J. SHEBOL & W. F. ALBRECHT.

FLUID PRESSURE GAGE.

APPLICATION FILED DEC. 31, 1912.

1,166,719.

Patented Jan. 4, 1916.

FIG. 1.

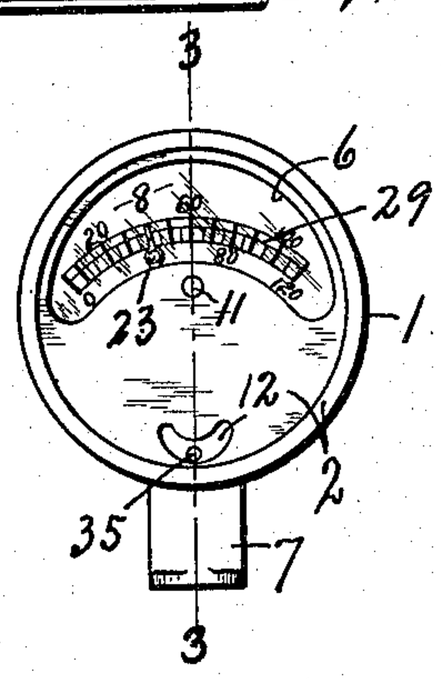


FIG. 2.

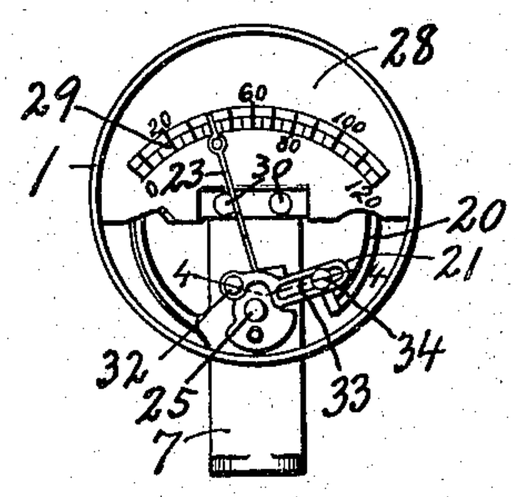


FIG. 3.

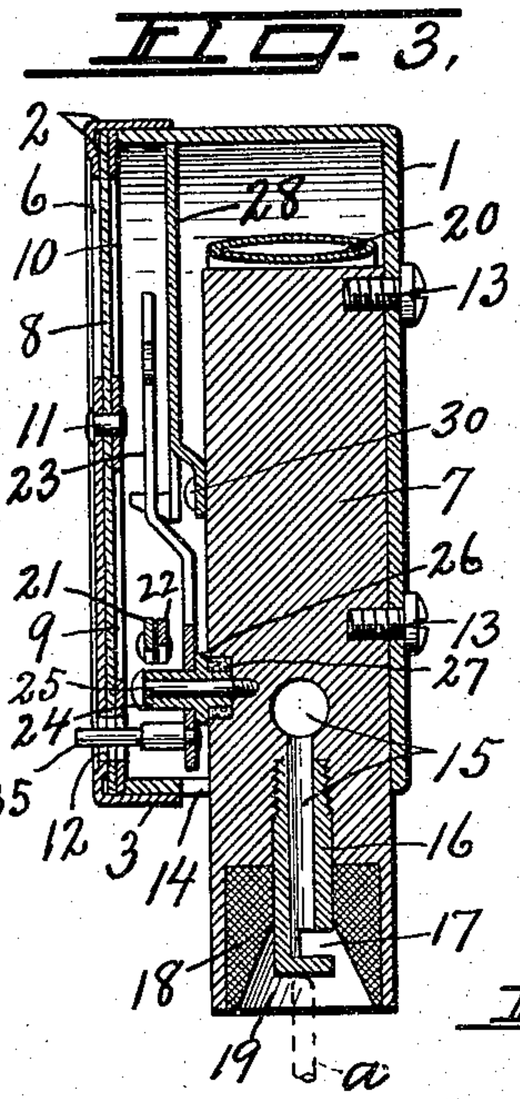


FIG. 4.

