May 11, 1948. W. F. LONGFIELD 2,441,544

STRIP UNCOILER

Filed April 17, 1946 6 Sheets-Sheet 1

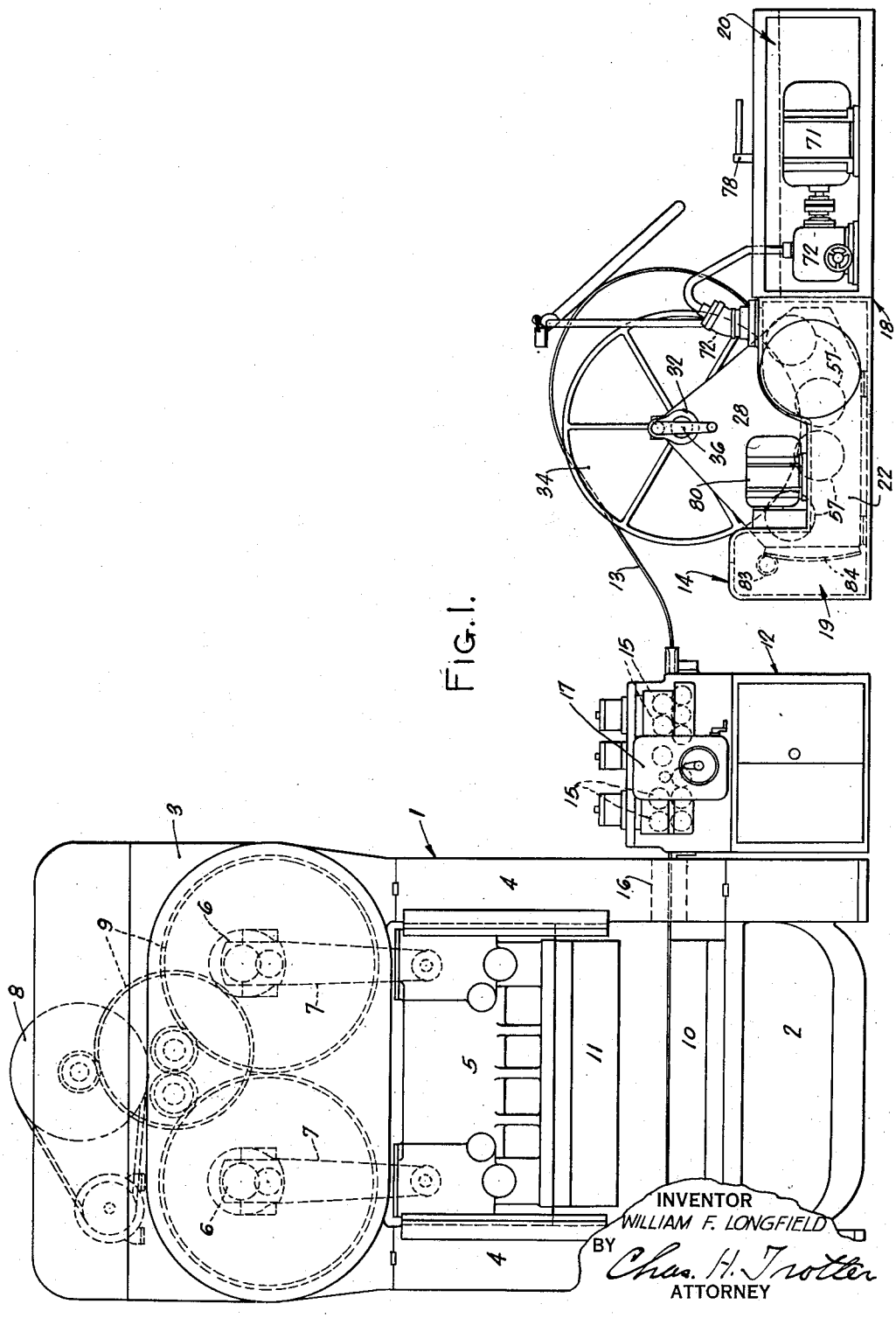


