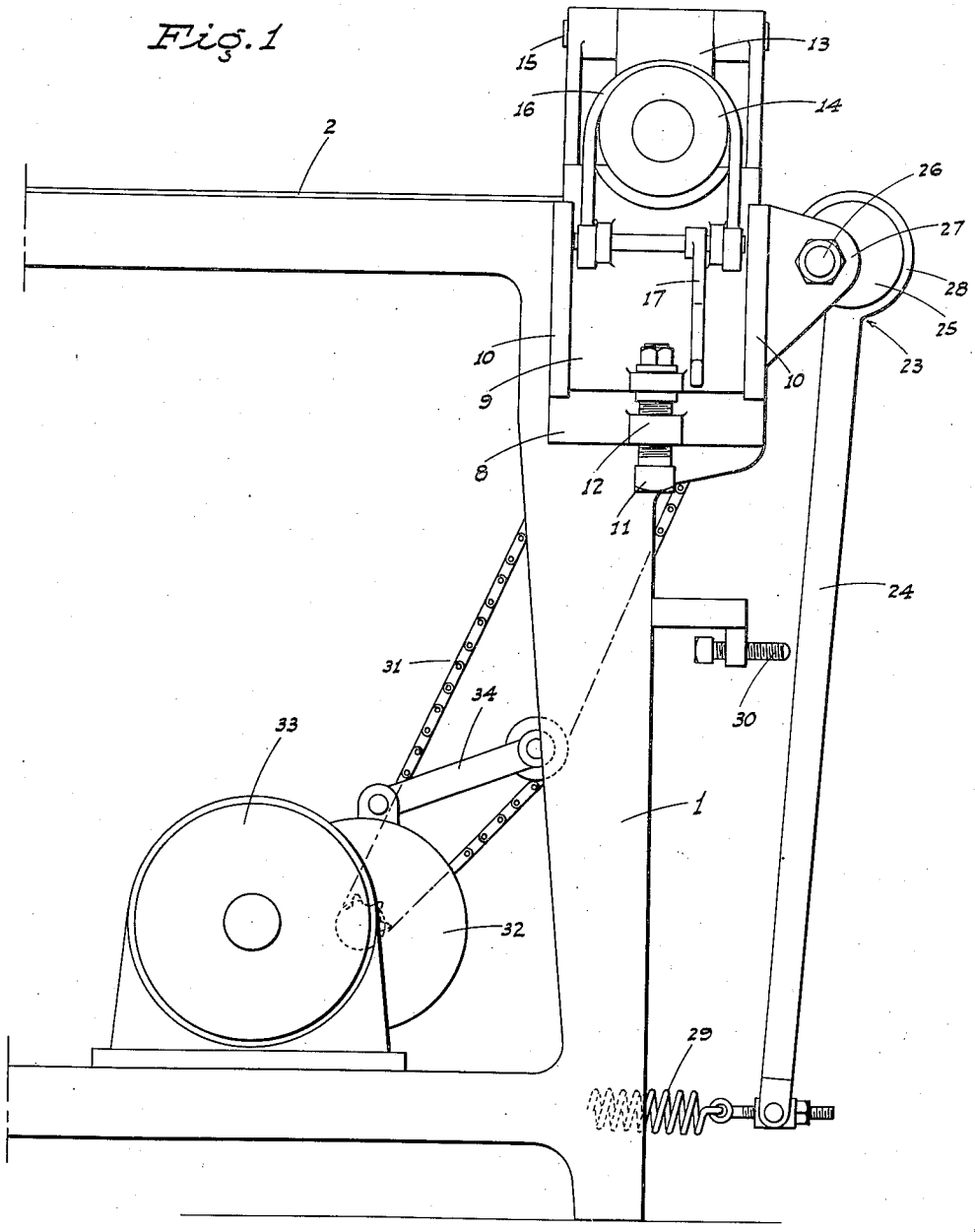
Sept. 28, 1948. A. L. GROVES 2,450,041

SHEET METAL ROLLING MACHINE

