

April 30, 1946.

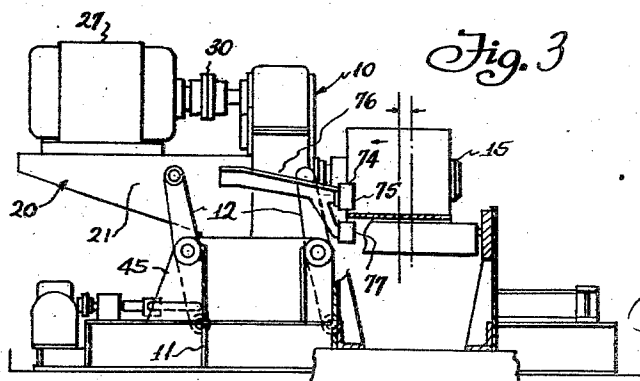
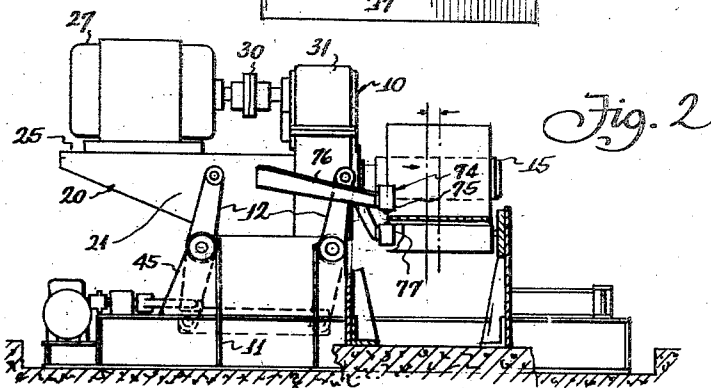
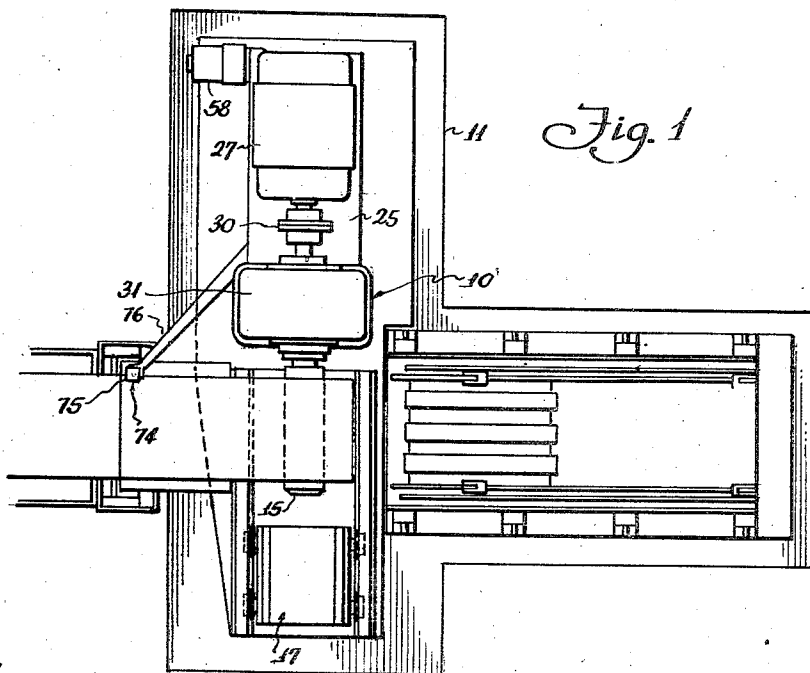
F. J. WOOD

