Dec. 9, 1941. J. JENSEN 2,265,234

GAUGING DEVICE

Filed Nov. 19, 1938

Fig. 1

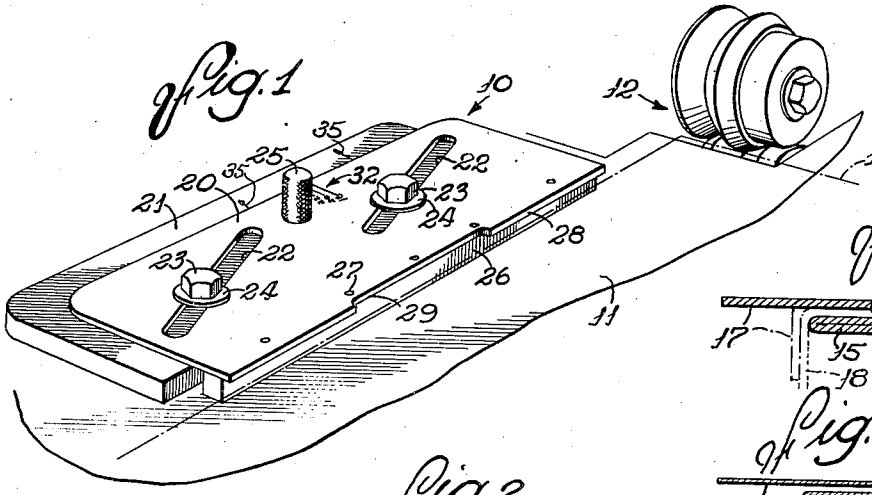


Fig. 4

Fig. 5



Fig. 2

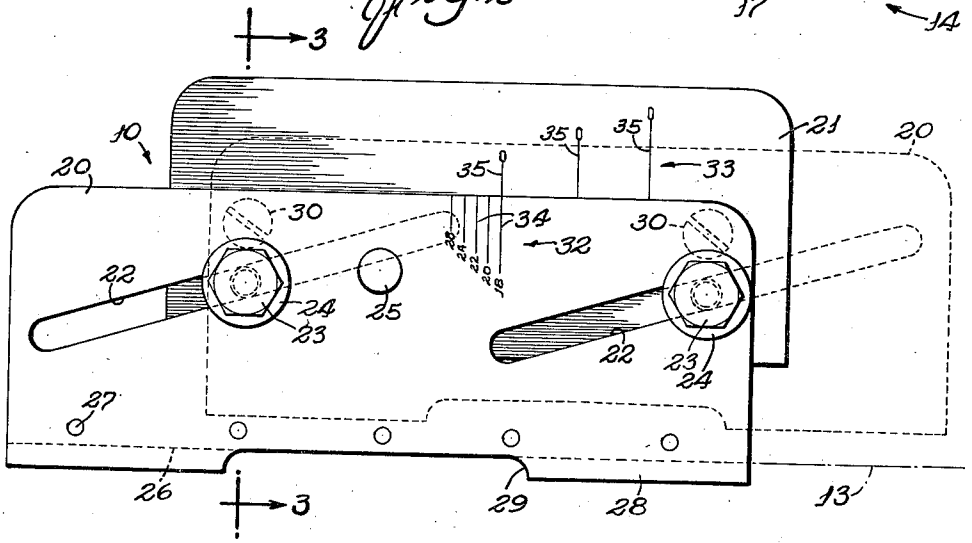
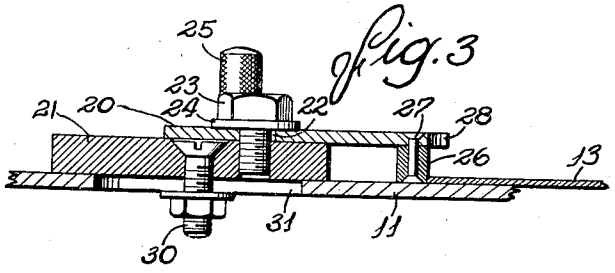


Fig. 3



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2,265,234

GAUGING DEVICE

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Application November 19, 1938, Serial No. 241,375

2 Claims. (Cl. 153—10)

This invention concerns a device which is adapted for gauging the width of the edge portion of a metal sheet to be fed to the forming rolls or the like of sheet metal shaping apparatus, and has to do particularly with such a device which can be used with a machine as disclosed, for example, in my copending application Serial No. 233,917, filed October 8, 1938, for producing the sheet metal joint lock sometimes referred to as the "Pittsburgh" lock. This joint lock is used where two sheet metal margins are to be united angularly, one margin being double folded longitudinally to provide a laterally opening mouth or socket and a projecting lip which may be bent over to lock within said socket a longitudinal edge flange on the other margin. The width of the projecting locking lip can, of course, be predetermined by controlling the width of the sheet metal margin that is fed to the forming rolls of the machine.