Filed March 16, 1946 3 Sheets-Sheet 1

Fig. 1



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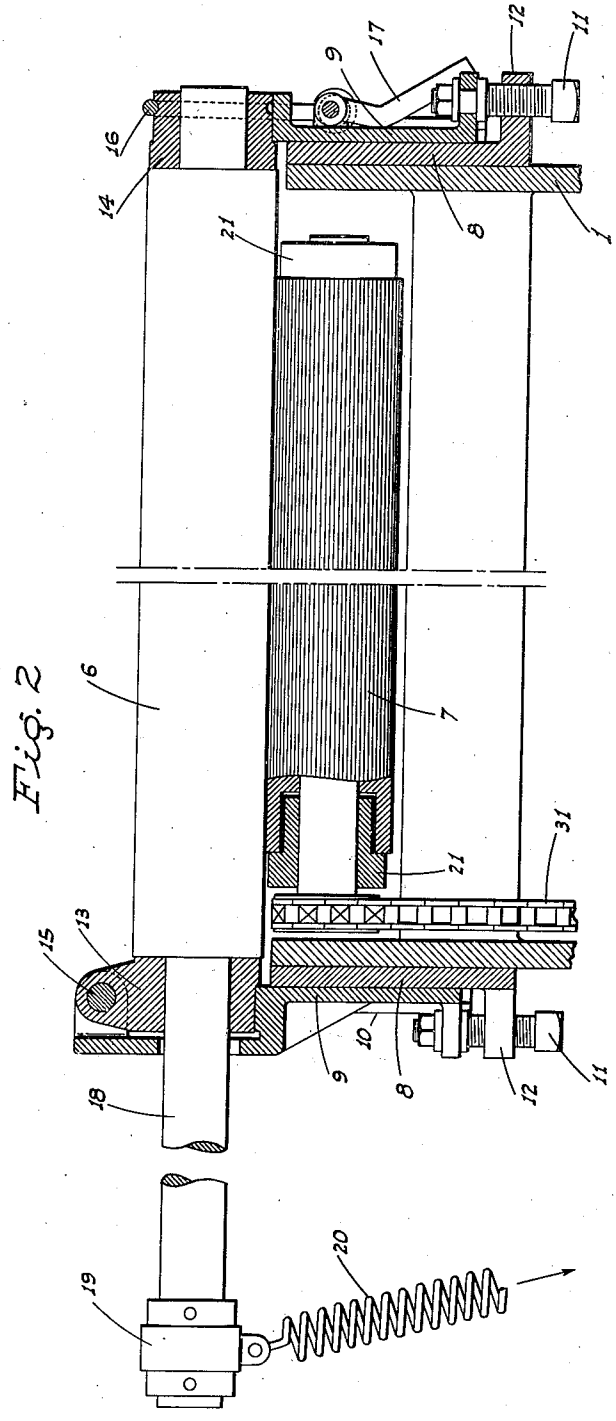