2,399,418

REELING DEVICE FOR STRIP METAL

Filed July 10, 1944

3 Sheets-Sheet 1



INVENTOR
Frank J. Wood
CLARENCE J. POSE
ATTORNEY

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F. J. WOOD

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Fig. 4

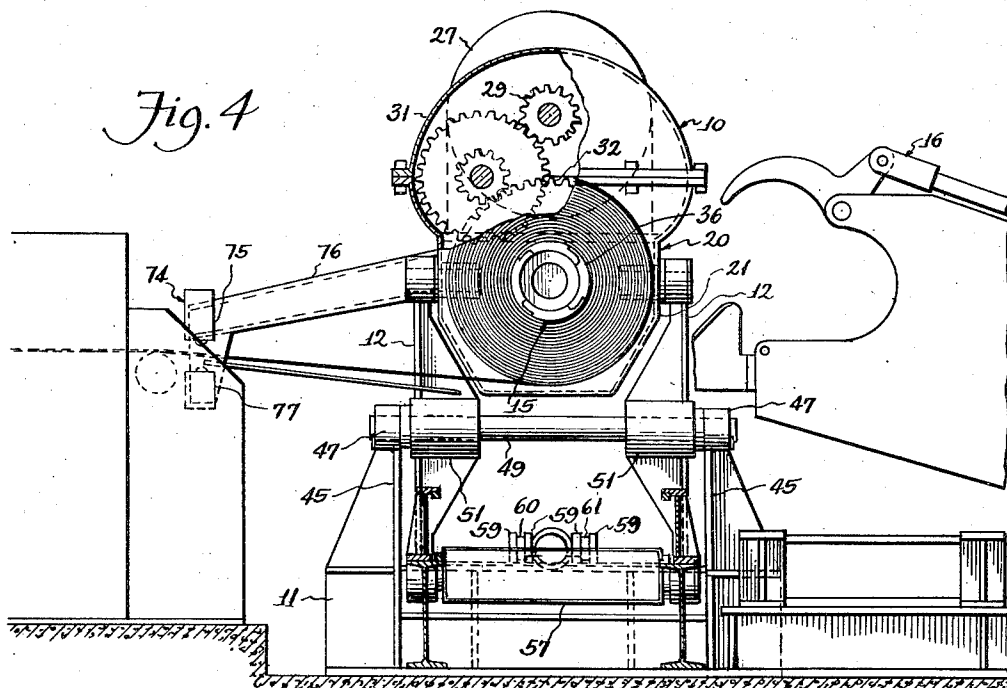


Fig. 7

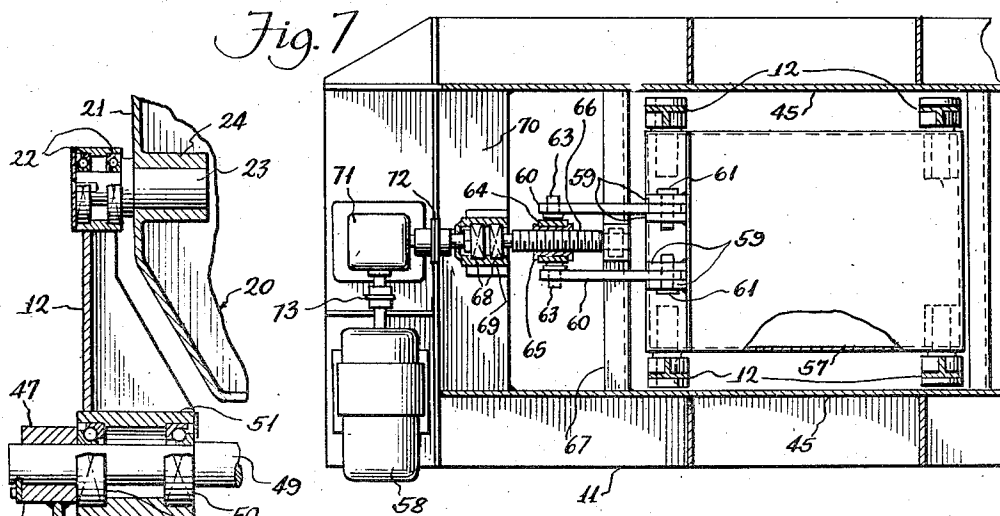
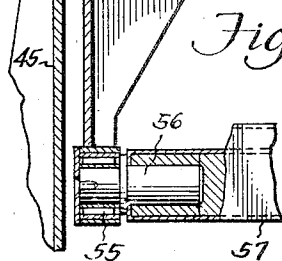


Fig. 6



INVENTOR
Frank J. Wood
Clarence F. Poole
 ATTORNEY

April 30, 1946.

