Aug. 16, 1949. W. BIRKS 2,479,200

APPARATUS FOR OPENING SHEET METAL SEAM LOCKS

Filed April 28, 1947

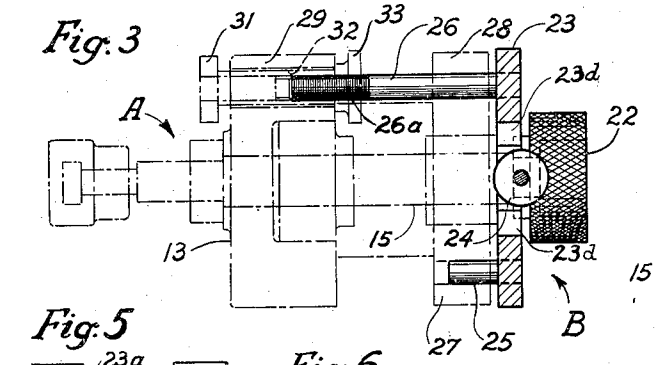


Fig. 3

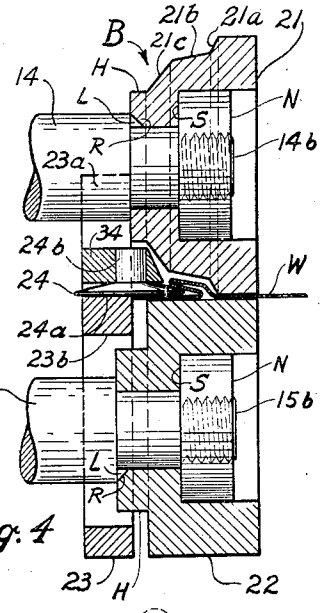


Fig. 4

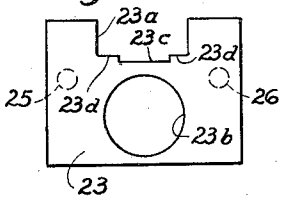


Fig. 5

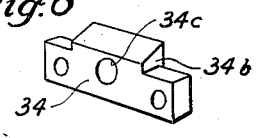


Fig. 6

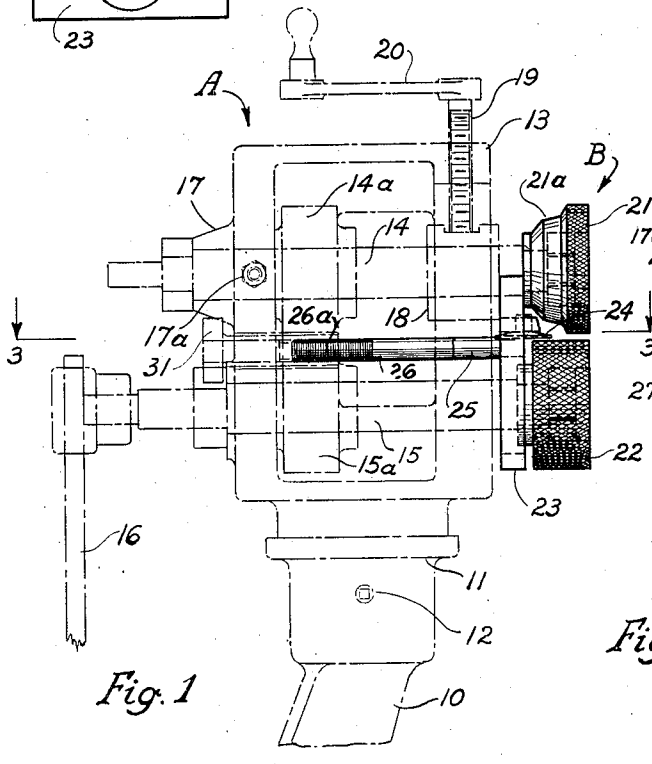


Fig. 1

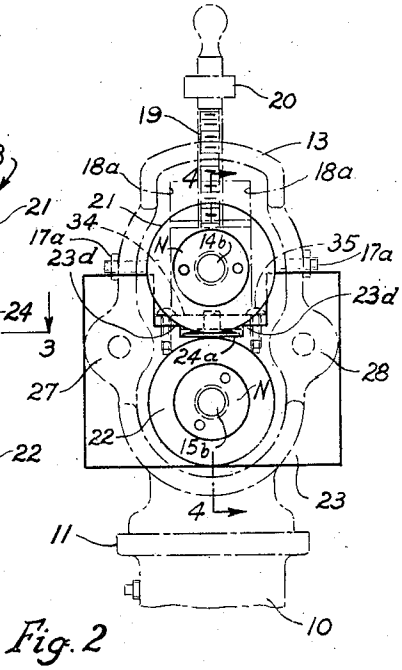


Fig. 2

INVENTOR.
William Birks
BY
Roy F. Steward
his Attorney.

Patented Aug. 16, 1949 2,479,200

UNITED STATES PATENT OFFICE

2,479,200

APPARATUS FOR OPENING SHEET METAL SEAM LOCKS

William Birks, Meriden, Conn.

Application April 28, 1947, Serial No. 744,511

19 Claims. (Cl. 153—30)

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This invention relates to apparatus for opening sheet metal seam locks; and it relates more particularly to apparatus useful in preparing, for employment in construction work, a metal sheet having its margin suitably folded to provide the continuously recessed member of a seam lock such, for example, as the so-called "Pittsburgh" lock so widely employed by sheet metal workers, especially in fabricating pipe and duct work for heating and ventilating system.

Depending upon the particular type of machine employed to fold the margin of the flat sheet in forming the "flange recess," i. e. the recess which is to receive the cooperating flange member of the seam lock, the metal folds may or may not have been forced so tightly together that before the product can be used, the walls of the recess-forming fold must be wedged or pried apart in order to permit entry of the cooperating flange member thereinto. In any event, even if the flange recess is left sufficiently open by the lock-forming machine, passing the sheet through forming or bending rolls to provide turns or other curved sections closes the lock recess, which must then be pried or wedged open.

