June 7, 1955 C. T. LANSTROM 2,710,062

HOLD-DOWN DEVICES FOR SIDE TRIMMING SHEARS

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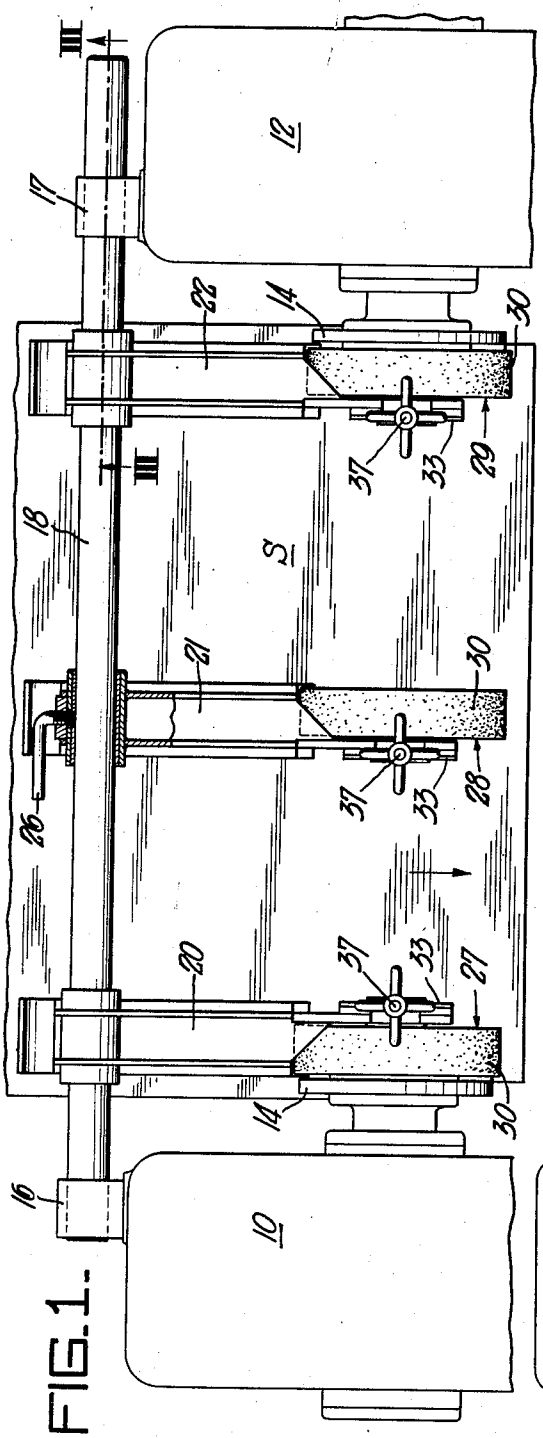

FIG. 1.