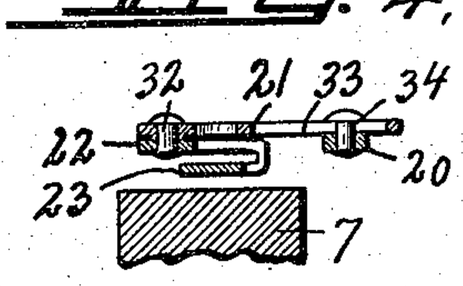


FIG. 5.

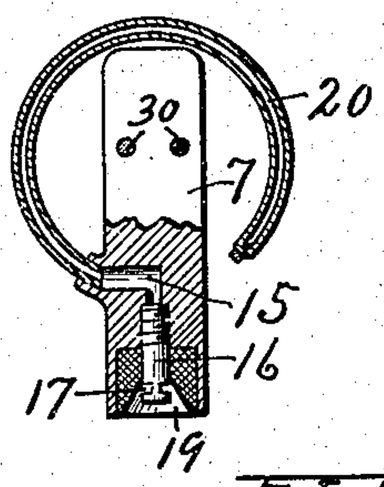


FIG. 6.

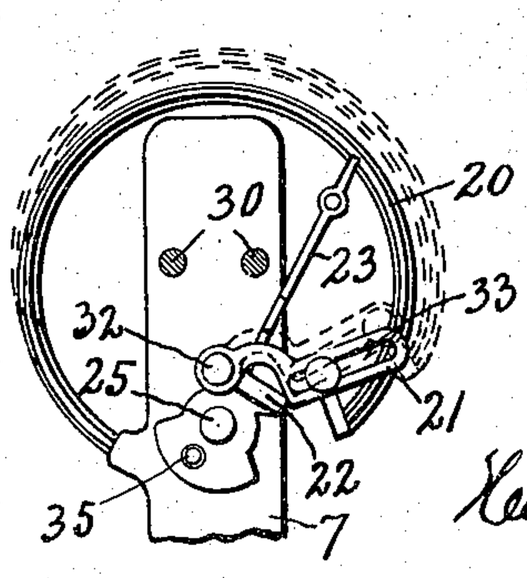
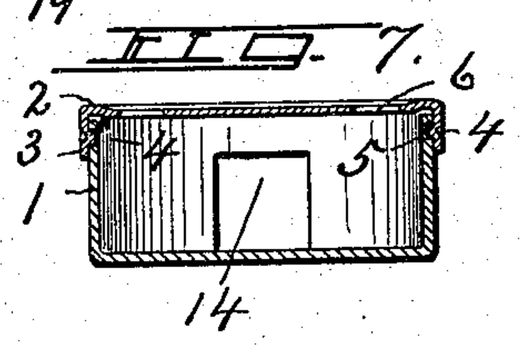


FIG. 7.



WITNESSES:

H. P. Hurst,

H. E. Chase

INVENTORS

J. Shebol and

W. F. Albrecht

BY Howard P. Denison

ATTORNEY.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOSEPH SHEBOL AND WILLIAM F. ALBRECHT, OF SYRACUSE, NEW YORK.

FLUID-PRESSURE GAGE.

1,166,719. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed December 31, 1912. Serial No. 739,460.

To all whom it may concern:

Be it known that we, JOSEPH SHEBOL and WILLIAM F. ALBRECHT, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Fluid-Pressure Gages, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in fluid pressure gages of the class set forth in our Patent No. 1,002,877 of September 12, 1911, in which the pressure-indicating finger is directly connected through the medium of a link to the free end of a Bourdon tube in such manner that the pivotal connection between the link and lever may be adjusted toward and from the axis of said lever to facilitate calibration and readjustment of the finger to the dial.

