

Feb. 5, 1946.

N. J. VLASS

2,394,027

DRAIN COCK WRENCH

Filed Sept. 19, 1944

Fig 1

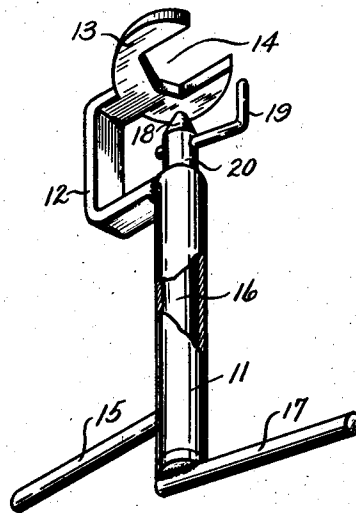
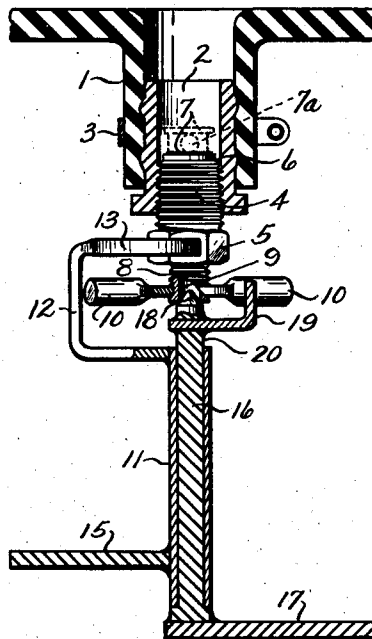


Fig 2



INVENTOR.  
NICHOLAS J. VLASS  
BY *Joseph Ch. Hazell*  
*Chas. Kountz*  
ATTORNEYS

## UNITED STATES PATENT OFFICE

2,394,027

## DRAIN COCK WRENCH

Nicholas J. Vlass, Atlanta, Ga.

Application September 19, 1944, Serial No. 554,833

4 Claims. (Cl. 81—55)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to improvements in wrench constructions, and more particularly, to wrenches for use in opening and closing conventional drain cocks and similar devices.

An object of the present invention is the provision of a unitary wrench device for engaging the shank or body portion of a conventional drain cock or similar structure to prevent the application of rotative torque thereto, and the inclusion of rotary means for engaging and rotating the drain cock valve stem within the drain cock body while the latter is held, to prevent the rotative torque applied to the valve stem from being communicated to any part of the structure in which the drain cock is mounted.

A further object is the provision of a wrench device having means for engaging the hexagonal portion or wrench-receiving portion of a conventional drain cock body, and rotary means carried by the holding means mounted for axial movement thereon so as to be moved into interlocking engagement with the drain cock valve stem to retain the wrench portion in operative position on the drain cock body, and the rotary means in engagement with the drain cock valve stem for rotation thereof during the operation of the device.

A further object is the provision of means for engaging the drain opening in the drain cock valve stem for centralizing and retaining the wrench device on the drain cock body against lateral displacement during the operation of the device.

A still further object is the provision of a drain cock wrench device for use in opening and closing conventional drain cocks mounted in fragile or delicate supports, including means for centering and holding the wrench device in operating position on the drain cock body to prevent rotative torque from being applied to the drain cock body or its support, including two relatively rotatable torque applying members for applying relatively rotatable torque in opposite directions between the drain cock body and the drain cock valve stem to effect rotation of the valve stem within the drain cock body.

A still further object is the provision of a pair of laterally extending handle members connected respectively to the drain cock wrench-receiving portion of the wrench device and to the rotary concentric drain cock valve stem-actuating

portion of the wrench device, in which each of said handle members is disposed in a predetermined angular relation to the drain cock engaging parts to indicate the relative drain cock engaging positions of said parts.

Other objects and advantages of the invention will become apparent from the following description, taken in connection with the accompanying drawing, in which like reference characters refer to like parts on the several figures.

Fig. 1 is a perspective view of my improved drain cock wrench device, part of the cylindrical body or sleeve portion being broken away and shown in section to more clearly disclose the rotatable operating stem.

Fig. 2 is a vertical sectional view taken through my improved drain cock wrench device, as seen in Fig. 1, showing its application to a conventional drain cock which is mounted in a relatively fragile support, such as a rubber or flexible drain outlet from a flexible tank or container.

In the maintenance or servicing of aircraft, certain containers, such as fuel tanks, etc., carried by the aircraft, are necessarily made light in weight, and considerable difficulty is often experienced in servicing the drain cocks. These drain cocks are often located in comparatively inaccessible locations. In order to securely tighten the drain cock valve considerable rotative torque is often applied through the drain cock body to the outlet portion of the container carrying the drain cock. Reverse torque, in excess of that which is desired, is often applied to the outlet portion of the container through the drain cock body, in an effort to loosen and rotate the cock valve to drain position. This excessive rotative torque is often sufficient to rupture or damage the portion of the tank or container adjacent the drain outlet.