Where the thickness or gauge of the sheet metal of the margin to be formed is changed without varying the initial width of the marginal portion fed to the forming rolls, however, measurable variation will occur in the width of the locking lip because of differences in the shrinkage value of the sheet metal of different gauges, that is, the area of metal absorbed in the folding process will increase as the thickness of the metal decreases. Stated another way, the heavier the gauge of the metal sheet which is formed into a joint lock, the less will be the area of sheet metal required to form a joint lock having a locking lip of given width. This results because in the folded condition the increased thickness of the metal at the bends reduces the necessary widths of the respective opposed flat sections of the folds, thus requiring less area of metal in the aggregate for the completed joint lock and permitting a marginal portion of sheet metal of relatively heavy gauge to form a joint lock of the same overall or finished width as a proportionally wider marginal portion of sheet metal of lighter gauge. Heretofore it has been difficult if not impossible, to exercise the necessary control over the marginal width of metal sheets of varying gauges to secure uniformity in the width of the locking lip.

A general object of the invention is to provide an easily adjustable, accurate gauging device of simple and inexpensive construction adapted for use in guiding metal sheets to the forming rolls of a Pittsburgh lock machine and capable of effecting substantial proportional or measured adjustments so that by making proper shrinkage allowance or compensation for differences in gauge or thickness of various metal sheets joint locks having locking lips of predetermined or standard width can be formed on the margins of the sheets.

Another object of the invention is to provide a width gauging device having the foregoing general characteristics which is adapted for adjustment to determine a plurality of selective widths for the joint locks and which is also adapted for adjustment by such predetermined measured degrees as are necessary to compensate for the variable shrinkage qualities of different gauges or thicknesses of sheet metal, so that uniformity in lip width can be maintained after the device has been adjusted for any selected width of the joint lock as a whole.

Another object is to provide a novel sheet metal width gauging device having improved means for effecting accurate, scaled adjustment thereof.

Other objects and advantages will become apparent from the following description taken in connection with the accompanying drawing in which:

Figure 1 is a perspective view of a width gauging device embodying the invention mounted upon a sheet metal shaping machine such as a Pittsburgh joint machine, only a fragmentary portion of which is shown.

Fig. 2 is a top plan view of the width gauging device.

Fig. 3 is a transverse vertical sectional view through the width gauging device taken substantially along line 3—3 of Fig. 2.

Fig. 4 is a fragmentary vertical sectional view taken transversely through a formed joint lock on the margin of a metal sheet.

Fig. 5 is another similar view of a joint lock formed on a sheet of thinner gauge than shown in Fig. 4.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawing and will herein describe in detail, the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Although, as will be apparent, a gauging device embodying the present invention, generally identified by the numeral 10, may be used with various sheet metal forming machines in which the problem of metal shrinkage is present, it will be

described in connection with a Pittsburgh lock machine where, in practice, use of this novel device has proven to be of substantial advantage. Such a machine may be of the kind described in my aforesaid copending application, including a sheet-supporting table 11 (Fig. 1) and a set of forming rolls 12 of which but a pair is shown and to which a metal sheet 13 (shown in full outline in Fig. 3 and indicated by dot-dash outline in Figs. 1 and 2) upon which a joint lock 14 (Figs. 4 and 5) is to be formed is fed by moving it over the table between the rolls. As it comes from the forming machine, the joint lock 14 consists of a double folded marginal portion of the sheet 13, including a closed fold 15 offset from the main body of the sheet and an open or socket fold 16 beyond which projects a locking lip 17. An angularly flanged margin 18 (broken outline Fig. 4) may be fitted into the open socket fold 16 and the locking lip 17 may then be bent over to the dot-dash position shown in Fig. 4 to form a permanent, locked joint.