Aside from the main object of reducing the number of parts to a minimum and permitting the adjustment of the index finger without loosening any of its connections with the tube, the specific object of our present invention is to establish a sliding or relatively movable connection between the link and free end of the tube normally adjusted so that the initial operation of the tube under pressure will move the index finger a corresponding distance around the dial and permit the tube to return to its normal position leaving the index finger in its adjusted position to indicate the degree of pressure after the pressure in the tube has been relieved.

Another object is to provide the index finger with a finger piece exposed to the exterior of the case whereby the operator may voluntarily restore said finger to its normal position after the degree of pressure has been noted or recorded.

We have found that it is desirable to make the index finger as long as possible and to pivot it in close proximity to one side of the case near the fixed end of the tube so as to permit the use of a dial of relatively large radius and eccentric to the axis of the case so that its graduations may be easily discerned and the pressure readings more readily obtained than when the dial is concentric with and close to the rim of the case, and, in order to avail ourselves of this advantage, we have sought to make the connection between the index finger and movable end of the tube as nearly direct as possible and close to the hub or axis of said finger so that the slightest movement of the free end of the tube will impart a considerably greater movement to the front end of the finger, thereby permitting the use of relatively wide space between the graduations of the dial so that the readings may be more easily discerned.

A still further object is to provide simple means for producing a very slight resistance to the free movement of the index finger so as to frictionally hold it in its adjusted position when the pressure in the tube is relieved and said tube restored to its normal position under its own tension without effecting the return of the index finger by said tube.

Other objects and uses relating to specific parts of the gage will be brought out in the following description.

In the drawings—Figure 1 is a front face view of a gage embodying the various features of our invention. Fig. 2 is a similar face view of the same gage, with the cover removed, showing the interior mechanism, the spring tube being shown as returned to its initial unexpanded form after having been expanded by the pressure indicated by the index finger. Fig. 3 is an enlarged transverse vertical sectional view of the gage taken on line 3—3, Fig. 1. Fig. 4 is an enlarged detail horizontal sectional view through the index finger and link taken on line 4—4, Fig. 2. Fig. 5 is a detail sectional view through the tube and its supporting post. Fig. 6 is an enlarged face view of the tube, index finger and link, the dotted lines indicating the degree of movement of the tube necessary to shift the index finger to the position shown, the spring tube being shown as returned to its zero position after having been extended as shown by dotted lines. Fig. 7 is a horizontal sectional view through the case showing the indentations for frictionally locking the cover thereto.

This gage may be used for any of the purposes to which a Bourdon tube may be applied, but is adapted more particularly for indicating the degree of air pressure in pneumatic tires and other devices containing air or gas under abnormal pressure and comprises a circular case —1— adapted to receive the various parts of the pressure-indicating mechanism hereinafter described and, in this instance, is preferably made of

sheet metal provided with a removable cap —2— having a marginal flange —3— fitted closely upon the periphery of the open side of the case —1— and forming a part thereof, said flange being provided with one or more indentations —4— adapted to register and interlock with corresponding indentations —5— in the periphery of the case as shown more clearly in Fig. 7 to frictionally hold the cover in operative position and, at the same time permitting it to be removed when necessary to repair or adjust any of the interior parts.

The upper portion of the front side of the cover is provided with a crescent-shape opening —6—, the lower portion of which is concentric with the axis of movement of an index finger, the inner side of said opening being covered by a transparent plate —8— of celluloid or equivalent material which is preferably circular and fitted against the back of the cover —2— where it is held in place by a metal retaining plate —9— as shown more clearly in Fig. 3, the upper portion of the retaining plate being also provided with a crescent shape opening —10— registering with the opening —6— to afford a clear and unobstructed vision of an inner dial plate presently described.

The marginal edges of the transparent plate —8— and its retaining plate —9— are tightly fitted within the cover —2— so as to be self-retaining but are additionally held in place between the front of the cover and adjacent edge of the case as shown in Fig. 3 and constitute a part of the cover, the central portions of said plates being secured together by a rivet —11—.

