Jan. 24, 1967 J. REEF 3,299,516

GAUGE

Filed May 21, 1964

FIG. 1

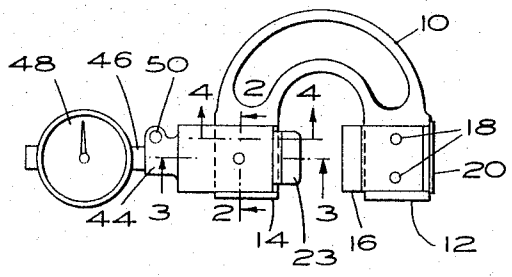


FIG. 6

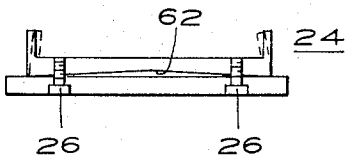


FIG. 2

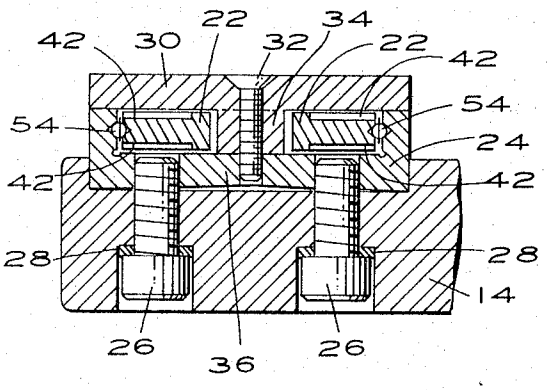


FIG. 5

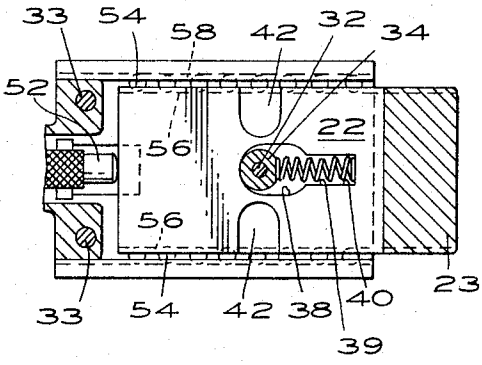


FIG. 4

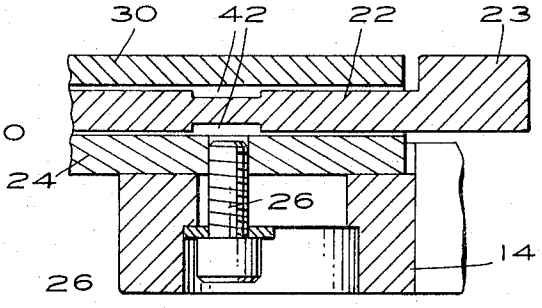


FIG. 8

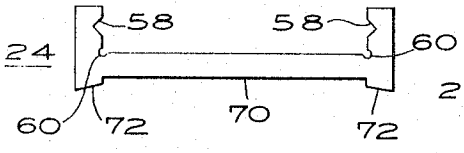


FIG. 3

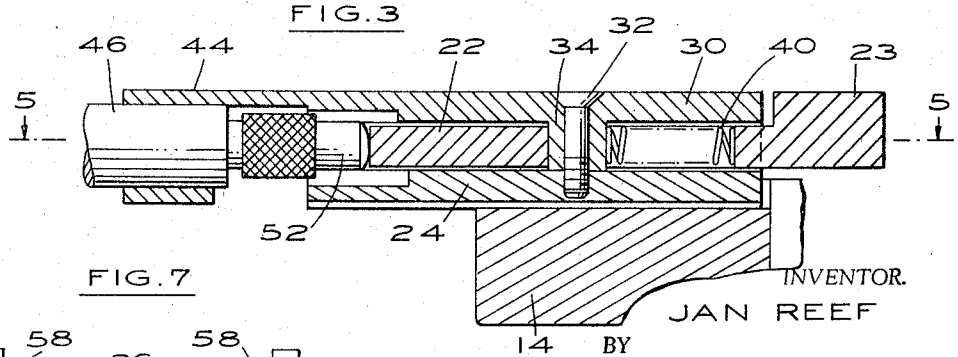
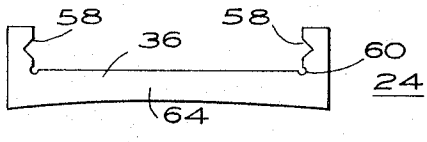


FIG. 7



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GAUGE

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4 Claims. (Cl. 33—147)

This invention relates to an improved gauge wherein the gauge frame is of a U-shape, and a blade is mounted upon each arm of the frame adjacent to its end and projects into the space between the arms. One of said blades is slidable toward and away from the other blade, and a dial indicator is provided to register the movement of the slidable blade.