Fig. 2

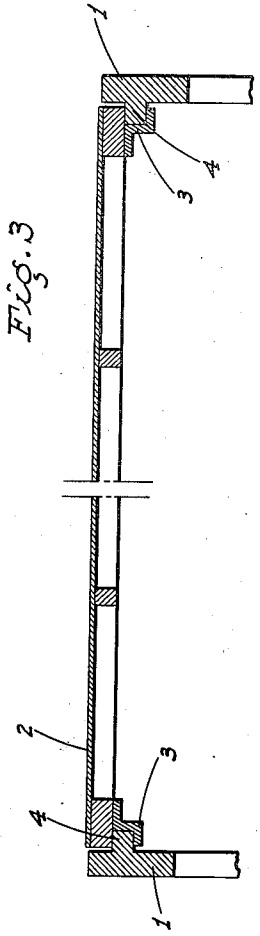


Fig. 3

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Fig. 4

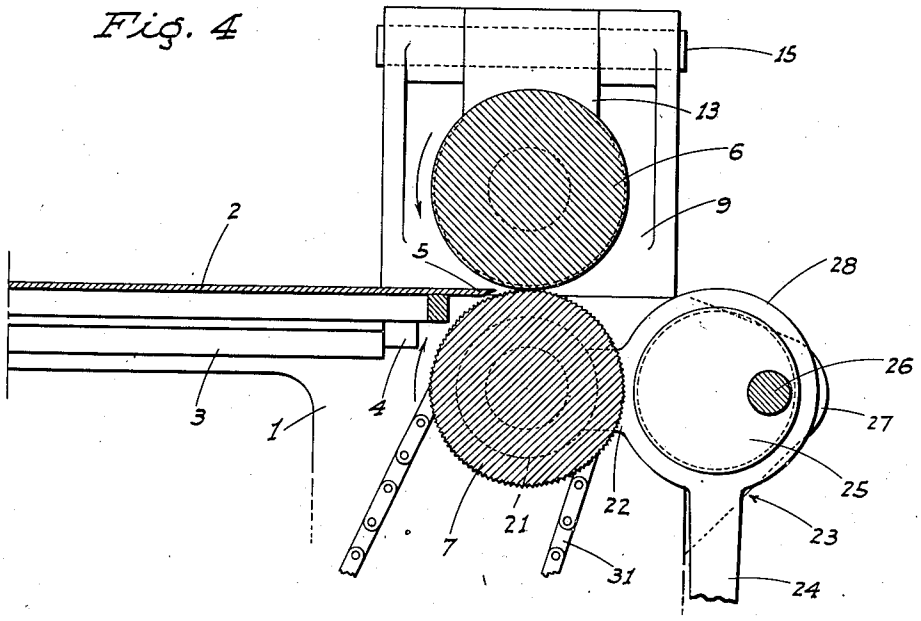
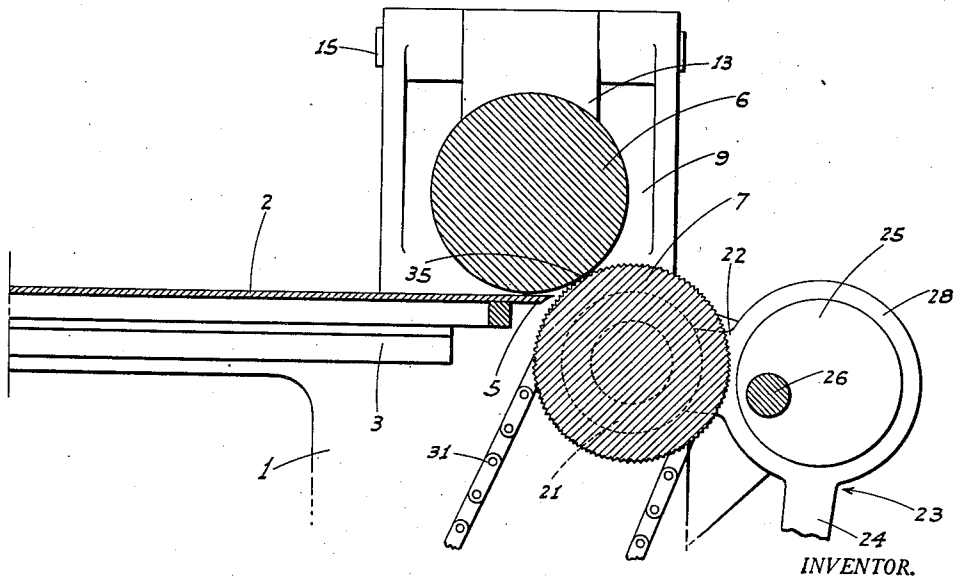


Fig. 5



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SHEET METAL ROLLING MACHINE

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Application March 16, 1946, Serial No. 654,970

3 Claims. (Cl. 153—54)

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This invention relates in general to an improved sheet metal rolling machine adapted to roll sheet metal to impart a radius thereto as is done in the manufacture of stove pipes, tubular ventilation ducts, and the like.

One object of the present invention is to provide a sheet metal rolling machine which is designed so that the intended curvature is imparted to a sheet of metal with one pass through the machine, the machine being operative to curve the sheet from edge to edge thereof leaving no unbent portion, along either edge, requiring subsequent bending.

Another object of the invention is to provide a sheet metal rolling machine which is adjustable, readily and quickly, to roll sheet metal to different radii, and such machine is also adjustable to accommodate metal sheets of different gauges.

A further object of the invention is to provide a sheet metal rolling machine which comprises a novel combination of a work supporting bed, an idler roller, and a cooperating driven feed roller; said elements of the machine being arranged so that the sheet of metal is worked by the cooperating rollers at a point closely adjacent the delivery end of the table which permits of proper support of the work and bending thereof from edge to edge without leaving any material unbent portion along either edge.