F. J. WOOD

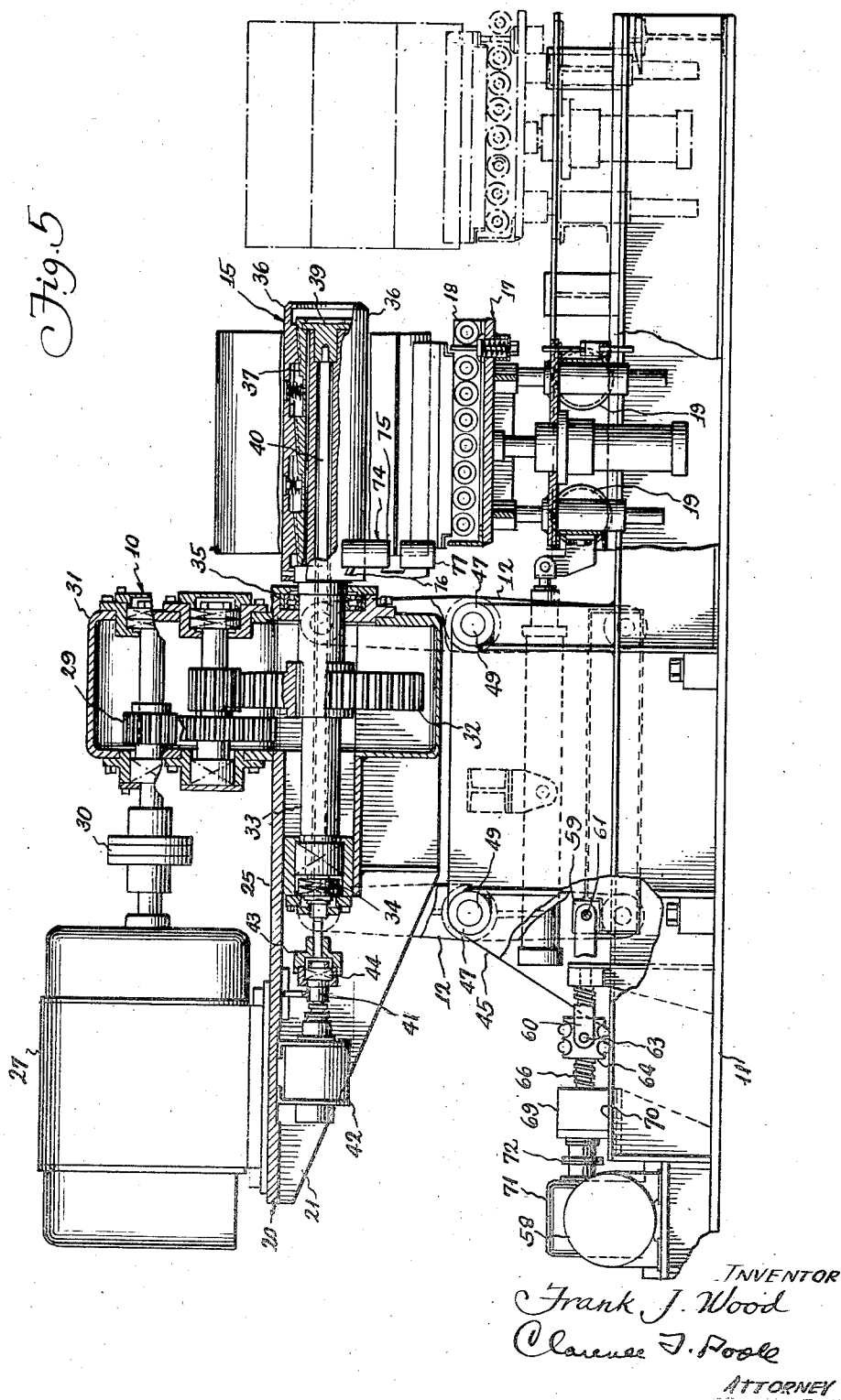
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Fig. 5