The lower front portion of the cover is provided with an additional crescent-shape opening —12— for receiving the operating member by which the index finger may be restored to its normal position after being shifted by the distension of the tube under pressure.

For convenience of assembling, the various parts of the pressure-indicating mechanism are mounted directly or indirectly upon a supporting member or post —7— which is secured by suitable fastening means, as screws, —13— to the inner face of the back of the case and extends radially through an opening —14— in one side thereof and is provided with a fluid passage —15— extending from one side within the case through the outer end of the post for connection with a valve or other conduit of the apparatus containing the fluid, the pressure of which is to be ascertained by the gage.

When the indicator is used in connection with a valve of a pneumatic tire or similar device having a normally protruding valve stem, the outer end of the post is preferably provided with a hollow bushing —16— having a lateral passage —17— in its outer end communicating with the passage way —15— through the bushing so that the outer end of the bushing may serve as a means for engaging a valve stem, as —*a*—, for opening the valve of such tire or similar device containing the fluid under pressure.

The outer end of the post is provided with an enlarged socket in which is tightly fitted a flexible packing —18— of rubber or equivalent material having a tapering opening —19— adapted to closely fit around the end of a valve case (not shown) so as to prevent leakage of the air or gas at this joint during the operation of testing the pressure.

The pressure-indicating mechanism previously referred to comprises a Bourdon tube —20— having one end secured to one side of the post —7— so as to register with the adjacent end of the passage —15— while the other end of the tube is free to expand and contract and is connected with a lost motion by a link —21— to an overturned bendable arm —22— on one side of an index finger —23—. This index finger is provided with a tubular hub —24— journaled upon the pivotal pin —25— which, preferably, consists of a headed screw secured in a threaded socket in the front side of the post —7— as shown more clearly in Fig. 3.

The index finger —23— is preferably made separately from the hub but is tightly secured thereto by a driving fit or otherwise so as to rest against an enlarged annular flange —26—, the adjacent portion of the front side of the post —7— being provided with an annular socket in which is seated a friction washer —27— of felt or equivalent material capable of producing a slight friction upon the turning connection between the index finger and post sufficient to hold the index finger in its adjusted position when the tube —20— returns to its normal position upon relieving the pressure therein. It is to be understood, however, that this friction is almost negligible in its resistance to the free operation of the index finger by the expansion of the tube under pressure and is only intended to retain the index finger against displacement from its adjusted position by its own gravity or by slight jars to which the instrument may be subjected when removed carefully from the tire or other apparatus to which it has been applied to register the degree of pressure of a fluid therein.

The pivotal connection between the index finger —23— and post —7— is located near the fixed end of the tube —20— and also near the adjacent side of the case while the free end of the index finger extends to a point in proximity to the opposite side of the case across the front face of a dial plate —28— having a graduated dial —29— con-

centric with the pivot —25— or eccentric to the axis of the cylindrical case —1— and it, therefore, follows that the pointer end of the index finger is relatively long so that a slight movement of the free end of the tube, which is connected to the lever close to its pivot, causes the free end of the pointer to move through a relatively long arc which implies that the graduations may be spaced a sufficient distance apart to be readily readable from a distance.

The graduations on the dial read from left to right and from zero to 120 indicating that the range of the test is from 0 to 120 pounds per square inch.

The dial plate —28— is substantially semi-circular and disposed in a plane substantially parallel with the front and back of the case, said plate having a portion of its lower edge depressed rearwardly beyond the plane of its main body and secured to the adjacent side of the post by rivets —30— so that the plate with a dial thereon extends across the openings —6— and —10— in the upper part of the front of the cap some distance to the rear thereof so as to allow the pointer end of the index finger to play freely in the intervening space along the dial or rather between the dial and transparent plate —8—.