A further object of the invention is to provide a sheet metal rolling machine which is practical and effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a side elevation of the improved sheet metal rolling machine.

Fig. 2 is a fragmentary transverse elevation, mainly in section, of the adjustable roller assembly.

Fig. 3 is a cross section taken through the work supporting bed.

Fig. 4 is an enlarged, fragmentary cross section illustrating the roller assembly and the adjacent or delivery end portion of the work supporting bed; the drive roller being shown in fully retracted position.

Fig. 5 is a similar view, but shows the drive roller and bed as fully advanced.

Referring now more particularly to the characters of reference on the drawings, the improved sheet metal rolling machine comprises a rigid, upstanding table or main frame 1 fitted on top with a work supporting bed 2 which is mounted for longitudinal adjustment by means of guide channels 3 on the bed which cooperatively engage with longitudinal tongues 4 on the main frame 1.

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The work supporting bed 2 may be adjusted lengthwise by any suitable means. At one end the bed 2 includes a relatively thin, outwardly projecting delivery lip 5.

At the end of the main frame 1 adjacent the delivery lips 5, the machine includes a pair of transverse cooperating sheet metal rollers disposed one above the other in parallel relationship; the upper roller 6 being an idler, while the lower roller 7 is driven. The mounting and operation of the rollers 6 and 7 is described in detail hereinafter.

The working face of the driven lower roller 7 is serrated, as shown, and is normally disposed in peripheral working contact with the upper, idler roller 6; the delivery lip 5 of the work supporting bed 2 terminating at its outer edge in very close relationship to said point of peripheral working contact of the lower roller with the upper roller.

The main frame 1 is fitted, beyond opposite ends of the rollers 6 and 7, with rigid, upstanding heads 8, each of which is provided, on the outside, with a vertically adjustable slide 9 carried in vertical guide channels 10 on opposite sides of said heads. The slides 9 are adjustable by screws 11 which extend upwardly through outwardly projecting flanges 12 on the lower ends of the heads 8. The screws 11 are used not only to level the upper, idler roller 6 but to adjust said roller relative to the plane of the delivery lip 5, as is necessary for working in connection with sheet metal of different gauges.

The upper, idler roller 6 is supported at opposite ends by bearings, indicated at 13 and 14, respectively; the bearing 13 being hinged, as at 15, in connection with the corresponding slide 9, for swinging movement in a vertical plane. The other bearing 14 is releasably held in engagement with the corresponding slide 9 by a removable hold-down yoke 16 actuated by an off-center type latch 17 mounted on said corresponding slide. It will be seen that with release and removal of the hold-down yoke 16 from the bearing 14, that the upper, idler roller 6 may swing upwardly about the pivot 15 so as to move clear of the lower, drive roller 7, and as is necessary to permit removal of tubular work from said idler roller 6, as will subsequently appear. As the upper, idler roller 6 is relatively heavy, the shaft 18 of said roller is extended at one end and connected by a rotary collar unit 19 with a tensioned counterbalancing spring 20 which connects at its lower end to a suitable point on the main frame. This arrangement makes it much easier for the operator to lift the upper, idler roller 6 for removal of the work.

The lower, drive roller 7 is supported, at opposite ends, by bearings 21 carried on the free ends of inwardly projecting legs 22 of bellcranks, indicated generally at 23; such bellcranks each in-

cluding an elongated, depending leg 24 disposed outwardly of the adjacent end of the upstanding main frame 1.

The pivot for these bellcranks 23 comprises, in each thereof, an eccentric circular cam 25 fixed on a transverse shaft 26 which is adjustably supported, at its ends, on ears 27 which project outwardly from the head 8. The adjustable shaft 26 includes a square end for the placement of a wrench thereon and is normally held against rotation by locking nuts, as shown. Each bellcrank 23 includes an eccentric strap 28 which encircles the corresponding cam 25. Each depending leg 24 is normally urged inwardly toward the upstanding main frame 1 by a tension spring 29 connected between the lower end of such leg and the frame, there being an adjustable stop 30 for each leg 24 to limit the extent of such swinging motion of said corresponding leg.