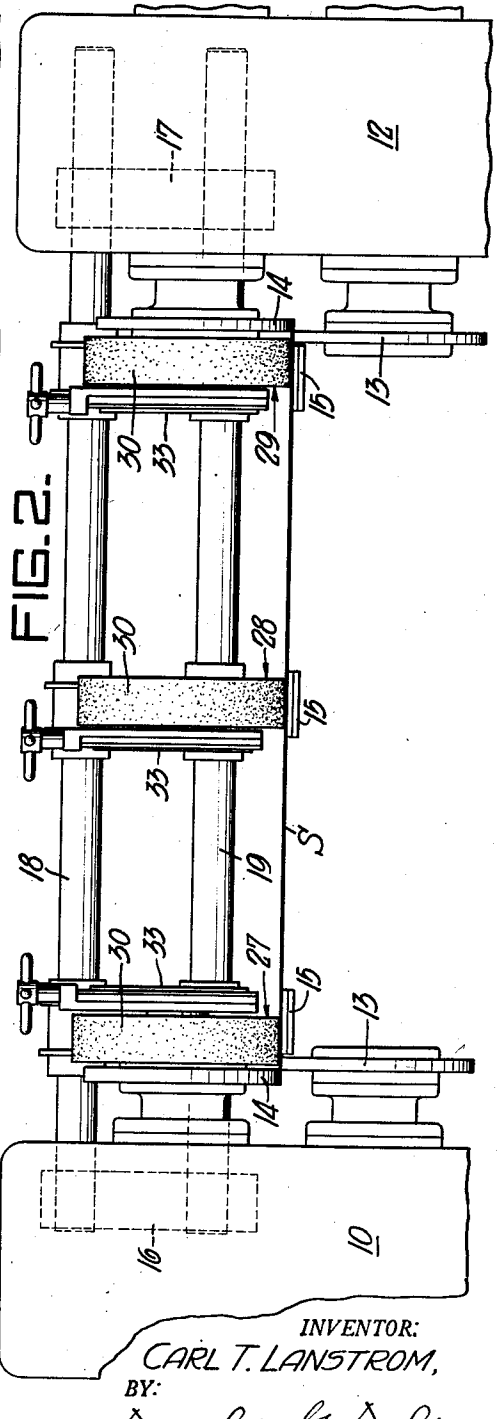

FIG. 2.

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FIG. 4.

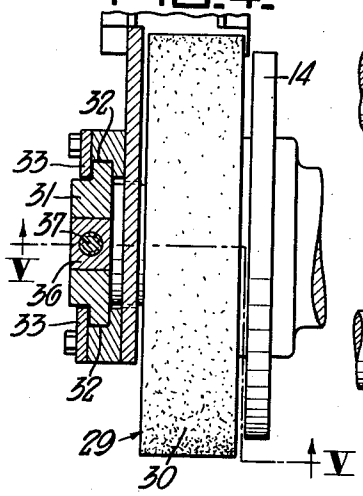


FIG. 3.

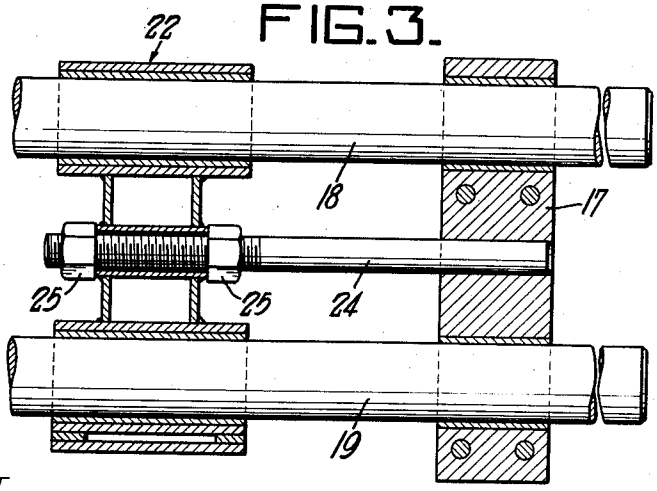


FIG. 5.

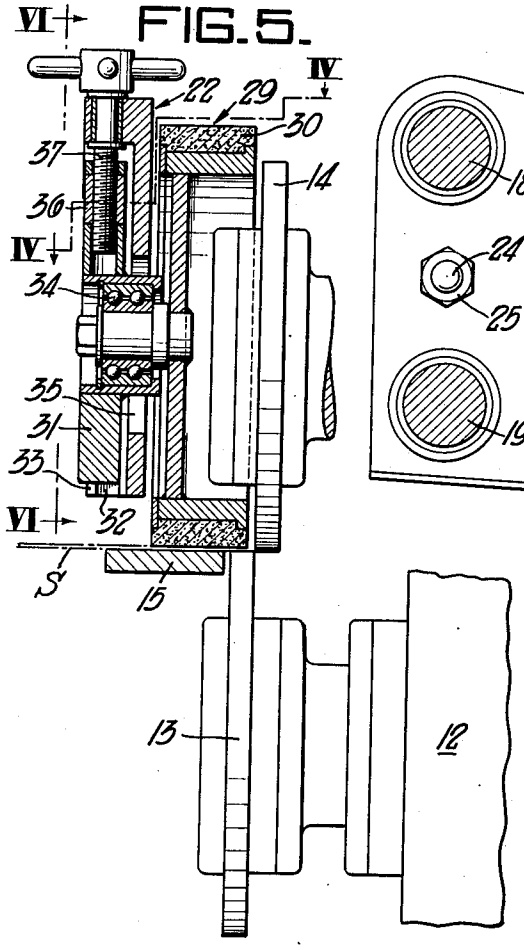
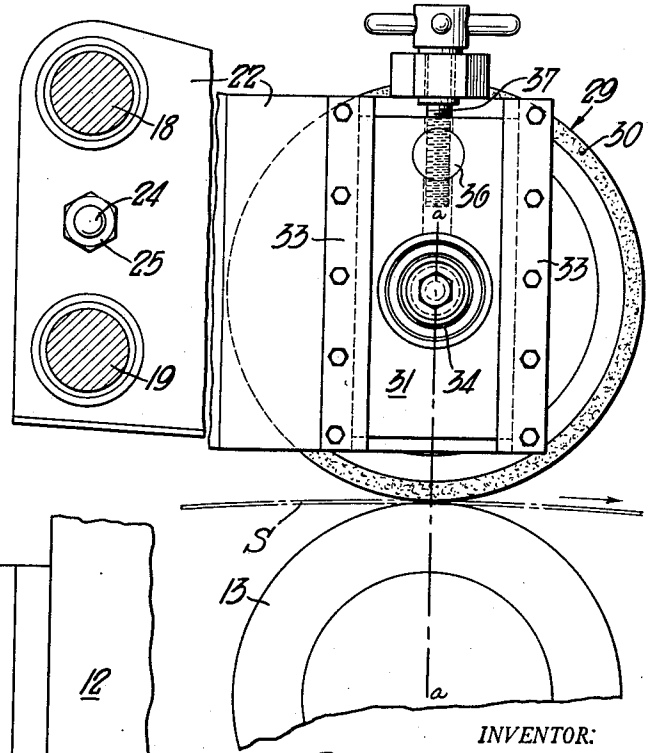