Self-sealing or bulletproof fuel tanks for aircraft are frequently made entirely of rubber compounds and fabric and have a flexible hose-like drain outlet portion, as indicated at 1 in Fig. 1 of the drawing, into which is inserted an annular ribbed nipple 2 of metal, plastic or other rigid material. This nipple 2 is secured in the drain outlet either by a suitable adhesive, or by a pipe clamp, as indicated at 3. The nipple 2 is threaded internally to receive the threaded end of a conventional drain cock body 4.

The drain cock body is tightly screwed into the nipple 2, often before the tank is placed in the aircraft, sometimes before the nipple is inserted in the drain outlet in the tank. The drain cock body is provided with a hexagonal or

wrench-receiving portion 5 at one end, and a valve seat 6 at the other end, for engagement with the valve portion 7 on the end of the hollow drain cock valve stem 8.

The stem 8 is externally threaded into the internally threaded portion of the drain cock body 4, and carries a valve head forming the valve portion 7 at one end, which extends beyond the body 4, closing the central drain passage 9, as seen in Fig. 2. The drain outlet passage 9 is provided with a plurality of lateral drain openings 7a extending through the stem, just under the valve head portion 7. An operating handle 10 comprises a pair of arms projecting laterally in opposite directions from the valve stem 8. These arms or drain cock valve stem handle members 10 are fixed to the drain outlet portion of the hollow stem 8. Rotation of the stem 8 by the handles 10 in one direction moves the stem and the valve head 7 upwardly to establish a draining communication between the inner bore 9 of the valve stem 8 and the tank outlet 1, through the lateral drain openings 7a. Rotation of the handles 10 in the other direction moves the valve head 7 downwardly against the seat 6 in the body. To secure the drain cock stem against accidental displacement, a wrench or pliers are usually applied to the handles 10, causing excess application of torque to be applied to the tank outlet 1. This rotative torque often ruptures the connections between the tank outlet and the tank, making it necessary to remove the tank from the aircraft. There is also danger of fire, in case the damage to the fuel tank outlet is not discovered before takeoff, or the rupture occurs during flight after having been weakened, due to previous applications of rotative torque to the drain cock body through the stem while tightening; and loosening the drain cock valve stem when the aircraft was being serviced.

My improved drain cock wrench comprises a cylindrical body or sleeve portion 11 formed at one end with a laterally and longitudinally bent arm or yoke member 12 carrying an inwardly extending socket or wrench portion 13 having a nut receiving opening or socket member 14 disposed concentrically in a plane at right angles to the longitudinal axis of the cylindrical body 11 and in spaced relation to the end of the body or sleeve member 11.

Projecting laterally from the side of the cylindrical body 11, adjacent the other end thereof, is a handle member 15 for holding the body 11 and wrench socket 14 while positioning the wrench device on a drain cock, and to hold the drain cock body against rotative displacement. The handle member 15 projects laterally from the body 11 in the opposite radial direction as the yoke member 12, so that the handle points in the same direction as the nut receiving socket or opening 14.

The cylindrical body or sleeve portion 11 has an operating stem 16 rotatably and axially movable therein, formed with an actuating handle 17 projecting laterally from one end. The opposite end of the operating stem 16 is tapered as indicated at 18 to provide a centering tip which is adapted to be inserted into the end of the drain cock drain passage 9 to centralize the wrench device on the drain cock during the application and operation of the wrench device.

This conical tip on the end of the stem 16 is also employed as a plug or stopper for closing the end of the drain passage while the device is being used to loosen the drain valve.

Extending laterally from the stem 16, adjacent the conical tip portion, is a laterally bent operating arm having a crank arm portion 19 which projects in a longitudinal direction part way across the yoke member so as to engage the arms 10—10 of the drain cock valve stem when the central stem of the wrench device is rotated by the handle member 17.

Sufficient space is provided between the laterally extending arm 19 and the upper end of the sleeve 11, as indicated at 20, to permit the axially extending crank portion of the arm to move sufficiently away from the end wrench portion 13 that the device may be easily and conveniently positioned on a drain cock without the crank extremity of the arm 19 striking the handles 10—10.

The crank arm 19 and handle 17 are rigidly secured to the stem 16 and extend radially in the same direction so that the handle 17 serves as an indicator for the position of the crank 19.

In the operation of the device, the end wrench portion 13 of the device is first manipulated so that the socket 14 receives the hexagonal portion 5 of the drain cock body 4. The stem portion 16 is moved axially within the body 11 by the operating handle member 17 to insert the conical tip 18 in the drain opening 9 of the hollow drain passage of the drain cock valve stem 8. This disposes the actuating stem 16 in concentric relation to the stem 8 of the drain cock. The operating stem 16 is then rotated by the handle member 17 to bring the crank arm portion 19 against one of the handles 10—10 of the drain cock valve stem. Torque is then applied in opposite rotative directions by the handles 15 and 17 of the wrench device to cause rotation of the stem 8, loosening the drain cock while, at the same time, preventing the rotative torque from being applied to the drain cock body 5 or to the tank outlet portion or sump 1 carrying the drain cock.