From time to time it may be desirable to vary the gauge or thickness of the metal of the sheet 13 but yet keep the locking lip 17 of the same width. In this connection reference may be had to Figs. 4 and 5 where although a substantial difference in gauge or thickness of the metal is shown, the width of the locking lip 17 is unchanged. It should be noted, however, that because of the greater thickness of the metal at the bends of the folds 15 and 16 in the joint lock 14 in Fig. 4, the respective widths of the several parallel sections of the folds are substantially less than the widths of the same sections in the joint lock 14 in Fig. 5 where the gauge of the metal is substantially thinner. In other words, there is greater shrinkage of metal in the production of the joint lock 14 in the thinner gauge metal than in the metal of heavier gauge. Therefore, in order to assure the same width in the locking lip 17 adequate compensation must be made in the width of the marginal portion of the sheet 13 that is fed to the rolls 12, a narrower portion being required for heavier gauges of metal in definitely calculable proportions than for the thinner gauges. To this end the gauging device 10 is adapted to be mounted adjustably upon the sheet-supporting table 11 of the machine in advance of the forming rolls 12 and in position to be engaged by the inner edge of the metal sheet 13 to guide to the forming rolls just the proper marginal width of the sheet to result in the desired width for the locking lip 17.

In a preferred form, the gauge 10 includes gauge and base plates 20 and 21, respectively, which are relatively movable for adjustment. In the present instance both of the plates are elongated in the direction of travel of the metal sheet 13, and the gauge plate 20 is adapted to be moved diagonally relative to the direction of sheet travel to effect adjustment by measured degrees for effecting predetermined variations in the width of the portion of the sheet to be fed to the forming rolls 12.

Means for guiding the gauge plate 20 for adjustment herein includes a pair of elongated diagonal slots 22 located in spaced parallel alinement adjacent to the opposite ends of the gauge plate. Passing through each of the guiding slots 22 is a bolt 23 which is threaded into the base plate 21. The shanks of the bolts 23 serve as fixed guiding posts for the slots 22 while the heads of the bolts bear against friction washers 24 when the bolts are tightened down so as to hold the gauge plate in adjusted position. As shown, the diagonal guiding slots 22 are at an acute angle to the longitudinal axis of the gauge plate 20 whereby any adjustment movement of this plate will be farther longitudinally than transversely. Preferably a finger grip such as a knurled stud 25 is provided on the gauge plate 20 to facilitate the adjustment movement thereof.

The outer edge of the gauge plate 20 projects substantially beyond the corresponding edge of the base plate 21 and has a depending flange 26 providing a shoulder against which the edge of the metal sheet 13 may abut. As best seen in Figs. 1 and 3, the shoulder flange 26 may be a straight-edge piece secured to the lower face of the gauge plate in any suitable manner as by rivets 27. In order to prevent the edge of the sheet 13 from accidental upward displacement as by sliding up off of the shoulder flange 26 due to bending of the sheet 13 in handling or otherwise, the outer edge of the gauge plate may be provided with an overhanging retaining flange or ledge 28. Centrally, the ledge 28 may be cut out as at 29 so that the edge of the metal sheet 13 may be viewed from above to ascertain whether it is abutting the shoulder 26.

The base plate 21 is preferably adjustably secured to the table 11 as by means of bolts 30 which extend through appropriate slots 31 in the table (Fig. 3). These slots 31 are preferably elongated at right angles to the path of movement of the metal sheets 31 so that the base plate may be located in different positions to effect width adjustment of the device as a whole. Thus, the device is adapted for a substantial range of adjustments longitudinally of the slots 31, and in any chosen adjusted position in this range the full range of incremental or measured adjustment of the gauge plate 20 is available.