FIG. 6.



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HOLD-DOWN DEVICES FOR SIDE TRIMMING SHEARS

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Application February 8, 1952, Serial No. 270,680

7 Claims. (Cl. 164—60)

This invention relates to improved devices for holding down metal strip while passing through side trimming shears.

The practice in manufacturing metal strip is to trim its side edges so that they are uniform in the finished product. This side trimming is accomplished by feeding the strip past shears which have rotatable knives situated adjacent each side edge of the strip. Such shears require hold-down devices for retaining the strip, and previous hold-downs with which I am familiar have been in the form of fixed shoes that contact both the upper and lower faces of the strip. For steel strip the shoes are of a softer metal, such as brass, in order not to scratch the strip surface. These shoes have the disadvantage that on one face of the strip small particles produced during cutting tend to lodge between the shoe and the strip surface and seriously scratch the latter. To minimize the chance for such particles to get under the shoes, the shoes are spaced a considerable distance inwardly of the shear knives, where they do not retain the strip properly and do not always prevent cobbling and torn edges.

An object of the present invention is to provide improved hold-down devices which overcome the foregoing disadvantages; that is, they can engage the strip closely adjacent its edges to furnish proper holding action and yet eliminate the possibility of scratching the strip surface.

A more specific object is to provide improved hold-down devices which include adjustably mounted rotatable wheels engageable with the upper face of the strip adjacent its opposite side edges, whereby any particles caught on the wheel surface at most dent the strip surface without scratching it and the particles easily can be removed.

In accomplishing these and other objects of the invention, I have provided improved details of structure, a preferred form of which is shown in the accompanying drawings, in which:

Figure 1 is a top plan view of side trimming shears which are equipped with an improved hold-down device embodying features of the present invention;

Figure 2 is a front elevational view of the structure shown in Figure 1;

Figure 3 is a vertical sectional view taken substantially on line III—III of Figure 1;

Figure 4 is a horizontal sectional view taken substantially on line IV—IV of Figure 5;

Figure 5 is a vertical sectional view taken substantially on line V—V of Figure 4; and

Figure 6 is a vertical sectional view taken substantially on line VI—VI of Figure 5.

Figures 1 and 2 show somewhat schematically a pair of side trimming shears which include spaced apart housings **10** and **12**. One or both of these housings are adjustable toward and away from the center line of the strip to accommodate strip of different widths. Each housing carries lower and upper rotatable knives **13** and **14**. A continuous strip S is fed through the space between said housings and is supported on its underside by the usual shoes **15** (Figure 2). The shear and feed means are not shown in detail since they can be of any standard or desired construction. The lower knives are offset inwardly with respect to the upper knives. Consequently any loose cuttings or other particles beneath the strip tend to move outwardly away from the strip and do not lodge between the shoes **15** and the bottom surface of the strip. The lower knives in fact act as barriers against such particles reaching the shoes. However, loose particles above the strip tend to move inwardly over the strip surface where they ordinarily can lodge under the hold-down device.

