked position whereby rotation of the hand lever will cause the threaded member to move relative to the support to cause additional movement of the gear segment and the mechanism to move the rack-like elements and the clamping jaws to firmly clamp the article between the jaws, the pawl being movable free of the ratchet to free the clamping jaws of the article by movement of the sleeve of the hand lever longitudinally of the threaded member, and a latch to hold the pawl free of the ratchet during movement of the clamping jaws toward their open positions.

5. An article supporting apparatus comprising relatively movable clamping jaws, reciprocable rack-like elements for supporting the jaws, a pinion engaging the elements, a shaft supporting the pinion for rotation about its axis, a gear mounted on the shaft, a gear segment mounted for rocking movement about its axis and operatively engaging the gear, a hand lever having a threaded member positioned to engage and move the gear segment, a sleeve movable longitudinally thereon and a handle carried by the sleeve, a support mounted for rocking movement about the axis of the gear segment and having a threaded aperture to receive the threaded member of the hand lever, whereby movement of the hand lever to rock the support will rock the gear segment, to rotate the mechanism including the gear, shaft and pinion to move the rack-like elements and their clamping jaws to position the clamping jaws closely adjacent an article to be clamped therebetween, a fixed position ratchet having a series of teeth, a pawl pivotally mounted on the support to engage the teeth of the ratchet to hold the support in the rocked position whereby rotation of the hand lever will cause the threaded member to move relative to the support to cause additional movement of the gear segment and the mechanism to move the rack-like elements and the clamping jaws to firmly clamp the article between the jaws, the pawl being movable free of the ratchet to free the clamping

jaws of the article by movement of the sleeve of the hand lever longitudinally of the threaded member, a latch to hold the pawl free of the ratchet during movement of the clamping jaws toward their open positions, and means to actuate the latch to free the pawl as the clamping jaws reach their open positions.

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