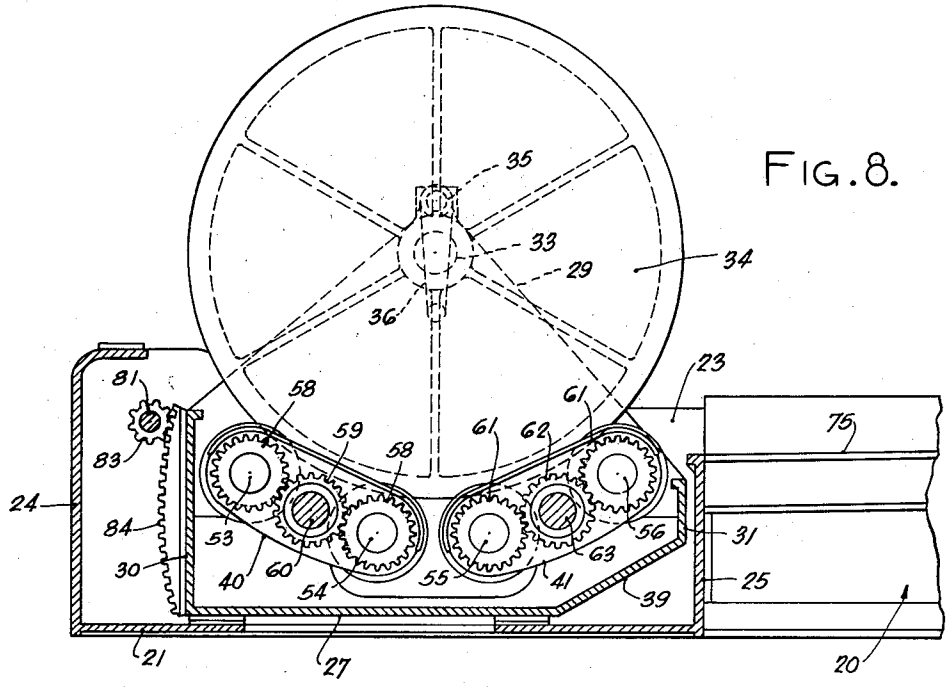
FIG. 1.

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FIG. 8.



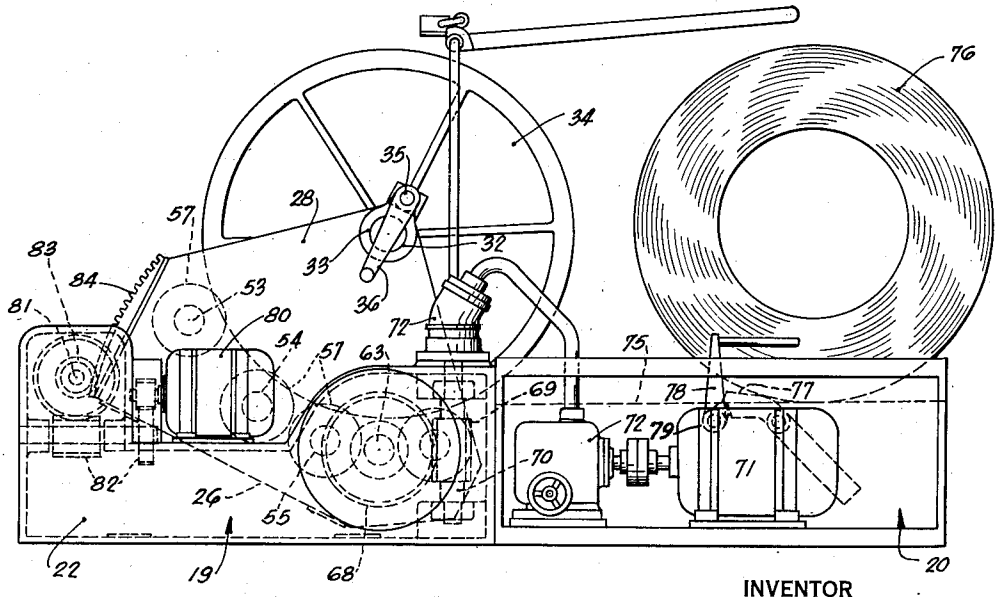


FIG. 2.