UNITED STATES PATENT OFFICE

2,399,418

REELING DEVICE FOR STRIP METAL

Frank J. Wood, Riverside, Ill., assignor to Goodman Manufacturing Company, Chicago, Ill., a corporation of Illinois

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10 Claims. (Cl. 242-76)

This invention relates to improvements in reeling devices for strip metal, and more particularly relates to an improved floating reeling device adapted to follow the strip metal as it moves laterally from side of side during the coiling operation so as to provide a coil with aligned edges.

Floating reels for strip metal have heretofore been used. These reels have usually been mounted in rectilinear guides and have been moved back and forth in these guides, as the strip metal weaves back and forth during the coiling operation, by means of a reversible motor. Movement of the reel has been controlled by means of a photo-electric scanning head, which is focused on the edge of the strip so that whenever the edge of the strip gets off center, an electrical impulse is initiated which starts the reversible motor in one direction or another, to cause the reel to follow the strip and keep the edges of the coil square. Such floating reels have not been entirely satisfactory in that the reeling mechanism is quite heavy and an undue amount of power is required to shift the reeling mechanism back and forth with the strip metal, and chattering is present during the shifting operation, due to this weight of the reeling mechanism, which impairs the sensitivity of movement of the reeling device and results in difficulty in guiding and mounting the reeling mechanism for rectilinear movement with the strip.

The principal objects of my invention are to overcome these difficulties by providing an anti-friction support for a reeling device for strip metal, permitting the reeling device to be moved back and forth with the strip metal, as it weaves from one side to the other, with a minimum amount of effort, including means moving in opposite phase relationship with respect to the reeling device for counterbalancing the weight thereof, to increase the sensitivity of movement of the reeling device and to reduce the power required to shift it back and forth.

A more specific object of my invention is to provide a novel form of counterbalanced anti-friction mounting for a reeling device for strip metal, which includes a plurality of parallel links journaled intermediate their ends for rocking movement in a vertical plane, forming an anti-friction support for the reeling device at their upper ends and moved back and forth by power upon back and forth weaving movement of the strip metal.

Other objects of my invention will appear from

time to time as the following specification proceeds, and with reference to the accompanying drawings wherein:

Figure 1 is a plan view in outline of a reeling device constructed in accordance with my invention;

Figure 2 is an outline view in side elevation of the reeling device shown in Figure 1;

Figure 3 is a view in side elevation somewhat similar to Figure 2, but showing the reeling device in a different position than in Figure 2;

Figure 4 is an enlarged end view of the reeling device, showing in outline a belt wrapper in a withdrawn position, for initially coiling the metal on the reel;

Figure 5 is an enlarged side view of the reeling device with certain parts broken away and certain other parts shown in substantially longitudinal section;

Figure 6 is an enlarged detail fragmentary transverse sectional view, showing certain details of the anti-friction mounting for the reeling device on its supporting base; and

Figure 7 is a partial fragmentary detail plan view showing certain details of the power drive connection, for moving the reeling device back and forth with the strip metal.

In the embodiment of my invention illustrated in the drawings, a reeling device 10 for the strip metal is shown as being mounted on a base 11 on the upper ends of a plurality of upright parallel links 12, 12, for movement with respect to said base in a direction laterally of the strip metal to permit said reeling device to move back and forth with the strip metal, to conform to back and forth weaving movement thereof as it is being coiled on an expansible reel or block 15, so as to keep the edges of the turns of the coiled strip metal in alignment with each other.

A belt wrapper 16 of a well known form is shown in outline in a withdrawn position with respect to the reel 15 (see Figures 1 and 4). Said belt wrapper serves to initially guide and wind the strip metal on said reel in a well known manner, and is withdrawn from the reel after the metal has been initially started thereon, and said reel has been expanded to firmly grip the metal.

