Nov. 24, 1970 M. M. MURATA 3,541,901

ADJUSTABLE SOCKET

Filed Aug. 30, 1968

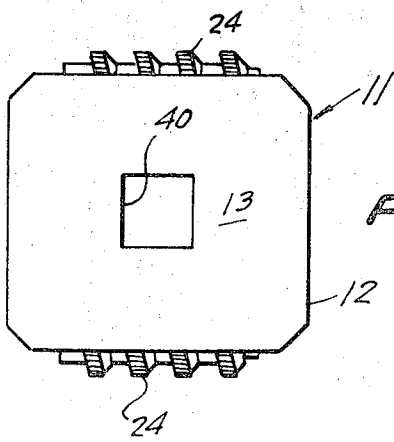


FIG. 1.

FIG. 2.

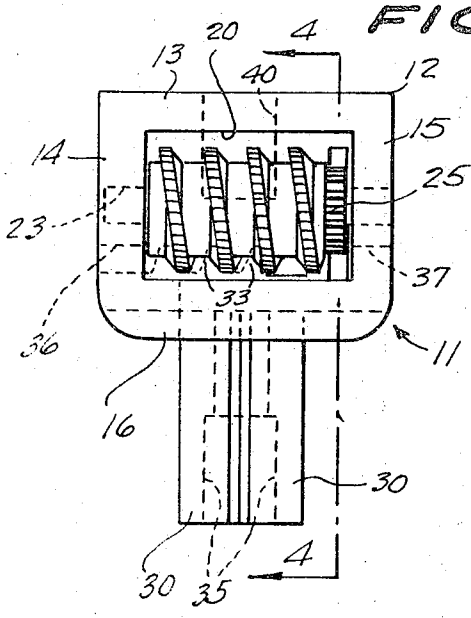
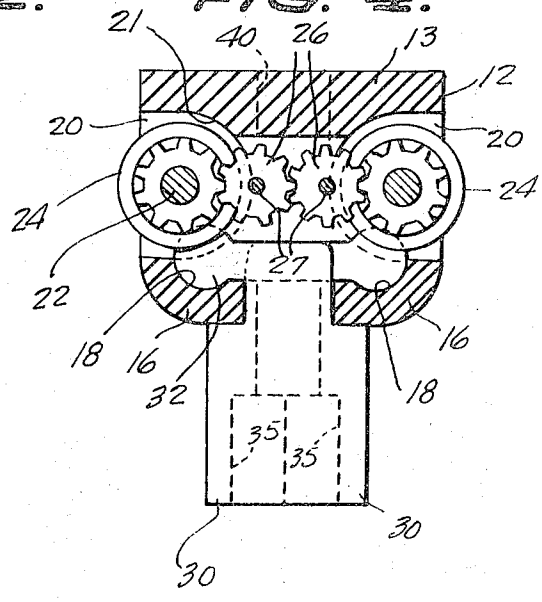


FIG. 4.



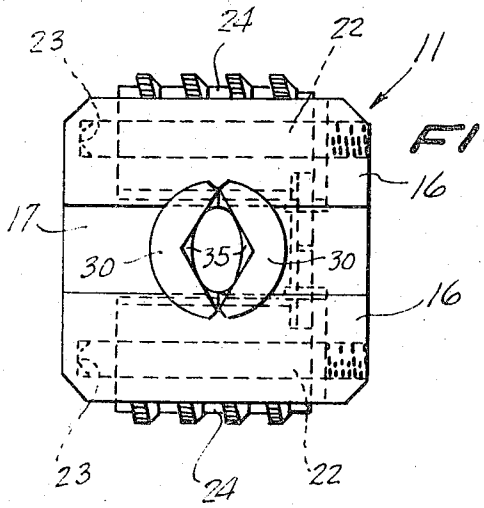


FIG. 3.

INVENTOR.
MARK M. MURATA,

BY
Berman, Davidson & Berman
ATTORNEYS.