The lower, drive roller 7 is driven at one end by an endless chain and sprocket unit 31 from a reduction unit 32 driven by a motor mounted in the upstanding main frame 1. A chain tightener 34 cooperates with the chain to maintain the same under proper tension regardless of the position of adjustment of the lower, drive roller 7.

The lower, drive roller 7 is adjustable from its fully retracted position, as shown in Fig. 4, to its fully advanced position, as shown in Fig. 5, by rotation of the shaft 26 and the cams 25; the springs 29 maintaining said lower roller in working engagement with the upper roller in all positions of adjustment of said lower roller.

When the upper and lower rollers are in direct vertical alinement, as in Fig. 4, no bending of a sheet of metal passed therebetween would result, and the extent of the bend or the radius of the bend is controlled by the advanced position of adjustment of the lower, drive roller 7. As the lower, drive roller 7 is advanced by adjustment thereof, the point of peripheral working contact of said drive roller with the idler roller is elevated—on the side of the idler roller opposite the work supporting bed—relative to said bed so that the radius of the bend which will be imparted to sheet metal work passing therethrough is progressively reduced.

In operation of the machine, the lower, drive roller 7 is first adjusted to produce a bend of desired radius in the work, and thereafter the work supporting bed 2 is adjusted so that the delivery lip 5 is disposed closely adjacent said point of peripheral working contact. At all times the bed is substantially tangential to the idler roller at the low point of the latter.

Thereafter, the lower roller is driven in the direction indicated and the sheet metal work fed from the bed 2 off the delivery lip 5 and between the rollers at the point of peripheral working contact thereof, which point is indicated, for example, at 35 in Fig. 5. With continued rotation of the lower, drive roller the work feeds upwardly and has the desired curvature or bend imparted thereto. As the delivery lip 5 is close to the point of peripheral working contact, the bend is imparted to the sheet to substantially the trailing edge thereof, thus completing the entire bend on the work with one pass through the machine.

As each piece of work is rolled to tubular form, the machine is stopped, the upper, idler roller 6 released and elevated at one end, as previously described, and the work slipped therefrom.

With the described sheet metal rolling machine, tubular work can be rolled from flat stock rapidly, effectively, and economically; the machine being simple and practical in its construction, operation and adjustment.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful and upon which Letters Patent are desired:

1. A sheet metal rolling machine comprising an upstanding frame, a work supporting bed on the frame, said bed having a delivery end, a pair of transverse, cooperating rollers, means mounting the rollers on the frame one above the other and directly beyond the delivery end of the bed, said delivery end of the bed being closely adjacent and substantially tangential to the upper roller at the low point thereof, the lower roller being mounted for adjustment to alter the peripheral working point thereof circumferentially of the upper roller on the side of the latter opposite the bed and above said low point, and means operative to drive a roller of the pair in a direction turning away from the bed at such peripheral working point; the lower roller mounting means comprising a pair of upstanding parallel bell crank levers, the lower roller being journaled at its ends on corresponding legs of the bell crank levers, means pivotally mounting said levers intermediate their ends in connection with the frame for swinging lengthwise of the latter and for adjustment in the same direction, and yieldable means connected to the bell crank levers and acting thereon in a direction to urge the lower roller toward the upper roller.

2. A sheet metal rolling machine, as in claim 1 in which the bell crank lever mounting means comprises a transverse shaft, said shaft being normally non-rotatable but rotatably adjustably mounted, circular eccentric cams on the shaft, and an eccentric strap on each bell crank lever intermediate its ends surrounding one of said cams in cooperative relation.

3. A sheet metal rolling machine comprising a frame, a work supporting bed on the frame, a roller journaled on the frame forwardly of and above the bed, an adjustable cam shaft mounted on the frame, cams on the shaft, straps surrounding the cams, projecting arms on the straps, a roller journaled in the outer ends of the arms and held in peripheral engagement with the first roller, and means to drive one of said rollers in a direction turning away from the forward edge of the work supporting bed.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
251,804	Steinbach	Jan. 3, 1882
1,406,004	Hahnemann	Feb. 7, 1922
1,486,975	Lindgren	Mar. 18, 1924
1,735,243	Hahnemann	Nov. 12, 1929
1,750,471	Hoover	Mar. 11, 1930