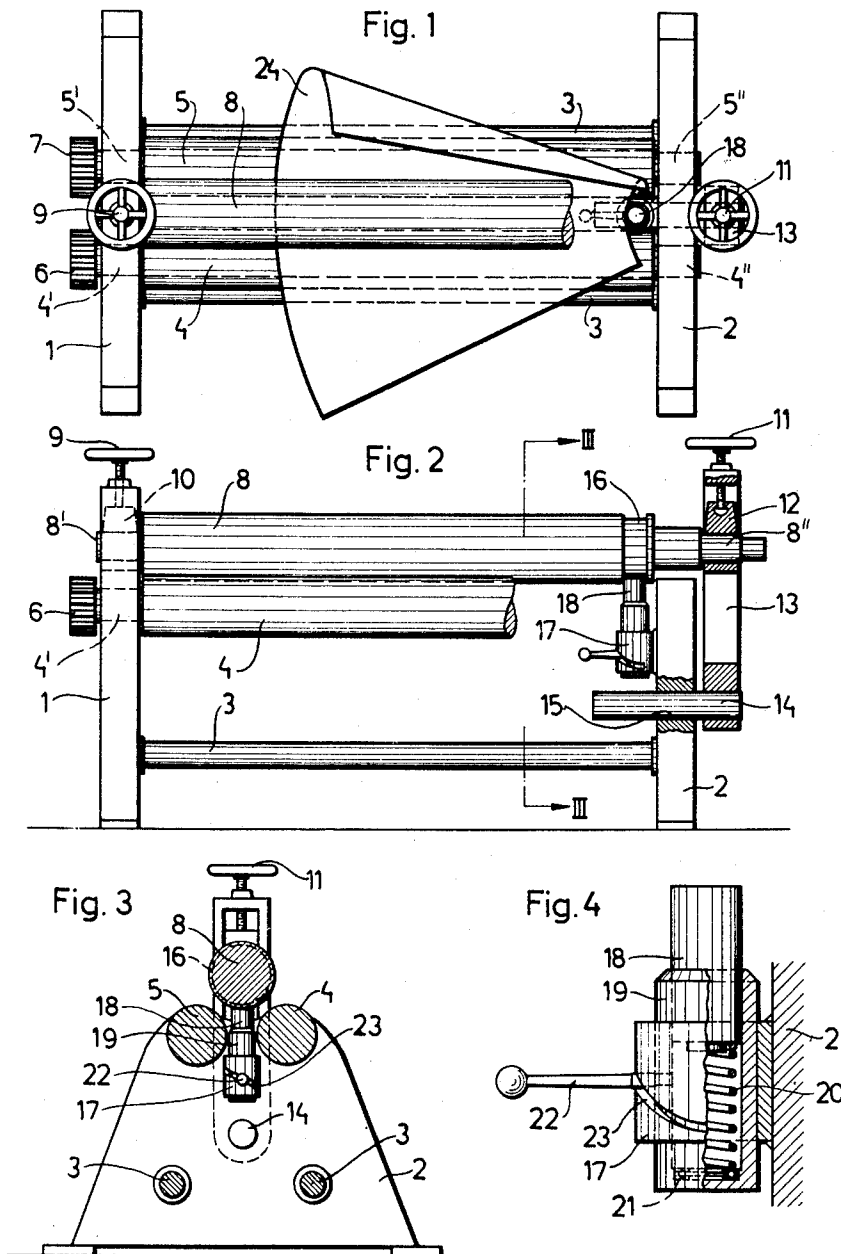


April 6, 1954

G. J. E. EKBERG
PLATE BENDING MACHINE

2,674,294

Filed Feb. 19, 1953



INVENTOR:

GUNNAR J. E. EKBERG

By: *Young, Emery & Thompson*
Attys.

UNITED STATES PATENT OFFICE

2,674,294

PLATE BENDING MACHINE

Gunnar Johan Emanuel Ekberg, Ornskoldsvik, Sweden, assignor to Aktiebolaget Broderna Ekbergs Platslagerifabrik, Ornskoldsvik, Sweden, a corporation of Sweden

Application February 19, 1953, Serial No. 337,808

5 Claims. (Cl. 153—61)

1

The present invention relates to plate bending machines of the type which operates with rolls.