Herein the gauging device 10 is preferably scaled for adjustment with respect to the basic width of the joint lock 14 and also with respect to the shrinkage ratio of the several gauges of sheet metal which may be used, so that the necessary adjustments can be accomplished accurately with great convenience and the width of the locking lip 17 can be maintained at a desired standard. Accordingly, the gauge plate 20 and the base plate 21 may be provided with measuring means such as a gauge scale 32, herein located on the gauge plate, and a width scale 33 located on the base plate 21 (Fig. 2). The gauge scale 32 includes indicia such as a plurality of appropriate markings 34 each of which is identified with a particular gauge of metal in a range, for example, from eighteen to twenty-eight gauge. These gauge markings 34 are located along the inner edge of the gauge plate 20 in proper measured spaced relation and are adapted to register with a marking or index point 35 in the width scale 33. Such index point 35 will represent a definite width to be had in the joint lock 14 when the gauge marking 34 which corresponds to the gauge of the metal being worked upon is in register therewith.

In practice there need be only one of the index points 35 and a substantial range of major width adjustments can be effected by altering the position of the base plate 21 longitudinally of the adjustment slots 31 in the table 11. However, after one such adjustment has been effected, other major width adjustments can be easily effected by shifting the gauge plate 20

along the guide slots 22 to relocate the shoulder 26, the slots 22 being of a length to permit a given range of such adjustments. A number of the width index points 35 may therefore be provided in the width scale 33 to define various major adjustments as to the marginal width of the sheet 13 to be fed to the forming rolls 12 in accordance with different sizes of the rolls for forming joint locks of different widths. As shown in Fig. 2, there may be three of the width index points 35 suitably differentiated by location and/or appearance such as length, each of which may represent the basic width to which the joint lock 14 will be formed for a different size of the forming rolls 12. Thus, when the forming rolls 12 are of a small size the gauging device 10 may be adjusted to effect registration of the gauge scale 32 with that one of the width marks 35 which will cause the gauge plate 20 to be in substantially the extreme extended position relative to the base plate 21 as shown in full outline in Fig. 2. Where the forming rolls are of either of the two proportionally larger sizes represented by the remaining two width marks 35, then appropriate adjustment can be effected by shifting the gauge plate to bring the gauge scale 32 into registration with the proper one of said two remaining marks 35, one such adjusted position being shown in broken outline in Fig. 2.

In the operation of the gauging device 10, the base plate 21 will be secured by the bolts 30 in adjusted position longitudinally of the adjustment slots 31 fixedly upon the table 11; and the gauge plate 20 will be moved to the desired adjusted position thereof by means of the finger grip 25 whereupon the guide bolts 23 will be tightened to lock the gauge plate in place. To effect readjustment of the gauge plate 20 it will merely be necessary to loosen the guide bolts 23 and relocate the gauge plate 20 to secure the desired measured result as determined through the cooperative medium of the gauge scale 32 and the width scale 33.

From the foregoing it will be apparent that the present invention provides a simple, inexpensive sheet metal width-gauging device which is particularly suitable for use with a Pittsburgh joint machine to secure certain definite results as to the over-all width of the joint lock and also as to the width of the locking lip of the joint lock. The device can be easily and accurately adjusted for consistently attaining uniformity of width in view of predetermined shrinkage variation factors occurring in a selective range of gauges of sheet metal to be shaped. Moreover, the range of accurate measured adjustments attainable with the device is unusually extensive.

I claim as my invention:

1. A device for gauging the width of that portion of a metal sheet which is to be fed to the forming rolls of a sheet metal shaping machine comprising, in combination, a base plate, a gauge plate having perpendicular abutment means at one edge, diagonal guiding slots located in spaced parallel alinement in said gauge plate, guiding means projecting from said base plate through said slots and also adapted for holding the gauge plate in adjusted position, a width index scale on one of said plates, and a gauge scale on the other of said plates cooperative with said width index scale.

2. A device for gauging the width of that portion of a metal sheet which is to be fed to the forming rolls of a sheet metal shaping machine comprising, in combination, a base plate arranged to be mounted stationarily, a gauging plate movably superimposed on said base plate and having a guiding edge extending beyond the base plate for engagement with the edge of the sheet and another edge set inwardly to expose a portion of the base plate, the exposed portion of the base plate having a width scale thereon and the adjacent edge of said gauging plate having a thickness scale cooperating with said width scale to indicate adjustments for different gauges of metal, one of said plates having spaced parallel slots therein and the other plate having guide means cooperating with said slots, said slots being inclined relative to the guiding edge of the gauging plate so as to impart transverse movements to the latter plate while it is being moved in a generally longitudinal direction relative to the base plate.

JOHN JENSEN.