This operation has been quite generally performed heretofore by hand, by the so-called "plow-and-hammer" method in which a screwdriver or other wedging tool is first forced into the flange recess and then driven the length of the seam by means of a hammer to open it up. Although apparatus for opening such seam locks has been proposed heretofore, none of such prior proposals has proved sufficiently satisfactory and practical to attain widespread use in the sheet metal working art. Among other disadvantages, such prior apparatus has been in the form of a machine complete in itself and useless for any other purpose; thus representing an investment frequently idle for considerable periods of time, besides being relatively heavy, cumbersome and space consuming.

A specific object of the present invention, therefore, is to overcome the disadvantages of such prior seam or lock openers by providing a set or group of cooperating seam-opening tools or tool members, constructed and arranged to be detachably assembled with the base unit of what is commonly known as a universal combination rotary machine, a type of machine on which sheet metal working tools of various kinds can be detachably mounted in order to perform different operations on sheet metal. One form of such universal rotary machine is illustrated for example in the patent to Platou 1,774,155. It is an advantage, accordingly, of the present invention that the utility of one machine need not be limited to the re-opening or flaring of lock seams, and a substantial economy in equipment is thus realized.

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Another and more general object of the invention is to provide apparatus of relatively simple construction for opening a recessed seam lock member preformed in the margin of a metal sheet, capable of operating effectively upon such work whether the work be flat or curved; in which apparatus the seam-opening tool set or group may or may not be detachable from the tool supporting and driving means.

Further objects and advantages of the invention will become apparent as the disclosure proceeds.