Such machines involve certain well-known difficulties in respect of bending plates into conical shape.

The invention has for its object to remedy this drawback and to enable, by including auxiliary means, the bending of conical mantles and the like.

The main characterizing feature of the plate bending machine according to the invention resides in that it comprises a pin which is adapted, during the bending operation, to be moved into engagement with one of the rolls in a substantially radial direction so as to serve as an abutment for one edge of the blank to be bent.

In order to explain the invention reference is had to the accompanying drawing which illustrates an embodiment thereof and in which:

Fig. 1 is a plan view, partly broken away, of a bending machine having three rolls and incorporating the invention.

Fig. 2 is a corresponding side view thereof, also partly broken away.

Fig. 3 is a cross-sectional view thereof taken along line 3—3 in Fig. 2.

Fig. 4, to a larger scale, illustrates a part thereof in more detail.

The machine illustrated in the drawing comprises a frame consisting of two end members 1 and 2 interconnected by bars 3. In these end members two lower rolls 4 and 5, respectively, are journaled in a known manner. The journals of the rolls are indicated at 4', 4'' and 5', 5'', respectively. The journals project through the left hand end piece 1 and carry gear wheels 6 and 7, respectively. These gear wheels are engaged by a common pinion (not shown) which rotates the lower rolls in the same sense. The source of power may be an electrical motor.

The upper roll 8 of the machine is mounted with one journal 8' in a bearing 10 which is vertically adjustable in the end member 1 by means of a screw 9. Its other journal 8'' is, in a similar manner, mounted in a bearing 12 which is vertically adjustable by means of a screw 11 and is mounted in a bracket 13 on the right hand frame end member 2. The bracket 13 has a pin 14 which engages a bore or bearing 15 in the frame end member 2, and is provided with a suitable locking device whereby it can be secured to the frame end member in a vertical position.

The arrangement so far described is previously

2

known and forms no part of the invention presently claimed.

The upper roll 8 is formed near its right hand end with a circumferential groove 16. Into this groove a cylindrical pin 18 provided in a holder 17 secured to the right hand end member 2 may be engaged. The pin 18 is guided in a sleeve 19 and is supported in the sleeve on a helical spring 20 the lower end of which is supported on a thrust bearing 21 of the anti-friction type disposed on the bottom of the sleeve, whereby the pin 18 will be easily rotatable in the sleeve 19. The sleeve 19, in its turn, is displaceably and rotatably mounted in the socket-shaped holder 17 attached to the frame end member 2 and is provided with a lever or handle 22 which projects through an inclined slot 23 in the holder 17. It will thus be possible, by rocking the lever 22 along the slot, to adjust the pin 18 vertically so as to cause the same to be engaged into or withdrawn from the circumferential groove 16 in the upper roll 8.

To bend sheet-metal plates into cylindrical shape the machine is operated in the conventional manner in which case the pin 18 is retracted from the groove 16 in the upper roll 8.

On the other hand, if a piece of sheet-metal is to be bent into conical shape, the pin 18, in the manner described in the foregoing, is engaged into the groove 16. The upper roll 8 is set at an angle by means of the screws 9 and 11 causing the bending radius to be greater at the left hand end of the machine than at the right hand end thereof where the pin 18 is engaged in the groove 16. The plate 24 to be bent is introduced between the upper roll 8 and the lower rolls 4, 5 and is fed through the machine. Due to the inclination of the upper roll, the plate, during the bending operation, will be kept pressed against the pin 18 which will also exert a certain braking action on the plate edge supported on the same, the opposite edge portion of the plate being advanced at a greater rate due to the inclination of the upper roll, so that the plate will twist and get the desired conical shape.

After the bending operation the bracket 13 may be pulled slightly outward and be turned laterally whereby the bent plate can be removed from the machine.

Owing to the spring 20, the pin 18 will be kept automatically in engagement with the upper roll in every adjusted angular position of the latter.

It will be understood that the embodiment described in the foregoing and illustrated in the accompanying drawing is susceptible of various

modifications within the scope of the appended claims.