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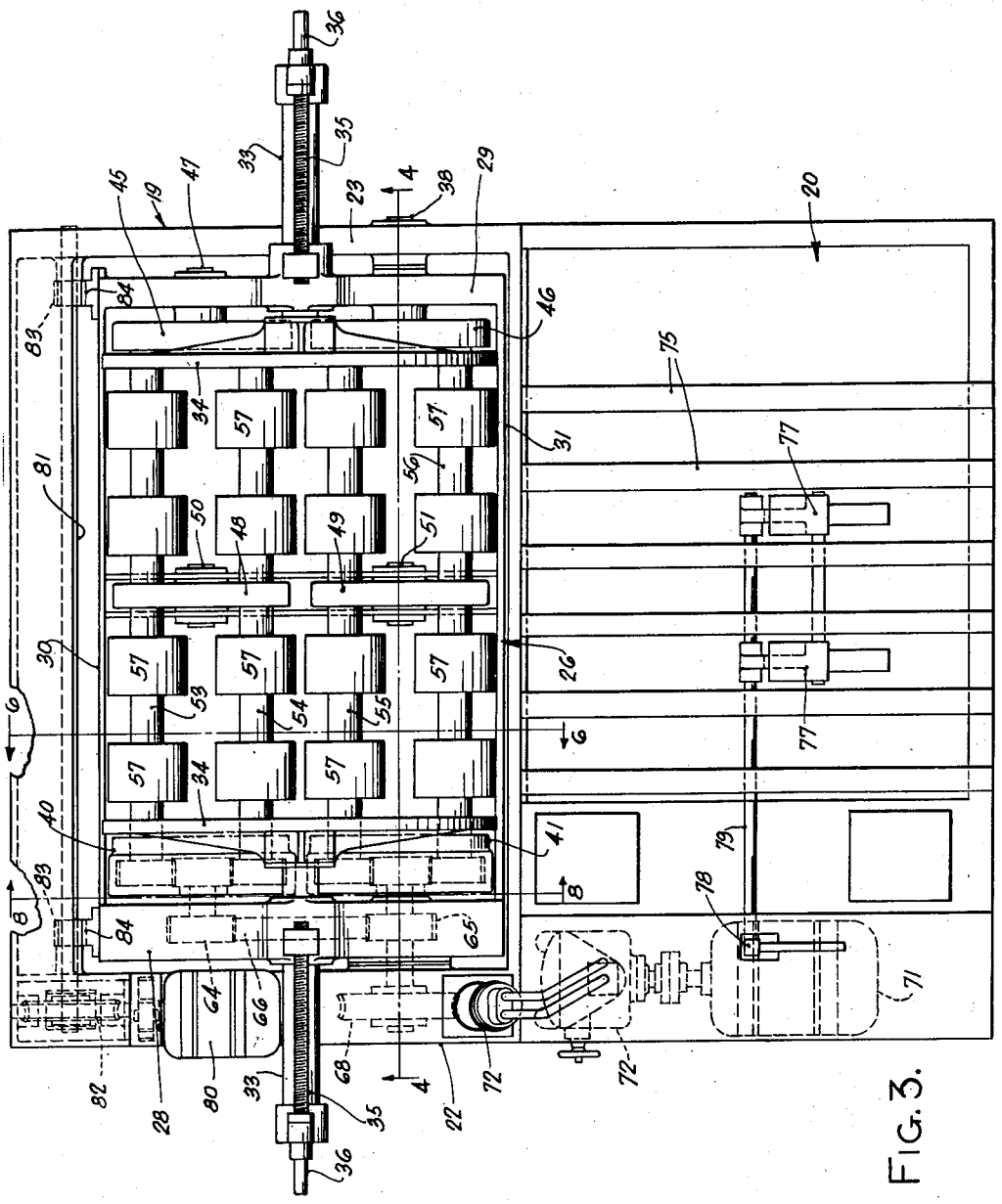


FIG. 3.