In order that the nature of the invention may be fully understood, an illustrative embodiment thereof affording important practical advantages is shown in the accompanying drawings and will now be described in detail. In these drawings,

Fig. 1 is a view in side elevation showing the novel tool set or group assembled in combination with supporting and driving means, the latter being provided, in this instance, by a metal working machine base unit of the universal rotary type above referred to, upon which the tool set is detachably mounted;

Fig. 2 is a view in front elevation of Fig. 1;

Fig. 3 is a view in plan of the lower part of the machine, certain parts being shown in section on line 3—3 of Fig. 1, looking in the direction of the arrows;

Fig. 4 is a fragmentary view, partly in section on line 4—4 of Fig. 2, on an enlarged scale; and

Figs. 5 and 6 are detail views in front elevation and perspective, respectively.

Referring now to the drawings, and at first more particularly to Figs. 1–3, that part of the apparatus which is designated generally as A, here shown in dotted lines for the sake of differentiation, is one characteristic form which the tool-mounting base unit often takes in the aforesaid universal rotary type of sheet metal working machine. This base unit, in and of itself, is old and well known. In accordance with the present invention, a novel seam-opening tool set shown in solid lines and designated generally as B is mounted, detachably in this instance, upon such a base unit to give a combination or complete machine assembly capable of functioning in the desired manner. The invention comprises both the combination and also, as a separate entity or sub-combination, the novel tool set.

In the operation of the apparatus, the work is fed through the machine by a pair of contra-rotating traction rolls, while a wedge-shaped flaring or spreading tool is held engaged in the flange recess between the adjacent folds of sheet metal forming this member of the seam lock. Passage of the work through the machine thus causes the flaring tool to spread apart the adjacent folds of the closed seam.

As shown in Figs. 1 and 2, the entire apparatus

is supported upon a bracket 10 having a socket 11 at its upper end, in which base unit A is mounted for pivotal adjusting movement about a vertical axis and can be fixed in any adjusted position by means of set screw 12. Bracket 10 may be provided at its base with suitable means, not shown, for clamping the apparatus to a work bench or other supporting base.

Unit A comprises a frame 13 and a pair of arbors 14 and 15 which project through opposite end walls of the frame and are suitably journaled for rotation about substantially parallel superposed horizontal axes. Lower arbor 15 is provided with fixed bearings formed in the opposite end walls of the frame and is provided at its outer end at the rear of the machine (i. e. to the left in Fig. 1) with suitable driving means, such means being in this instance a hand crank 16, although a motor may of course be employed. As is usual in base units of this type, one of the arbors is angularly movable with respect to the other in order to adjust the distance between their tool-supporting ends as may be necessary in order to properly correlate the cooperating working surfaces of the rotary tools to be attached thereto, or to facilitate inserting work between the rolls by a direct thrust parallel to their axes. In this instance, arbor 14 is journaled at the rear of the unit in a bearing 17 which is trunnioned on frame 13, as indicated at 17a, for pivotal movement about a horizontal axis perpendicular to the arbor axis. At its forward or tool-bearing end, the arbor is carried in a bearing block 18 which is laterally confined between and vertically movable in guides 18a provided at the forward end of the frame. Suitable spring means (not shown) urges bearing 18 toward its uppermost position in frame 13, and the block can be moved to and held in any intermediate position by turning the adjusting screw rod 19 which bears against the upper surface of the block, through actuation of crank 20. Keyed to arbors 14 and 15, respectively, within frame 13 are intermeshing gears 14a and 15a which cause the arbors, when driven, to rotate in opposite directions.