United States Patent Office 3,541,901
Patented Nov. 24, 1970

3,541,901

ADJUSTABLE SOCKET

Mark M. Murata, Kaneohe, Hawaii
(Box 275, FPO, Seattle, Wash. 98766)

Filed Aug. 30, 1968, Ser. No. 756,628
Int. Cl. B25b *13/14, 13/16*
U.S. Cl. 81—165 5 Claims

ABSTRACT OF THE DISCLOSURE

An adjustable socket for use with a socket wrench. The socket has a housing with a pair of opposing jaws projecting therefrom, the jaws having parallel rack elements slidably mounted on parallel trackways in the housing. The rack elements are gearingly engaged by parallel knurled worm members journaled in the housing and projecting laterally from its opposite sides so as to be manually rotatable. The worm members are gearingly coupled together for simultaneous operation.

This invention relates to adjustable sockets for use with socket wrenches, and more particularly to an adjustable socket adapted to be employed with a ratchet drive shaft, such as the drive shaft of a ratchet wrench, to provide an adjustable socket which may be employed for a wide range of nut or bolthead sizes.

A main object of the invention is to provide a novel and improved adjustable socket for use with a socket wrench or similar implement, the adjustable socket being simple in construction, involving relatively few parts, and having a wide range of adjustments.

A further object of the invention is to provide an improved adjustable socket for use with a ratchet wrench or similar implement, the socket being inexpensive to manufacture, being durable in construction, being very versatile, being easy to adjust, and being very compact in size so that it can be easily stored in a tool box or similar container.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

FIG. 1 is a top plan view of an improved adjustable wrench socket element constructed in accordance with the present invention;

FIG. 2 is a side elevational view of the socket assembly of FIG. 1;

FIG. 3 is a bottom plan view of the socket assembly of FIG. 1; and

FIG. 4 is a vertical cross-sectional view taken substantially on the line 4—4 of FIG. 2.

Referring to the drawings, **11** generally designates an improved adjustable socket assembly constructed in accordance with the present invention. The assembly **11** comprises a generally rectangular or square housing **12** having a top wall **13**, transverse end walls **14** and **15** and inwardly directed opposing longitudinal bottom flanges **16, 16** defining a longitudinal slot **17** therebetween, the flanges **16** being provided with upwardly concave channels or trackways **18** at their top surfaces inside housing **12**. Thus, as shown in FIG. 2, respective rectangular apertures **20, 20** are defined at the opposite sides of housing **12**.

The apertures **20** have generally semicylindrically contoured inner walls, shown at **21**, and axially mounted in the cavities thus defined are respective longitudinal shafts **22**, the shafts **22** being threadedly engaged in the end wall **15** and having their opposite end portions received in respective sockets or recesses **23** provided therefor in the end wall **14**. Journaled on the shafts **22, 22** are the respective knurled worm members **24, 24** which project laterally from the opposite sides of housing **13** through

the apertures **20**, as is clearly shown in FIG. 4. Each worm element **24** is integrally formed adjacent one end thereof with a gear **25**, and said gears **25** are coupled together by a pair of meshing intermediate gears **26, 26** journaled on respective shafts **27, 27** secured to end wall **15**. Thus, the worm elements **24, 24** are gearingly coupled together for simultaneous operation by the intermediate idler gears **26**.

Designated at **30, 30** are respective generally V-shaped jaws which are slidably mounted on the respective flanges **16, 16** and which project outwardly through the slot **17**, thus depending below the housing **12**, as viewed in FIGS. 2 and 4. Each jaw **30** is integrally formed with a rack element **32** shaped to slidably engage in a trackway **18**, the rack element being formed with rack teeth **33** gearingly engageable by one of the worm elements **24**. Thus, each rack element **32** is drivingly engaged by a worm element **24**. The worm elements are formed so that the jaws **30, 30** are made to move in opposite directions responsive to the rotation of the worm elements. As above explained, the worm elements are gearingly coupled together so that both worm elements are simultaneously operated responsive to rotational force applied to either worm element. Thus, if the worm element **24** at the left side of the assembly, as viewed in FIG. 4, is rotated in a clockwise direction, the worm element **24** at the right side thereof is rotated in a counterclockwise direction. This motion of the worm elements causes the opposing jaws **30, 30** to be moved inwardly toward each other. The reverse motion of the worm elements causes the jaws **30, 30** to separate from each other.