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STRIP UNCOILER

Filed April 17, 1946 6 Sheets-Sheet 4

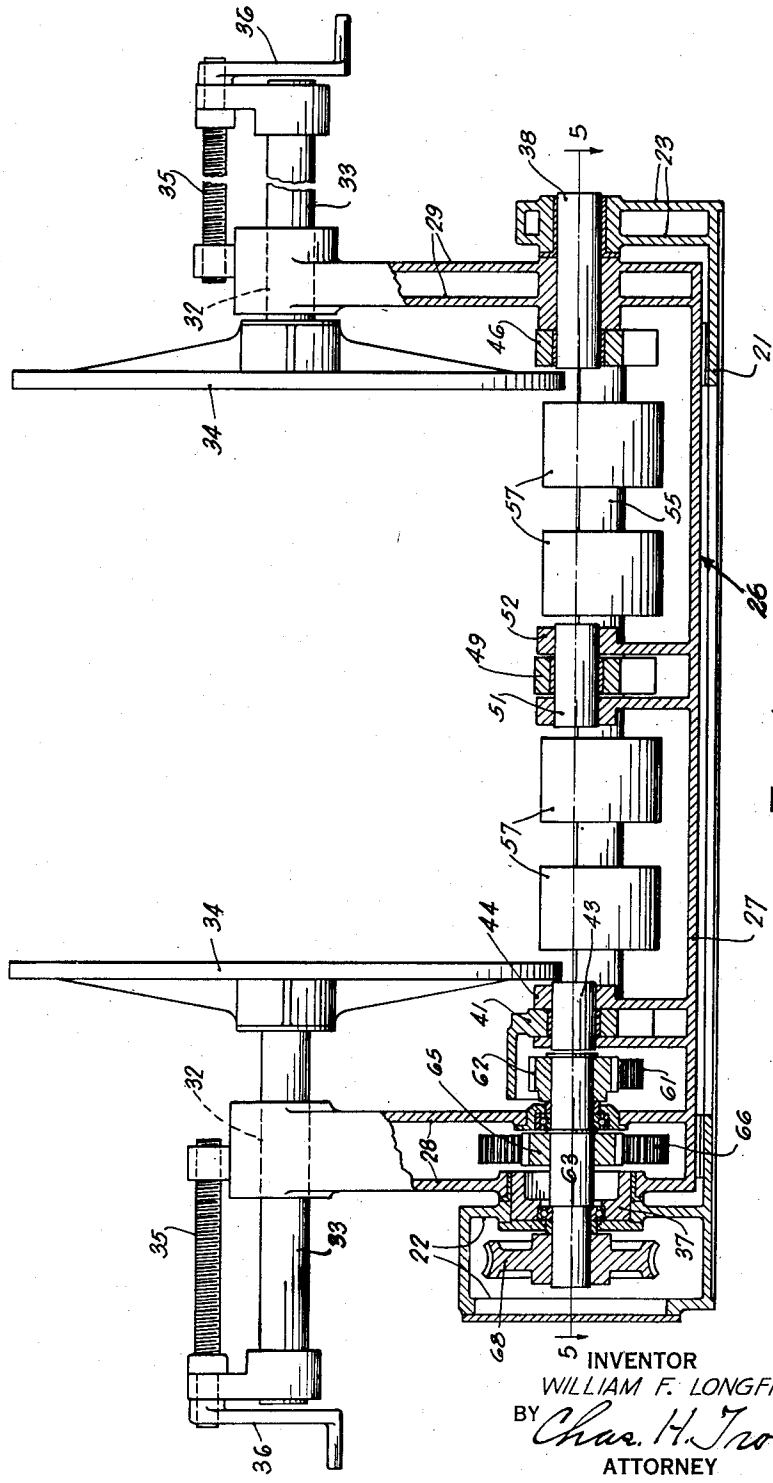


FIG. 4.