The set of tool members which is to be combined with unit A is indicated at B as aforesaid. It comprises traction rolls 21 and 22 which, at their forward ends, are of the same diameter, an adjustable bed or base plate 23, and a seam-opening or flaring tool 24 mounted upon the plate. Rolls 21 and 22 are rigidly but removably secured to the forward ends of arbors 14 and 15, respectively. As here shown, said rolls are hollow and are interiorly formed to permit the hub portion H of each to be slipped on over the reduced and threaded end portions 14b and 15b of the respective arbors in such manner as to effect driving engagement between a projecting lug or key L on the arbor and a cooperating recess R in the rear face of the hub; this driving engagement being maintained by turning threaded collar or nut N on the forward end of each arbor up solid against shoulder S. In order to increase the tractive effort of the rolls on the work W (Fig. 4), the rolls most desirably have their immediately adjacent peripheral working surfaces knurled. To the rear of the relatively narrow knurled working surface of upper roll 21, the roll diameter is reduced to provide inclined steps or shoulders 21a, 21b, 21c, the purpose of which will appear hereinafter. Bed plate 23, located between the rear faces of said rolls and the machine frame in perpendicular relation to the roll axes, not only serves to support flaring tool 24, but also to provide a guide or gauge against which the rear longitudinal edge of the work (i. e. the edge of the "hammer-over" margin of the "Pittsburgh" lock member with which the work is shown provided in Fig. 4) is automatically held in firm abutment as the work passes through the machine. The plate is adjustably mounted upon frame 13, for limited movement parallel to the arbors, by means of a pair of studs 25, 26, which are secured to and project rearwardly from the rear face of the plate into apertures in bosses 27 and 28, respectively, provided at opposite sides of the frame. In this instance, stud 26 extends completely through boss 28 and well into an aperture in a second boss 29 at the rear of the machine, its threaded rearmost portion 26a being engaged in an internally threaded sleeve 32 rotatable in said aperture but held against longitudinal movement. By means of operating knob 31, the sleeve may be turned to move the stud 26, and hence the bed plate, forwardly or rearwardlly as may be necessary to properly adjust the position of the gauging face of the bed plate relative to the traction rolls. Stud 25 may, if desired, be similar to stud 26, and similarly held in adjusted position; but in practice it has been found that sufficiently rigid mounting of the bed plate is attained by having stud 25 only long enough to project into the aperture in front boss 27, without being anchored therein, since when thus disposed it acts effectively both to assist in properly supporting the base plate and also to prevent turning movement thereof transversely with respect to arbors 14, 15.

The adjustability of plate 23 toward or away from the traction rolls permits accommodating work having lock seam members of different overall widths. A locking nut 33 on stud 26 engages the inner face of boss 29 to lock the plate in position after it has been adjusted to the desired position. For the purpose of allowing ample clearance relative to arbors 14 and 15, in assembling bed plate 23 with base unit A, the bed plate is provided, as shown more particularly in Fig. 5, with a generally rectangular notch 23a in its upper edge, and with a circular aperture 23b in its lower portion, these apertures being vertically alined centrally of the plate.

Flaring tool 24, which is carried by plate 23 as previously mentioned, is so mounted on said plate as to be rotatable about a fixed vertical axis, with its flaring edge projecting horizontally forward and just above the knurled periphery of roll 22, clearing it by a distance only very slightly greater than the thickness of the sheet metal to be worked. In this instance, the flaring tool consists of a circular disc 24a which is relatively thick at its center but tapers to a thin edge at its periphery. As here shown, one face (the under face) of the disc is plane, while the other slopes inwardly from the thin periphery upwardly to a central locality of maximum thickness at which there is provided an axial mounting stud or pivot pin 24b perpendicular to the plane under face or side of the disc. Notch 23a of the bed plate is deepened centrally to provide a relatively shallow rectangular recess or sub-notch 23c extending between shoulders 23d and having a uniform depth approximately equal to the maximum thickness of the flaring tool disc. Retaining bar or yoke 34, having a forwardly projecting central portion 34b apertured at 34c and a plane undersurface, is supported at its

ends on shoulders 23*d* to which it is secured by machine screws 35 after the flaring tool has been placed in position with approximately one-half of the plane face of flaring disc 24*a* bearing against the bottom of recess 23c and with mounting stud 24*b* projecting vertically upward into yoke aperture 34*c*. Said stud is received in aperture 34*c* with a bearing fit permitting free rotation but sufficiently close to prevent appreciable lateral movement. It will be seen that the axis of rotation is substantially in the plane of the parallel arbor axes. Clearance between the retaining yoke and the flaring disc where the latter is thickest (at the base of the mounting stud), while sufficient to permit free rotation of the tool, is insufficient to permit appreciable vertical movement thereof.