The hold-down device of the present invention comprises brackets **16** and **17** mounted on the entry ends of the two housings **10** and **12**. A pair of rods **18** and **19** are fixedly supported in bracket **16** and adjustably supported in bracket **17** so as not to interfere with sidewise adjustment of the housings. Three supporting arms **20**, **21** and **22** are slidably mounted on rods **18** and **19**. Adjusting bolts **24** are fixed to brackets **16** and **17** and are adjustably received in openings through the outside arms **20** and **22** (Figure 3). Positioning nuts **25** are threadedly engaged with said bolts for holding the arms in adjusted position. Once the outside arms are adjusted with respect to the housings, it is unnecessary to vary their adjustment except to position them for knives of different thickness, although of course these arms move with the housings as the latter are adjusted to accommodate strip of different widths. During such adjustment arm **22** can move back and forth along the rods **18** and **19** with the housing **12**. The central arm **21** has a locking screw **26** engageable with one of the rods **18** or **19** (Figure 1). Normally this arm is adjusted to a position over the center line of the strip, which position varies with the width of strip.

Each of the arms **20**, **21** and **22** extends from the rods **18** and **19** to a position over the axes of rotation of the knives **13** and **14**, and each carries a wheel **27**, **28** and **29** respectively. Each of the wheels has a tire **30** that engages the strip S opposite one of the shoes **15**. As shown in Figure 6, the line of contact between the tire **30** of the wheel **29** and the upper surface of the strip S lies in the same vertical plane *a*—*a* as the axes of rotation of the upper and lower knives. The lines of contact between the tires **30** of the wheels **27** and **28** and the strip also lie in this same vertical plane. The tires are of smooth non-abrasive material, such as hard fiber, and do not scratch the strip surface. The outer faces of the outside wheels **27** and **29** are dished to receive the knife hubs as shown in Figure 5, and the tires are relatively wide to furnish a relatively long line of contact with the strip.

Figures 4, 5 and 6 show in detail the mounting means for the wheel **29** on the arm **22**, the mounting means for the wheels on the other arms being similar. This mounting means includes a vertically movable slide **31** which rides in a groove **32** in the face of the arm, where it is held by gibs **33**. The slide carries a wheel bearing **34** which extends through a slot **35** in the arm and in which the wheel shaft is rotatably journaled. The upper part of the slide carries a nut **36**. An adjusting screw **37** is journaled in the upper part of the arms and threadedly engages nut **36**, so that manual rotation of the screw raises or lowers the slide, wheel bearing and wheel.

In setting up the hold-down device, the outside arms **20** and **22** are adjusted on the rods **18** and **19** for the particular knives used in the shears. The adjustment is such that the outside wheels **27** and **29** lie closely adjacent the upper knives **14** and preferably their edges overlap the edges of the lower knives **13**, as Figure 5 shows. Next the housings **10** and **12** are positioned so that the spacing between their knives correspond with the desired strip width in accordance with usual practice. The central arm **21** then is moved to a position such that its wheel **28**

lies directly over the center line of the strip. The three wheels are raised by rotation of their adjusting screws 37 and the strip is threaded through the shears and hold-down. The wheels then are lowered by rotation of screws 37 in the opposite direction until they bear against the upper surface of the strip with the desired pressure. The strip now can be fed through the shears.

It is seen that the three wheels function as hold-downs for the strip and that the outside wheels are situated closely adjacent the knives where they prevent cobbles and torn edges. Any cuttings from the strip which come against the wheel surfaces either are thrown off by centrifugal force or easily can be cleaned off. There is no likelihood of such particles scratching the strip surface.

While I have shown and described only a single embodiment of the invention, it is apparent that modifications may arise. Therefore, I do not wish to be limited to the disclosure set forth but only by the scope of the appended claims.

I claim:

1. In a side trimming shear for metal strip which includes a pair of spaced apart housings, lower and upper rotatable knives carried by each of said housings and adapted to trim the strip edges, and shoes for supporting the strip on its underside, the combination with said housings of a hold-down device which comprises support means carried by the housings, a pair of arms carried by said support means, each of said arms being adjacent a different one of said housings and spaced inwardly thereof, wheel bearings carried by each of said arms, means on each of said arms for individually adjusting the wheel bearing thereon in a vertical direction, wheels mounted in each of said wheel bearings for rotation on axes which are independent of the axes of rotation of said knives, said wheels having smooth non-abrasive surfaces engageable with the upper face of the strip opposite said shoes and closely adjacent said knives, and additional means engageable with the upper face of the strip at its center line.