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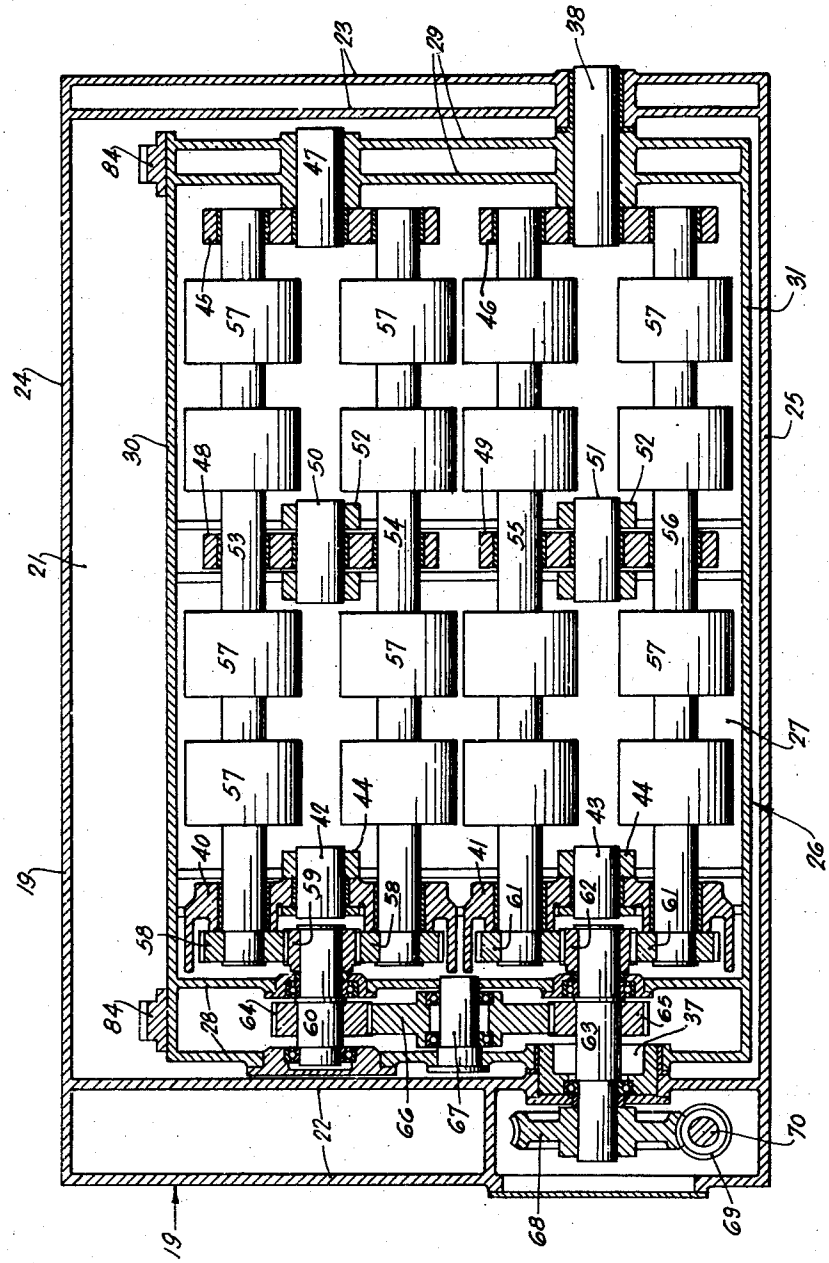


FIG. 5.

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STRIP UNCOILER

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FIG. 7.