In operating the machine, the sheet metal work to be prepared for use can be passed through it in either direction, (i. e. right or left in Fig. 2) depending upon the angular direction in which the traction or feed rolls 21, 22, are driven. In practice, before starting a piece of work through the machine, it is usually advisable, although not indispensable, to open the closed flange recess slightly at its leading end, in order to make certain that the edge of the rotary flaring disc may at the outset be properly engaged between the walls of the recess. This initial opening may be accomplished in any suitable manner as by means of a prying or wedging tool, for example. The work, with its edge held against plate 23 as a guide, as shown in Fig. 4, can then be inserted into the pinch between the traction rolls, the flaring disc entering the opened leading end of the recess and, as the work is fed against it by the action of the traction rolls, progressively opening the recess smoothly and uniformly throughout its entire length. Instead of making use of a separate tool to effect the initial opening up of the recess at its leading end, it is often more convenient to accomplish this in another way. Thus, the gap between the traction rolls is first enlarged sufficiently, by swinging arbor 14 up through manipulation of adjusting crank 20, to permit the leading margin of the work to be thrust transversely between the rolls (i. e. parallel to their axes) despite the three thicknesses of metal at the seam, and the single-thickness portion to the rear of the seam to be forced into the small clearance between the lower roll and the now stationary horizontal flaring disc far enough to engage the "hammer-over" edge firmly against plate 23. Simultaneously the leading end of the folded flange recess is forced against the thin edge of the flaring disc, which enters and opens the recess to a depth predetermined by the setting of the bed or gauge plate. The adjusting crank 20 is then turned to force arbor 14 down until the knurled portion of roll 21 engages the sheet metal work firmly enough to exert thereon, in conjunction with roll 22, the desired tractive or feeding action when the rolls are driven by operating crank 16. At the same time, the lowering of roll 21 into this position sets the cylindrical forward portion of the roll down against the work with its rear edge or shoulder 21*a* just in front of and engaging the forward edge of the slight ridge or thickening produced by the metal folds of the flange recess, thereby preventing movement of the work forward, away from the gauge plate, which would otherwise result because of the horizontal forward reaction thrust of the flaring tool disc on the work in entering and opening the recess as the work is fed against the disc in the

ensuing operation of the machine. Furthermore, the construction and arrangement of the cooperating parts is such that deformation of the "hammer-over" or standing edge portion through being bent downwardly in the seam-opening operation is effectively prevented. In the first place, the hereinabove described mounting of the flat-bottom flaring tool on the bed plate precludes any appreciable tilting of its disc out of horizontal through the downward thrust exerted upon its margin by the work in resisting its seam-opening action. But, in addition, the entire width or depth of work margin being operated upon at any given instant is solidly backed up from below by the working surface of uniform-diameter lower roll 22, as is best shown in Fig. 4, thus ensuring smooth and accurate ironing of the work on both sides of the seam folds as they are being opened, and hence maintaining the parts of the seam lock member in proper form and alinement.

From the foregoing, it will be apparent that, by reason of its adjustable mounting on unit A, the bed or gauge plate can be set to cause the flaring tool disc to enter the flange recess to any desired depth, within practical limits, and thereby to open the recess to a corresponding predetermined extent. Moreover this action of the tool will be accurately uniform throughout the entire length of the work operated upon, because at all times during its travel through the machine, the work is positively confined and held against transverse or lateral displacement by the engagement of the gauge plate with the rear edge of the work, on the one hand, and the engagement of the aforesaid shoulder of roll 21 with the forward edge of the aforesaid thickening at the seam base, on the other. The inclined step 21*b* just to the rear of said shoulder 21*a* on the upper traction roll permits outward movement of a wall of the flange recess as the latter is entered by the flaring tool. The further inclined step 21*c* provides for clearance between the roll and the forwardly projecting portion 34*b* of retaining bar 34.