If upward pressure is maintained on the operating stem 8 of the drain cock, the conical extension prevents excessive leakage through the drain passage 19 during the opening of the drain cock.

In the drain cock valve tightening operation the procedure just described is reversed. The handle 15 is held stationary while rotative torque is applied to the handle 17 to rotate the drain cock stem into tightly closed position. The handle member 15, being held rigid against rotative movement, prevents the application of the rotative torque communicated to the stem from being communicated to the tank outlet portion 1 as the stem 8 of the drain valve 7 is jammed up tightly against its valve seat 6.

While I have disclosed a wrench device applicable for use with conventional drain cocks, such as the hollow center drain valve type, it is obvious that various changes may be made in the construction as illustrated, such as variations in the shape and size of the yoke socket 13 and in the formation of the crank member 19, to adapt the device for securing other rotary fastening and operating members without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, I claim:

1. In a drain cock wrench, a tubular body having an offset yoke member at one end, wrench means formed thereon at the end of the yoke member, disposed in a plane normal to the longitudinal axis of the tubular body in spaced relation to the end of the tubular body for receiving and holding against rotation the body of a

conventional drain cock having a centrally rotatable valve stem formed with a drain opening therethrough, an axially shiftable operating stem concentrically and rotatably movable within the tubular body with one end thereof projecting toward the drain cock receiving and holding portion on the yoke member and terminating in a tapered extremity adapted to be received in the drain opening in the drain cock valve stem, means carried by said operating stem adjacent said tapered extremity for interengaging the drain cock valve stem to rotate the same, and handle means carried by said operating stem adjacent the other end, beyond the end of the tubular body, for limiting axial movement of the operating stem within the tubular body, and for rotating said operating stem within the tubular body to rotate the drain cock valve stem.

2. In a drain cock wrench, a tubular body having an offset yoke member at one end, wrench means formed thereon at the end of the yoke member, disposed in a plane normal to the longitudinal axis of the tubular body in spaced relation to the end of the tubular body, for receiving and holding against rotation the body of a conventional drain cock having a centrally rotatable valve stem formed with a drain opening therethrough, an axially shiftable operating stem concentrically and rotatably movable within the tubular body having one end projecting from the tubular body toward the drain cock receiving and holding portion on the yoke member and terminating in a tapered extremity, adapted to be received in the drain opening in the drain cock valve stem, means carried by said operating stem adjacent said tapered extremity for interengaging the drain cock valve stem to rotate the same, handle means carried by said operating stem adjacent its other end, beyond the end of the tubular body for limiting axial movement of the operating stem within the tubular body and for rotating said operating stem within the tubular body to rotate the drain cock valve stem, and handle means carried by the tubular body for holding the same stationary while the operating stem handle means is being actuated.

3. In a wrench device of the class described, a cylindrical body having a handle extending laterally therefrom at one end and a U-shaped yoke extension secured to the opposite end portion of the body on the side thereof opposite from said handle, said U-shaped yoke extension having a nut socket formed therein concentric with and at right angles to the axis of the cylindrical body in axially spaced relation from the end thereof, a cylindrical operating stem concentrically rotat-

able in said cylindrical body having a conical head portion extending concentrically toward the axis of the nut-receiving socket, an actuating arm projecting from one side of said cylindrical operating stem and terminating in an angularly bent end disposed in parallel offset relation to the axis of the nut-receiving socket and located between the yoke-carrying end of the cylindrical body and said nut-receiving socket portion thereof, a handle member projecting laterally from the opposite end portion of the cylindrical stem in a direction opposite said angularly bent actuating arm and beyond the end of the cylindrical body, the distance between the actuating arm and handle on said cylindrical stem being in excess of the distance between the ends of the cylindrical body so that the conical head portion of the stem may be inserted into the drain opening in the drain cock valve stem to prevent lateral displacement of the wrench portion of the cylindrical body and said actuating arm, with respect to the axis of said drain cock, when said handle members are swung toward or away from each other with the axis of the cylindrical body, stem, and drain cock body in alignment.

4. In a drain cock wrench, a tubular body having an offset yoke member at one end, wrench means formed thereon at the end of the yoke member, disposed in a plane normal to the longitudinal axis of the tubular body in spaced relation to the end of the tubular body, for receiving and holding against rotation the body of a conventional drain cock having a centrally rotatable valve stem formed with an axial drain opening therethrough, an axially shiftable operating stem concentrically and rotatably mounted within the tubular body having one end projecting from the tubular body toward the drain cock receiving and holding portion of the yoke member and terminating in an axial guide extremity, adapted to be received in the axial drain opening in the drain cock valve stem, means carried by said operating stem adjacent the guide extremity for interengaging the drain cock valve stem to rotate the same, handle means carried by said operating stem adjacent its other end, beyond the end of the tubular body for limiting axial movement of the operating stem within the tubular body and for rotating said operating stem within the tubular body to rotate the drain cock valve stem while held centralized by said axial extension, and handle means carried by the tubular body for holding the same stationary while the operating stem handle means is being actuated.

NICHOLAS J. VLASS.