The coiled strip metal is removed from the reel 15 by means of a coil supporting carriage 17. Said carriage may be of any well known form and, as herein shown, consists of a roller platform 18 which may be elevated to lift the weight of the coil from the reel 15, when said reel is retracted, and which is moved away from

said reel to remove the coil from the end thereof. Said carriage is suitably guided on the base 11 for movement away from the reel, on flanged wheels 19, 19. The details of construction of said carriage and the means for elevating said platform and for moving said carriage towards or away from said reel, are no part of my present invention so need not herein be shown or described in detail.

The reeling device 10 includes a frame 20 having a pair of parallel spaced side walls 21, 21. Said frame is journaled on the upper ends of the parallel links 12, 12 on spaced anti-friction bearings 22, 22 (see Figure 6). Said bearings are herein shown as being ball bearings and form an anti-friction support for stub shafts 23, 23 projecting laterally from opposite side walls of said frame, and are also arranged to take care of all side thrusting loads which may be imparted to said links through said frame, during the coiling operation. Said stub shafts are mounted in inwardly extending bosses 24, 24, formed integrally with the side walls of said frame.

The frame 20 has a top platform 25, which has a motor 27 mounted thereon for rotatably driving the reel 15. The drive connection from said motor to said reel includes a gear reduction train 29 driven by said motor through a flexible coupling 30. Said gear reduction train is enclosed in a split casing 31 mounted on the frame 20 and extending beneath the top platform 25, and has a gear 32 as a final drive element, which is keyed on a hollow shaft 33, for driving said shaft from said motor. Said shaft projects outwardly from said casing and is journaled at its inner end in said frame and casing on ball bearings 34, 34, and is journaled intermediate its ends, adjacent the outer end of said frame and casing, on a radial thrust bearing 35. The reel 15 is mounted on and driven from the projecting end of said shaft.

The reel 15 may be of any well known form and as herein shown includes a plurality of expandible segments 36, 36 mounted on and expanded by means of wedge-shaped cams 37, 37, which are mounted on said shaft for rectilinear movement therealong, and which are driven from said shaft (see Figure 5). Said cams are engaged at their outer ends by a cap piece 38, slidably mounted in the outer end of said shaft, and are moved along said shaft upon rectilinear movement of said cap piece. A rod 40 journaled within said hollow shaft is secured to said cap piece at one of its ends and is connected at its opposite end with a piston rod 41, extensible from a fluid pressure cylinder 42. The connection from said rod to said piston rod includes a connecting member 43 mounted on said piston rod on a thrust bearing 44, so as to rectilinearly move said rod upon movement of said piston rod, and to permit said rod to rotate with said shaft and reel during the coiling operation. Fluid under pressure may be supplied to the head and piston rod ends of said cylinder, to expand said reel or to permit it to retract in any well known manner, which is not herein shown or described in detail since it is no part of my present invention.

Referring now in particular to the details of the floating mounting of the frame 20 and reeling device 10 on the base 11, said base is provided with two parallel spaced upright walls 45, 45. Each of said walls has a boss 47 mounted at each end of its upper edge. Said bosses on

opposite side walls are in alignment with each other and are adapted to form supports for the ends of shafts 49, 49 extending transversely of said coiling device. Said shafts form supports for the parallel links 12, 12, each of which links is mounted thereon, adjacent the inside of each wall, on a pair of spaced anti-friction bearings 50, 50. Said anti-friction bearings are herein shown as being ball bearings arranged to take care of all side thrusting loads imparted to said links during the coiling operation. Each pair of said bearings is mounted within a bearing support boss 51, formed intermediate the ends of each link.

The lower ends of the parallel links 12, 12 have anti-friction bearings 55, 55 mounted therein. Each of said anti-friction bearings has the outer end of a stub shaft 56 journaled therein, the inner end of which shaft extends from a counterweight 57 mounted between and connecting the lower ends of said parallel links together, and moving in opposite phase relationship with respect to the reeling device 10, to counterbalance the weight thereof and cut down the effort required to move said reeling device back and forth.