What I claim is:

1. In a plate bending machine, a frame, two parallel cylindrical rolls rotatably mounted in said frame and adapted to be driven in the same direction, a third cylindrical roll situated substantially in the median plane between the two first-mentioned rolls and freely rotatably mounted in said frame in adjustable bearings permitting said third roll to be inclined relatively to the two first-mentioned rolls for producing conical bends, a tubular support mounted in fixed relation to said frame adjacent one end of said third roll and substantially perpendicularly to its axis, and a pin slidably mounted in said tubular support and movable into engagement with the periphery of said third roll to serve as an abutment for the edge of a plate when producing a conical bend.

2. In a plate bending machine, a frame, two parallel cylindrical rolls rotatably mounted in said frame and adapted to be driven in the same direction, a third cylindrical roll situated substantially in the median plane between the two first-mentioned rolls and freely rotatably mounted in said frame in adjustable bearings permitting said third roll to be inclined relatively to the two first-mentioned rolls for producing conical bends, said third roll being provided with a peripheral groove adjacent one end, a tubular support mounted in fixed relation to said frame adjacent the grooved end of said third roll and substantially perpendicularly to its axis, and a pin slidably mounted in said tubular support and movable into engagement with said peripheral groove to serve as an abutment for the edge of a plate when producing a conical bend.

3. In a plate bending machine, a frame, two parallel cylindrical rolls rotatably mounted in said frame and adapted to be driven in the same direction, a third cylindrical roll situated substantially in the median plane between the two first-mentioned rolls and freely rotatably mounted in said frame in adjustable bearings permitting said third roll to be inclined relatively to the two first-mentioned rolls for producing conical bends, said third roll being provided with a peripheral groove adjacent one end, a tubular support mounted in fixed relation to said frame adjacent the grooved end of said third roll and substantially perpendicularly to its axis, and a pin rotatably mounted in said tubular support and being slidable therein into engagement with said peripheral groove to serve as an abutment for the edge of a plate when producing a conical bend.

4. In a plate bending machine, a frame, two parallel cylindrical rolls rotatably mounted in said frame and adapted to be driven to the same

direction, a third cylindrical roll situated substantially in the median plane between the two first-mentioned rolls and freely rotatably mounted in said frame in adjustable bearings permitting said third roll to be inclined relatively to the two first-mentioned rolls for producing conical bends, said third roll being provided with a peripheral groove adjacent one end, a tubular support mounted in fixed relation to said frame adjacent the grooved end of said third roll and substantially perpendicularly to its axis, a sleeve member mounted in said tubular support and adjustable therein in axial direction, and a pin yieldingly and rotatably mounted in said sleeve member and movable therewith into engagement with said peripheral groove to serve as an abutment for the edge of a plate when producing a conical bend.

5. In a plate bending machine, a frame, two parallel cylindrical rolls rotatably mounted in said frame and adapted to be driven in the same direction, a third cylindrical roll situated substantially in the median plane between the two first-mentioned rolls and freely rotatably mounted in said frame in adjustable bearings permitting said third roll to be inclined relatively to the two first-mentioned rolls for producing conical bends, said third roll being provided with a peripheral groove adjacent one end, a tubular support mounted in fixed relation to said frame adjacent the grooved end of said third roll and substantially perpendicularly to its axis, a sleeve member slidably mounted in said tubular support and provided with an arm extending through an inclined slot in said support so as to be adjustable in axial direction, a thrust bearing mounted in said sleeve member, a helical spring carried by said thrust bearing, and a pin resting on said helical spring and being movable together with said sleeve member into engagement with said peripheral groove to serve as an abutment for the edge of a plate when producing a conical bend.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
16,395	Ostrander	Jan. 13, 1857
49,045	Valentine	July 25, 1865
401,216	Sagendorph	Apr. 9, 1889
760,406	Gregersen	May 17, 1904
965,171	Erickson	July 26, 1910
1,669,957	Wagner	May 15, 1928
2,410,603	Dubosclard	Nov. 15, 1946

FOREIGN PATENTS

Number	Country	Date
314,807	Germany	Oct. 14, 1919