As shown in FIG. 3, the jaws **30, 30** have opposing V-grooves **35, 35** shaped to lockingly interengage with a standard nut or bolthead. The end walls **14** and **15** are suitably apertured at **36, 37** to slidably receive the cross-section of the rack elements **32** and the arm portions connecting them to the jaw elements **30**, so as to permit relatively wide separation of the jaw elements **30, 30**, as required to receive large-size nuts or boltheads. Therefore, the adjustable socket can be employed for a wide range of sizes of boltheads or nuts.

The top wall **13** of housing **12** is substantially centrally formed with a square aperture **40** shaped to receive the conventional square driving shank of a ratchet wrench or similar implement. Thus, the adjustable socket device **11** may be employed in place of a conventional wrench socket.

It will be noted that the design of the adjustable socket device **11** is such that the socket jaws **30, 30** can be adjusted by unidirectional movement of the exposed surfaces of the knurled worm elements **24, 24**. Thus, the jaws can be adjusted by exerting upward or downward pushing action on both of the exposed portions of the knurled worm elements simultaneously, or on either one separately. Thus, regardless of the position of the exposed worm portions relative to the handle of the ratchet wrench or other driving implement used with the assembly, the interaction of the two inner idler gears **26, 26** produces the desired unidirectional adjustment in response to the appropriately directed force supplied to either one or both of the exposed worm element portions.

Although the jaws **30, 30** are specifically illustrated herein and described above as having a V-shaped configuration, suitable for engagement with a hexagonal nut or bolthead, this design is presented only as being typical. The shape of the jaw indentations can be designed for either multiple use or to accommodate nuts or boltheads of any configuration.

While the specific embodiment of an improved adjustable socket for use with a socket wrench or similar implement has been disclosed in the foregoing description, it

will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitation be placed on the invention except as will be defined by the scope of the appended claims.

I claim:

1. An adjustable wrench socket assembly comprising a housing having a pair of opposing inwardly-directed bottom flanges defining a slot therebetween, respective opposing concave jaws slidably-engaged on said flanges and depending through said slot, said jaws having top rack bar elements extending parallel to said slot and to each other, respective worm members journaled in said housing and meshingly-engaging the rack bar elements, and means drivingly-coupling the worm members together for simultaneous rotation, at least one of the worm members projecting laterally from the housing, wherein said worm members are journaled on axes parellel to the rack bar elements, wherein the means drivingly-coupling the worm members together comprises a gear train, and wherein said gear train comprises respective gears rigid and coaxial with the worm members, and idler gear means journaled in the housing between the worm members meshingly-coupled with said gears.

2. The adjustable socket assembly of claim 1, and wherein said idler gear means comprises a pair of meshing idler gears journaled in the housing and respectively meshing with the gears of the worm members.

3. The adjustable socket assembly of claim 2, and wherein both of said worm members project laterally outwardly from the housing.

4. The adjustable socket assembly of claim 3, and wherein said jaws have substantially V-shaped configurations.

5. The adjustable socket assembly of claim 4, and wherein said flanges are formed on their upper surfaces with concave trackways extending parallel to said slot and said rack bar elements are shaped to slidably interfit with said trackways.

References Cited

UNITED STATES PATENTS

354,266	12/1886	Stetson	279—112
920,372	5/1909	McDaniel	81—163
1,123,958	1/1915	Vacarezza	81—165 X
1,432,263	10/1922	Schultz	81—165
2,112,565	3/1938	Hare	81—163 X

FOREIGN PATENTS

947,732	1/1949	France.

OTHELL M. SIMPSON, Primary Examiner