The arm —22— is preferably formed integral with a portion of the index finger —23— near the hub —24— and, in this instance, is united at one end to the side of the index finger adjacent the free end of the tube —20— while its other end is bent or returned laterally in the opposite direction across the front face of the finger and is relatively narrow and curved from the pivot so as to be readily bendable toward and from the axis of the index finger to vary the degree of throw of said finger, thereby permitting the dial to be properly calibrated or the finger to be adjusted relatively to the dial to register with the graduations corresponding to a predetermined pressure exerted upon the tube.

One end of the link —21— is pivoted at —32— to the free end of the overturned arm —22— and its other end is connected with a lost motion to the free end of the tube —20— and for this purpose is provided with an elongated slot —33— for receiving a stud or shoulder —34— on the adjacent end of the tube, the slot and stud being relatively adjusted so that, when the tube is in its normal position and the index finger is registered with a zero graduation, the stud —34— will engage the end of the slot adjacent the tube, said slot being of sufficient length to permit the free end of the tube and its stud —34— to return to their normal positions when the pressure in the tube is relieved independently of the index finger even though the latter may be moved to its extreme limit of movement along the dial, thereby assuring the temporary retention of the index finger to any position of adjustment produced by the expansion of the tube after said tube is returned to its normal position.

The means for voluntarily restoring the index finger to its zero position consists in providing the heel of the index finger with a stud or operating member —35— projecting forwardly through the opening —12— where it is available for operation by the finger from the front side of the case and may serve as an additional pressure indicator.

In operation, assuming that the index finger is in its zero position and that it is desired to test the pressure of a pneumatic tire or similar apparatus containing a normally closed valve and protruding valve stem, it is simply necessary to place the open outer end of the post —7— against such valve and to press the same tightly thereon to prevent leakage at the joint, whereupon the outer end of the bushing —16— will engage the stem of the valve and open the same to allow the fluid under pressure to enter the tube —20—, thereby causing the tube to expand or distend to produce a corresponding movement of the index finger around the dial through the medium of the link —21—. The indicator as a whole may then be removed, thereby permitting and allowing the tube to return to its normal position while the index finger will remain in its adjusted position by the friction produced by the washer —27— so that the indicator may be taken to the light and the exact degree of pressure ascertained by the position of the pointer on the dial and when this pressure is noted, the index finger may be returned to its zero position by proper manipulation of the operating member —35—.

In case the index finger should not register the pressure accurately or return to its zero position, the arm —22— may be adjusted by bending toward or from the axis as may be required until the pointer is properly positioned to correspond with the pressure produced in the tube.

It is also apparent that by mounting the dial, tube and index finger together with the link entirely upon the post, this portion of the device which constitutes the indicating means may be made up as a unit and afterward assembled in the case by simply forcing the outer end of the post from the inside outwardly through the opening —14— and afterward placing the screws —13— in operative position.

What we claim is:

1. In a fluid pressure gage of the character described, the combination with a Bourdon tube, a dial, a pivoted index finger

movable around the dial, coöperative friction members concentric with the pivot for holding said finger to any position of adjustment, and a link having one end pivoted to the finger between its pivot and point, and its other end connected with a lost motion to the free end of the tube to actuate the finger when the tube is under pressure and to permit said tube to return independently of the finger when such pressure is reduced.

2. In a fluid pressure gage of the character described, the combination with a Bourdon tube, a dial, a pivoted index finger movable around the dial, coöperative friction members concentric with the pivot for holding said finger to any position of adjustment, and a link having one end pivoted to the finger between its pivot and point, and its other end connected with a lost motion to the free end of the tube to actuate the finger when the tube is under pressure and to permit said tube to return independently of the finger when such pressure is reduced, said finger having an exposed hand-piece thereon by which the index finger may be returned at will.

In witness whereof we have hereunto set our hands this 19th day of December, 1912.

JOSEPH SHEBOL.
WILLIAM F. ALBRECHT.

Witnesses:
H. E. CHASE,
EVA E. GREENLEAF.