The flaring tool rotates about its vertical axis due to its frictional contact with the closed recess walls between which it progressively enters and which it wedges or plows apart as the work is fed through the machine. Much less power is required than as though the flaring tool were not rotatably mounted, and embodiments of the invention in which the flaring tool is rotatably mounted are therefore far superior and greatly to be preferred.

While, as already pointed out, the novel seam-opening apparatus will operate effectively on flat work, its ability to handle bends and curved shapes generally, always with such notably satisfactory results, is of especially outstanding practical importance for sheet metal workers. Achievement of this great advantage is made possible by the manner in which the parts of the tool assembly cooperate in the arrangement hereinabove described, whereby a curved section being operated upon is compelled, by the laterally confining effect thereon resulting from engagement therewith of the shouldered upper roll acting in conjunction with the vertical gauging face plate 23 against which the work abuts at the rear, to travel through the machine in a path parallel to and in front of said vertical gauging face. As will be apparent from Figs. 2 and 3 especially, plate 23 extends a considerable distance from the roll pinch both vertically and horizontally, thereby enhancing the above mentioned confining ef-

fect. Accordingly, regardless of their length or specific form, curved sections can be readily handled through the machine without interference with or obstruction of the travel of the work by contact with a part of the apparatus itself, or with the work bench or standard on which it is mounted, a disadvantage which has characterized some seam-opening apparatus heretofore proposed. In the apparatus of the present invention, with the novel tool set or combination assembled with the base unit and overhanging the edge of the bench (e. g.), the curved section can extend and travel either above or below, or both above and below, the bench level and in either direction, without encountering any obstruction by the bench or any part of the apparatus itself.

What is claimed is:

1. The combination, in a sheet metal working machine tool assembly which is adapted and arranged to separate adjacent folds of sheet metal work having a pre-formed seam fold along one margin, of a pair of contra-rotating, mutually cooperating traction rolls adapted to receive such work between them and to advance it through the machine, a bed plate adjacent said rolls against which the margin of such work abuts and is guided as it is advanced, and a flaring tool carried by said bed plate and projecting into the path of movement of such work, said flaring tool being adapted and arranged to enter progressively between adjacent walls of said marginal seam fold and to cause the flaring apart thereof as the work is advanced through the machine.

2. A tool set or group constructed and adapted for attachment to the base unit of a sheet metal working machine of the universal rotary type to adapt such a machine for re-opening a lock seam having a flange recess folded into the margin of sheet metal work, said set or group comprising a pair of rolls, a gauge plate and a rotary flaring tool, all as further defined in claim 1, and being adapted for assembly with the base unit of a universal rotary type machine as and for the purposes set forth in said claim.

3. In a sheet metal working machine, a detachable tool assembly comprising, in combination, a pair of mutually co-acting traction rolls, between which sheet metal work having a seam fold along one margin is adapted and arranged to be passed by the contra-rotation of said rolls, a bed plate adjacent said rolls against which the edge of the marginal seam fold abuts in passing through the machine, and a flaring tool carried by said bed plate, said tool projecting into the path of said marginal seam fold as it is advanced through the machine and adapted and arranged to enter progressively between adjacent folds of said seam fold and to effect a separation thereof.