2. A combination as defined in claim 1 in which said additional means includes an arm carried by said support means, and a wheel rotatably supported by said last named arm.

3. In a side trimming shear for metal strip which includes a pair of spaced apart housings adjustable toward and away from each other, lower and upper rotatable knives carried by each of said housings and adapted to trim the strip edges, and shoes for supporting the strip on its underside, the combination with said housings of a hold-down device which comprises a support extending therebetween and being adjustably mounted on one of said housings, outside arms and a central arm mounted on said support and extending over the knife axes, wheel bearings carried by each of said arms, means on each of said arms for individually adjusting the wheel bearing thereon in a vertical direction, and wheels carried by said wheel bearings for rotation on axes which are independent of the axes of rotation of said knives, said wheels having smooth non-abrasive surfaces engageable with the upper face of the strip opposite said shoes, the wheels on said outside arms lying closely adjacent said upper knives, said central arm being adjustable along said support to enable the wheel thereon to be placed over the center line of the strip.

4. In a side trimming shear for metal strip which includes a pair of spaced apart housings adjustable toward and away from each other, lower and upper rotatable knives carried by each of said housings and adapted to trim the strip edges, and shoes for supporting the strip on its underside, the combination with said housings of a hold-down device which comprises a pair of rods fixed to one housing and adjustably mounted on the other and extending between the two housings, outside arms and a central arm mounted on said rods for adjustment therealong and extending over the knife axes, wheel bearings carried by each of said arms, means on each of said arms for individually adjusting the wheel bearing thereon in a vertical direction, and wheels carried by said wheel bearings for rotation on axes which are independent of the axes of rotation of said knives, said wheels having smooth non-abrasive surfaces engageable with the upper face of the strip opposite said shoes, the wheels on said outside arms lying closely adjacent said upper knives and having their outer faces dished to receive the knife hubs, adjustment of said central arm along said rods enabling the wheel thereon to be placed over the center line of the strip.

5. In a side trimming shear for metal strip which includes a pair of spaced apart housings adjustable toward and away from each other, lower and upper rotatable knives carried by each of said housings and adapted to trim the strip edges, said lower knives being offset inwardly with respect to said upper knives, and shoes for supporting the strip on its underside, the combination with said housings of a hold-down device which comprises a pair of rods fixed to one housing and adjustably mounted on the other and extending between the two housings, outside arms and a central arm mounted on said rods for adjustment therealong and extending over the knife axes, wheel bearings carried by each of said arms, means on each of said arms for individually adjusting the wheel bearing thereon in a vertical direction, and wheels carried by said wheel bearings for rotation on axes which are independent of the axes of rotation of said knives, said wheels having smooth non-abrasive surfaces engageable with the upper face of the strip opposite said shoes, the wheels carried by said outside arms lying closely adjacent said upper knives and having their outer faces dished to receive the knife hubs and their edges overlapping said lower knives, adjustment of said central arm along said rods enabling the wheel thereon to be placed over the center line of the strip.

6. In a side trimming shear for metal strip which includes a pair of spaced apart housings adjustable toward and away from each other, lower and upper rotatable knives carried by each of said housings and adapted to trim the strip edges, and shoes for supporting the strip on its underside, the combination with said housings of a hold-down device which comprises a support extending therebetween and being adjustably mounted on one of said housings, outside arms and a central arm mounted on said support and extending over the knife axes and having vertical slideways formed therein, wheel bearings mounted in said slideways for individual vertical adjustment, rotatable adjusting screws connecting each of said arms with the bearings mounted therein, and wheels carried by said wheel bearings for rotation on axes which are independent of the axes of rotation of said knives, said wheels having smooth non-abrasive surfaces engageable with the upper face of the strip opposite said shoes, the wheels on the outside arms lying closely adjacent said upper knives, said central arm being adjustable along said support to enable the wheel carried thereby to be placed over the center line of the strip.

7. A combination as defined in claim 6 in which the wheels carried by said outside arms have dished outer faces receiving the knife hubs.

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