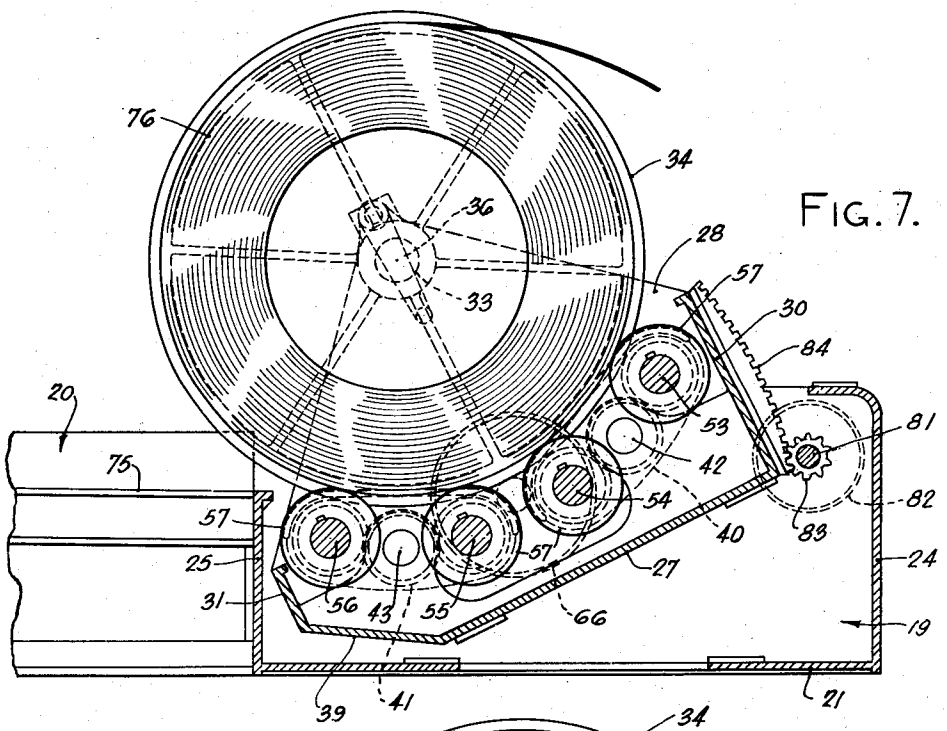
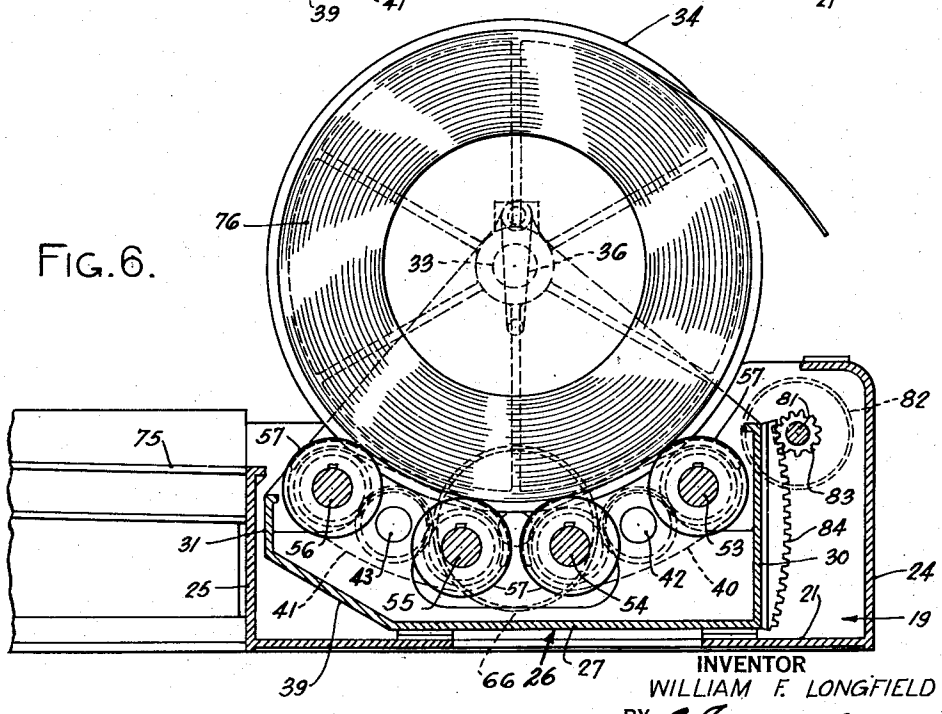


FIG. 6.