The counterweight 57, links 12, 12 and reeling device 10 are held in a fixed position or are moved to cause said reeling device to follow the strip metal by means of a reversible motor 58. The connection between said motor and counterweight includes two pair of parallel spaced ears 59, 59 mounted on the end of said counterweight opposite from the reel 15. A link 60 is adapted to be pivotally connected between each pair of said ears by means of a pivotal pin 61 (see Figure 7). The opposite ends of said links are mounted on trunnion shafts 63, 63, projecting from opposite sides of a split collar 64, journaled on a sleeve 65 threaded on a threaded shaft 66. Opposite ends of said threaded sleeve are flanged so as to cause said collar to move rectilinearly there-with upon rotation of said threaded shaft. Said threaded shaft is journaled at one of its ends in a cross frame member 67, connected between the side walls 45, 45 of the base 11, and is journaled at its opposite end in bearings 68, 68, mounted in a bearing support member 69, mounted on a top plate 70 of said base.

The threaded shaft 66 is driven from a speed reducer 71 through a coupling 72 which is driven from the motor 58 through a flexible coupling 73. Thus rotation of said motor will pivot said parallel links about the axes of the shafts 49, 49, which will move the reeling device 10 with the strip metal in a direction opposite to the direction of movement of the counterweight 57, so the reel 15 may follow the strip metal during lateral weaving movement thereof.

The control means for the motor 58, which causes the reeling device 10 to follow the strip metal during lateral weaving movement thereof, includes a photo-electric scanning head 74 mounted on and movable with said reeling device. Said scanning head includes a source of light 75 mounted on an arm 76, which projects from the frame 20 of said reeling device, towards the strip metal. As herein shown, said source of light is positioned so as to be focused at the edge of the strip metal, and project its light to a photo-electric cell 77, which is disposed beneath the path of travel of the strip metal and which is also mounted on said arm 76. Whenever the edge of the strip metal gets slightly off center, an electrical impulse is initiated which results in

starting the motor 58 in one direction or another, to shift the reel about the axes of the shafts 49, 49 to the correct position of the reel with respect to the metal, to keep the edges of the coil in alignment with each other. As soon as the edge of the strip is exactly centered under said source of light, there is no signal to move, and the reel stays stationary. Said photo-electric cell and the control means initiated thereby for starting and stopping the motor 58, may be of any well known form and are no part of my present invention so are not herein shown or described in detail.

While I have shown and described one form in which my invention may be embodied, it will be understood that the construction thereof and the arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting my invention to the specific embodiment illustrated, excepting as it may be limited in the appended claims.

I claim as my invention:

1. In a reeling device for strip metal, a frame, an expansible reel mounted on said frame and overhanging one end thereof, means mounted on said frame for rotatably driving said reel, means for mounting and for moving said frame and reel laterally with the strip metal to conform to back and forth weaving movement thereof during the coiling operation including a plurality of parallel links, bearing means for pivotally mounting said links intermediate their ends, and bearing means for supporting said frame on the upper ends of said links.

2. In a reeling device for strip metal, a frame, an expansible reel mounted on said frame and overhanging one end thereof, means mounted on said frame for rotatably driving said reel, means for mounting said frame for back and forth movement during the coiling operation to correspond to back and forth weaving movement of the strip metal including a plurality of parallel links, bearing means for mounting said parallel links intermediate their ends, for pivotal movement towards and from the strip metal, bearing means for supporting said frame on the upper ends of said links, a reversible motor connected with the lower ends of said links, for moving said links and frame back and forth during the coiling operation, and a counterweight journaled on the lower ends of said links to counterbalance the weight of said frame and reel.

3. In a reeling device for strip metal, a base, a frame, an expansible reel mounted on said frame and overhanging one end thereof, means mounted on said frame for rotatably driving said reel, means for moving said frame and reel with respect to said base, to conform to the back and forth weaving movement of the strip metal, and a bearing mounting for said frame on said base, supporting said frame and reel for back and forth movement with respect to said base including a plurality of parallel links journaled on said base intermediate their ends, bearing mountings for said frame on one of the ends of said links, and power means operatively connected with the opposite ends of said links for moving said links and frame back and forth during back and forth weaving movement of the strip metal.