4. In a sheet metal working machine for manipulating work having a marginal seam folded to provide a flange recess, said machine having a pair of substantially parallel arbors suitably journaled for rotation therein and driving means for rotating said arbors in opposite directions, the combination which comprises a pair of mutually cooperating traction rolls for engaging and progressing sheet metal work between them, said rolls being secured to the outer ends of said arbors and carried thereby, a guide plate against which the margin of such work abuts and is guided in passing through the machine, said plate being mounted on said machine adjacent the inner surfaces of said rolls and substantially perpendicular to their axes of rotation, and a flaring tool mounted on said guide plate to project outwardly therefrom, adapted and arranged to enter the flange recess between adjacent seam folds of such marginally seam-folded work as it progresses through the machine and to effect a separation of such adjacent seam folds.

5. A tool set or group constructed and adapted for attachment to the base unit of a sheet metal working machine of the universal rotary type to adapt such a machine for re-opening a lock seam having a flange recess folded into the margin of sheet metal work, said set or group comprising a pair of rolls, a gauge plate and a rotary flaring tool, all as further defined in claim 4, and being adapted for assembly with the base unit of a universal rotary type machine as and for the purposes set forth in said claim.

6. In a sheet metal working machine for opening lock seams having a flange recess formed in the margin of sheet metal work, said machine having a pair of substantially parallel arbors suitably journaled for rotation therein and driving means for rotating said arbors in opposite directions, the combination which comprises a vertically disposed work guiding plate against which the edge of the lock seam abuts, vertically opposed traction rolls mounted on said arbors adjacent said plate, said rolls being adapted to engage such work between their tractive surfaces and to advance it in either direction through the machine, and a flange recess opening tool carried by said work guiding plate and disposed in substantial alignment with the adjacent surfaces of said traction rolls to cause it to enter between and separate the walls of such flange recess as such work is advanced through the machine.

7. A tool set or group constructed and adapted for attachment to the base unit of a sheet metal working machine of the universal rotary type to adapt such a machine for re-opening a lock seam having a flange recess folded into the margin of sheet metal work, said set or group comprising a pair of rolls, a gauge plate and a rotary flaring tool, all as further defined in claim 6, and being adapted for assembly with the base unit of a universal rotary type machine as and for the purposes set forth in said claim.

8. In a universal rotary type sheet metal working machine the combination, with a base unit which includes a frame supporting a pair of substantially parallel power driven arbors journaled for rotation in opposite directions about superposed horizontal axes, of a set or group of tools assembled with said base unit and adapting the machine for opening the flange recess of a lock seam formed in the marginal portion of sheet metal work, said set or group comprising a vertically disposed plate member against which the seamed edge of said sheet metal work abuts and is guided in passing through the machine, means for securing said plate to the base frame, a relatively thin-edged disc secured to and supported by said plate member for rotation about a vertical axis, the diameter of said disc being substantially greater than the thickness of said plate member to cause a portion of its periphery to project horizontally beyond the face of said plate, and a pair of vertically opposed traction rolls affixed to the ends of said arbors adjacent said plate member, said rolls having peripheral surfaces which cooperate mutually at a point in substantial alignment with the projecting periphery of said disc and are adapted to engage the work

between them at such point to advance it past said disc to cause the latter to progressively enter between and separate opposite walls of said flange recess as the work is advanced through the machine.

9. The machine set forth in claim 8, in which said plate member is notched downwardly centrally of its face to provide shoulders on opposite sides of the notch and said disc is mounted between said shoulders and journaled in a yoke extending between and secured to said shoulders.

10. The machine set forth in claim 8, in which the thickness of said disc tapers outwardly from the edge thereof to provide a wedge-shaped peripheral margin on said disc.

11. The machine set forth in claim 8, in which said plate member is provided with mounting studs extending perpendicularly from the rear face of said plate member, said studs being adjustably secured in apertures provided in the frame of said machine.

12. A tool set or group constructed and adapted for attachment to the base unit of a sheet metal working machine of the universal rotary type to adapt such a machine for re-opening a lock seam having a flange recess folded into the margin of sheet metal work, said set or group comprising a pair of rolls, a gauge plate and a rotary flaring tool, all as further defined in claim 8, and being adapted for assembly with the base unit of a universal rotary type machine as and for the purposes set forth in said claim.