An object of this invention is to provide a gauge of the character specified wherein the slidable blade is disposed within a channel guide for slidable movement, and ball bearings are mounted between each side wall of the guide and the adjacent edge of the slidable blade to facilitate accurate easy movement of the blade.

Another object is the provision of a gauge of the character hereinabove set forth wherein the guide for the slidable blade is a separate guide channel element, which element is mounted upon and carried by one arm of the frame and one or both side walls of said channel guide element is tensioned toward the blade so as to exert a pressure thereupon through the ball bearings whereby the blade is freely supported for slideable movement without any undesired wobble or play.

Another object of the invention is the provision of a gauge assembly of the character hereinabove specified wherein a dial indicator is associated with the frame and is coupled with the slidable blade to register the movement thereof on the indicator dial.

Another desirable feature of the gauge as hereinabove set forth is that the guide channel element has the outer face of the base of the guide channel undercut and means is provided to act upon the base of the guide channel to urge one or both side walls thereof toward the slidable blade to maintain a pressure thereupon through the ball bearing assemblies. Such pressure will prevent undesirable play while permitting free movement of the blade.

A meritorious feature of the invention is that the guide channel element is undercut linearly of the base of the guide channel and preferably the undercut decreases in depth from the longitudinal center line thereof toward the longitudinal margins of the base of the guide channel, and means is provided acting upon the under side of the base of the guide channel in such a way as to hold both side walls of the guide channel yieldingly tensioned toward the slidable blade.

A further meritorious feature is that the slidable blade and its cooperating elements is protected by a cover plate and such cover plate also protects the plunger of the dial indicator.

Other objects, advantages and meritorious features will more fully appear from the following description, claims, and accompanying drawings wherein:

FIG. 1 is a plan of a gauge embodying the invention;

FIG. 2 is a cross-sectional view taken on the line 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view taken on the line 3—3 of FIG. 1;

FIG. 4 is a cross-sectional view taken on the line 4—4 of FIG. 1;

FIG. 5 is a cross-sectional view taken on the line 5—5 of FIG. 3;

FIG. 6 is a schematic end elevation showing, somewhat exaggerated, the connection of a bevel undercut guide channel element with the supporting frame;

FIG. 7 is an end elevation of the guide channel element showing the shape thereof and the undercut formed on a radius; and

FIG. 8 is a view similar to FIG. 7, showing a modified form of undercut as compared with FIGS. 6 and 7.

In the drawing the U-shaped frame is indicated as **10**. It has two arms **12** and **14**. A blade **16** is carried by the arm **12** and secured thereto at an adjusted position by screws **18** whereby its projection into the space between the two arms may be regulated. A cover plate extends over the heads of the screws and over the opposite side of the frame from that shown in FIG. 1. The edge of such cover plate is indicated as **20** in FIG. 1. It is an angular cover plate.

The opposite arm of the frame is provided with a blade **22** (FIGS. 3 and 4) which is slidably disposed within a guideway carried by such opposite arm. Such channel guide is in the form of a separate guide channel indicated as **24** in FIG. 2. Such guide channel is secured by two screws **26** within a channel cut-out in the end of the arm **14** of the frame as shown in FIG. 2. A spring washer **28** is interposed underneath the head of each screw **26** exerting tension tending to hold the guide channel **24** in place without play. The blade itself indicated as **22** is shown in FIG. 1 in cross-section and is also shown in FIGS. 3, 4 and 5.

There is a cover plate **30** shown in FIG. 2 held by a screw **32** extending through a boss **34** formed on the plate into the base **36** of the guide channel element **24** and by two screws **33** to the guide channel (FIG. 5). The boss is shown in FIG. 2 as extending through a cut-out in the blade, which cut-out is shown more clearly in FIG. 5 and is indicated at **38**. The boss **34** has a flatted side as shown in FIG. 5 and a spring **40** is mounted in the extension **39** of the cut-out **38** with one end bearing against the flatted side of the boss and the opposite end bearing against the blade to hold the same projected toward the blade carried by the opposite arm of the frame.

The blade is shown as having a projecting end **23** which is of increased thickness as compared with the remainder of the blade. It will be noted that the blade adjacent each of its two linear edges is provided with recesses **42** on both faces. The purpose of these recesses is that if the screws **28** were too long or projected a little beyond the inner surface of the base of the guide channel element they would, as shown in FIG. 2, enter these recesses rather than contacting the blade itself and they would not therefore interfere with the free movement of the blade. The reason for the provision of the recesses on both sides of the blade is that it may be desired to reverse the blade and have its heavier projecting portion **23** project in the opposite direction.