4. In a reeling device for strip metal, a base, a frame, an expansible reel mounted on said frame and overhanging one end thereof, means mounted on said frame for rotatably driving said reel, means for moving said frame and reel with respect

to said base, to conform to back and forth weaving movement of the strip metal, and a mounting for said frame on said base, supporting said frame and reel for back and forth movement with respect to said base including a plurality of upright parallel links journaled on said base intermediate their ends, and bearing mountings for said frame on the upper ends of said links.

5. In a reeling device for strip metal, a base, a frame, an expansible reel mounted on said frame and overhanging one end thereof, means mounted on said frame for rotatably driving said reel, a bearing mounting for said frame on said base, supporting said frame and reel for back and forth movement with respect to said base to conform to back and forth weaving movement of the strip metal including a plurality of upright parallel links, bearing means for mounting said links on said base intermediate their ends, power means connected with the lower ends of said links, for moving said links back and forth, to cause their upper ends to conform to weaving movement of the strip metal, and bearing mountings for said frame on the upper ends of said links.

6. In a reeling device for strip metal, a base, a frame, an expansible reel mounted on said frame and overhanging one end thereof, means mounted on said frame for rotatably driving said reel, a bearing mounting for said frame on said base, supporting said frame and reel for back and forth movement with respect to said base to conform to back and forth weaving movement of the strip metal including a plurality of substantially vertically extending parallel links, bearing means for mounting said links on said base intermediate their ends, a reversible motor, a drive connection from said motor to the lower ends of said links, for moving said links so their upper ends will conform to weaving movement of the strip metal, and bearing mountings for said frame on the upper ends of said links, to support said frame on said links for back and forth movement with the strip metal.

7. In a reeling device for strip metal, a base, a frame, an expansible reel mounted on said frame and overhanging the end thereof, means mounted on said frame for rotatably driving said reel, a bearing mounted for said frame on said base, supporting said frame and reel for back and forth movement with respect to said base, to conform to back and forth weaving movement of the strip metal including a plurality of substantially vertically extending parallel links, bearing means for mounting said links on said base intermediate their ends, bearing means for mounting said frame on the upper ends of said links, to support said frame and reel for back and forth movement with the strip metal, a reversible motor for moving said links back and forth during weaving movement of the strip metal, and the drive connection from said motor to said links including a counterweight journaled on the lower ends of said links and counterbalancing the weight of said frame and reel.

8. A bearing support for a floating reeling device for strip metal and in combination with means for causing said reeling device to move back and forth in conformance with back and forth weaving movement of the strip metal, a base, a plurality of parallel links, bearing means for mounting said parallel links on said base intermediate their ends, other bearing means for mounting said reeling device on said parallel links adjacent one of the ends of said links, and a counterweight journaled on the ends of said

links opposite from said reeling device, for counterbalancing the weight of said reeling device and reducing the power required to move it back and forth.

9. A bearing support for a floating reeling device for strip metal and in combination with means for causing said reeling device to move back and forth in conformance with back and forth weaving movement of the strip metal, a base, a plurality of substantially vertically extending parallel links, bearing means for mounting said parallel links on said base intermediate their ends, a reversible motor having operative connection with the lower ends of said links, for moving said links back and forth upon weaving motion of the strip metal, and other bearing means for supporting said colling device on the upper ends of said links.

10. A bearing support for a floating reeling de-

vice for strip metal and in combination with means for causing said reeling device to move back and forth in conformance with back and forth weaving movement of the strip metal, a base, a plurality of substantially vertically extending parallel links, bearing means for mounting said parallel links on said base intermediate their ends, a reversible motor having operative connection with the lower ends of said links, for moving said links back and forth upon weaving motion of the strip metal, other bearing means for supporting said reeling device on the upper ends of said links, and a counterweight journaled on and connecting the lower ends of said links together, to counterbalance the weight of said reeling device and to reduce the power required to move said reeling device back and forth.

FRANK J. WOOD.