13. Apparatus for opening sheet metal seam locks which comprises a pair of driven rolls mounted with their axes parallel and vertically superposed, adapted and arranged to engage between their peripheries sheet metal work having a seam fold marginally pre-formed therein parallel to the adjacent end of the work, and to feed the work in a path parallel to such fold, the lower roll being of uniform diameter over its entire working face, while the upper roll is of uniform diameter over only the forward portion of its periphery and is shouldered to reduce its diameter over the remaining portion, a gauge plate mounted to present, adjacent the rear ends of said rolls but spaced therefrom, a plane gauging face perpendicular to the roll axes, the mounting of said plate being adjustable to permit moving it toward or away from the rolls, a flaring tool mounted on said plate for rotation about a vertical axis in the plane of the roll axes and having a flat-bottom circular flaring disc which projects forwardly from said gauging face to overlie closely a rear portion of the lower roll periphery and adjusting means operable to so position said plate that the horizontal distance between its vertical gauging face and the forwardmost shoulder on the upper roll is substantially equal to the distance between the rear edge of the work and the base of the seam fold pre-formed therein.

14. A tool set or group constructed and adapted for attachment to the base unit of a sheet metal working machine of the universal rotary type to adapt such a machine for re-opening a lock seam having a flange recess folded into the margin of sheet metal work, said set or group comprising a pair of rolls, a gauge plate and a rotary flaring tool, all as further defined in claim 13, and being adapted for assembly with the base unit of a universal rotary type machine as and for the purposes set forth in said claim.

15. A set of cooperating seam-opening tool members constructed and adapted for assembly with a universal type rotary sheet metal working machine base unit which includes a frame and a pair of substantially parallel contra-rotatable arbors supported thereby, said set comprising the following members which, when in such assembly, are in the hereinafter specified relationship to said unit and to each other: a pair of traction rolls mounted on said arbors and having mutually cooperating peripheral surfaces for engaging and advancing between them, upon contra-rotation of the rolls, sheet metal work having a seam fold along one margin, the advance being in a direction parallel to said fold; a guide plate supported by said frame adjacent said rolls against which the edge of the marginal seam fold abuts as the work is advanced through the machine; and a flaring tool carried by said guide plate, said tool projecting into the path of said marginal seam fold as it is advanced through the machine, and being adapted and arranged to enter progressively between the adjacent folds of the seam and to effect a separation thereof.

16. A set of cooperating seam-opening tool members as defined in claim 15, constructed and adapted for assembly with a base unit of the stated type which has its arbors horizontally disposed; the said members, when in such assembly, being in the specified relationship, with said traction rolls in vertical alignment, said guide plate having a flat face positioned adjacent said rolls at the rear thereof and perpendicular to their axes, and said flaring tool projecting horizontally from said plate toward and between said rolls.

17. A set of cooperating seam-opening tool members as defined in claim 16, in which said flaring tool is a circular disc having a wedge-shaped edge; which disc, in such assembly, is supported by said guide plate for free rotation about a substantially fixed vertical axis in the plane of the parallel horizontally disposed axes of said arbors.

18. A set of cooperating seam-opening tool members as defined in claim 17, in which said circular disc is plane on one face and is provided on the other with an axial mounting stud, while said guide plate is formed with a recess to receive said disc with its plane face seating therein; said set further including a retaining member apertured to receive said mounting stud and adapted to be secured to said plate in order, when the parts are assembled, to maintain said axis of rotation substantially fixed.

19. A set of cooperating seam-opening tool members as defined in claim 15, in which said flaring tool is a circular disc of thickness decreasing towards its periphery; which disc, in such assembly, is supported by said guide plate for free rotation about a fixed axis in the plane of and perpendicular to the parallel axes of said arbors.

WILLIAM BIRKS.

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