The cover plate **30** which extends over the slidable blade **22** has a portion **44** which is in the form of a socket adapted to receive the tubular guide **46** for the plunger **52** of the dial indicator **48**. The tubular socket **44** is adapted to be tightened by screw **50** to secure the tubular guide for the plunger of the dial indicator securely therein as shown in FIGS. 1 and 3.

The dial indicator **48** is provided with a shiftable plunger **52** which bears against the end of the blade **22** to be actuated by movement of the blade either counter its spring **40** or by such spring as hereinabove described.

A ball bearing assembly **54** is disposed between each linear margin of the blade and the adjacent side wall of the guide channel element as shown particularly in FIGS. 2 and 5. The opposed edges of the blade are provided with ball receiving channels **56** as indicated with the dotted lines in FIG. 5, and the inner faces of the side walls of the channel guide are provided with ball receiving channels **58** as indicated particularly in FIGS. 7 and 8.

As noted in FIGS. 7 and 8 a channel **60** is formed between each side wall and the base of the guide channel

itself, so as to increase the flexibility of the side walls in order that they may be tensioned toward the blade to hold the balls thereagainst.

The guide channel **22** has its side walls so spaced apart and of such a spring nature that they tend to hold the ball bearings **54** against the opposite edges of the slidable blade **22**. The balls may be initially installed by springing the side walls of the guide channel apart and then loading the ball bearings in place between these ouwardly sprung side walls and the opposed edges of the blade. When the force of springing the side walls apart is released they spring back and hold the ball bearings against the edges of the blade.

In order to facilitate the springing of the side walls of the guide channel **24** apart for insertion of the ball bearings or to adjust the tension of said side walls upon the ball bearings following wear, it has been found desirable either to initially undercut the base **36** of the guide channel **24** or to undercut the same following a certain amount of wear. In FIG. 6 the undercut is shown as a bevel undercut having its greatest depth along the linear center line and being indicated by the number **62**. In FIG. 7 the undercut is on a radius indicated by **64**. In FIG. 8 the undercut is in the form of a channel itself as indicated by **70** and the two opposite side walls of the guide channel itself are shaped as at **72** on a bevel as shown.

It is apparent that tightening of the screws **26** would draw the marginal portions of the base of the guide channel downwardly and thereby tilt the side walls inwardly toward the blade. This is shown in exaggerated form in FIG. 6. Actually the extent of movement is very slight and it is believed that the wear will probably be so slight that initial adjustment will be satisfactory for a long period of use.

What I claim is:

1. A gauge comprising, in combination, a generally U-shaped frame having a pair of opposed arms, a blade mounted upon each arm adjacent to the end thereof and extending transversely of the arm and adapted to project into the space between the arms, one of said blades being mounted within a channel-shaped guide carried by one of the arms for slidable movement of the blade within the channel guide toward and away from the blade carried by the other arm, said guide being a separate channel guide element secured to and carried by its arm, a ball bearing assembly disposed between each side wall of the channel guide and the adjacent edge of the slidable blade, said channel guide having the outer surface of the bottom portion thereof undercut between the outer side margins of the guide, and means extending between the undercut bottom of the channel guide and the frame adjustable to draw the undercut bottom of the guide toward the frame to urge one side wall of the guide channel inwardly toward the opposite side wall thereof.

2. A gauge as defined in claim numbered **1** characterized in that the means extending between the undercut bottom of the channel guide and the frame and which is adjustable to draw the undercut bottom of the guide toward the frame urges both side walls of the guide inwardly toward each other to support the blade for desired guided slidable travel between the bearings disposed between the side margins of the blade and the tensioned side walls of the guide channel.

3. A gauge as defined in claim numbered **1** characterized in that the undercut outer surface of the bottom portion of the channel guide is undercut from adjacent to the two opposite side margins thereof sloping inwardly toward a linear mid-point center line therebetween and increasing in depth as it approaches said linear midpoint center line therebetween.

4. A gauge as defined in claim numbered **1** characterized in that the means extending between the undercut bottom of the channel guide and the frame is in the form of two screws connecting the arm of the frame with the undercut bottom portion of the channel guide on opposite sides of the linear center line of the channel guide and the screw openings extend entirely through the undercut bottom portion of the guide and the slidable blade disposed within the channel guide is undercut on its bottom face linearly in line with each of said screw openings.

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