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Patented May 11, 1948 2,441,544

UNITED STATES PATENT OFFICE

2,441,544

STRIP UNCOILER

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Application April 17, 1946, Serial No. 662,761

5 Claims. (Cl. 242—78)

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This invention relates generally to sheet metal working apparatus of the type wherein flat sheet metal is blanked or formed between a pair of cooperating dies, one of which is moved toward and away from the other.

Formerly the metal was rolled into flat sheets which were fed by hand between the dies when they were in their separated position. In recent years the art of making sheet metal has advanced to the point where it is possible to roll sheet metal hundreds of feet long. The metal is then rolled into coils which are as wide as eighty inches and are as much as six feet in diameter and weigh many tons. Sheet metal in coils or rolls of this character is much easier to handle, ship, and store, and in consequence of this coiled sheet metal stock is now used quite extensively.

Apparatus was then developed to automatically feed coiled stock into sheet metal working presses. This apparatus consists generally of an "uncoiler" and a "roll-feed." The coil of stock is placed in the uncoiler which rotates the coil to uncoil it, and the roll-feed draws the stock from the coil as it is uncoiled, straightens it and feeds it into the press. The roll-feeds are usually equipped with controls by means of which predetermined lengths of stock are intermittently fed into a press.

My invention pertains to the uncoiler, and has for its principal object to provide a device of this character whereby the length of time the press is shut down due to placing new coils of stock in the uncoiler is greatly reduced, thereby increasing the production of the press with which my improved uncoiler is associated.

Another object of the invention is to provide a device of this character having incorporated therewith means for quickly loading new coils of stock thereinto after each coil of stock is used up, without the use of a crane.

Another object of the invention is to provide a device of this character which is simple and efficient in operation and which can be easily and quickly adjusted to different size coils.

Other and more specific objects of the invention will be apparent from the following specification and the accompanying drawings forming a part thereof wherein:

Fig. 1 is a side elevation of a sheet metal working press equipped with a roll-feed and an uncoiler constructed according to my invention;

Fig. 2 is a side elevation of my uncoiler with the parts thereof being shown in position to receive a fresh coil of stock;

Fig. 3 is a top plan view with the various parts being shown in operative or uncoiling position;

Fig. 4 is a transverse section taken on the line 4—4 of Fig. 3;

Fig. 5 is a horizontal section taken on the line 5—5 of Fig. 4;

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Fig. 6 is a longitudinal section taken on the line 6—6 of Fig. 3, with the various parts in operative or uncoiling positions;

Fig. 7 is a view similar to Fig. 6 showing the various parts in position to receive a fresh coil of stock; and

Fig. 8 is a longitudinal section taken on the line 8—8 of Fig. 3.

My improved uncoiler includes a carriage in which are mounted a plurality of rolls which are adapted to support a coil of sheet metal. These rolls are rotated in unison by a standard hydraulic drive driven by an electric motor. They in turn rotate the coil of sheet metal in a direction to uncoil or unwind the sheet metal. From the uncoiler the sheet metal is fed through what is generally known as a "roll feed" which straightens the sheet metal and feeds predetermined lengths thereof into a sheet metal working press. An inclined platform which slopes towards the carriage is located at one side of the carriage closely against thereto. While a coil of sheet metal in the carriage is being uncoiled and fed by the roll feed into the press a fresh coil of sheet metal is brought from storage and placed on the inclined platform where it is held by a suitable stop. After the coil of sheet metal in the carriage has been completely uncoiled and fed into the press the forward end of the carriage is raised and the stop is moved to release the coil of stock on the inclined platform, which then rolls by gravity down into the carriage upon the rotary supporting rolls. The carriage is then lowered into operative position and the operation repeated.

Referring now to the drawings by reference characters, the numeral 1 indicates a sheet metal working press of standard construction. This press comprises a base 2 and a crown 3 which is supported upon a pair of uprights 4 extending upward from the base 2. The base 2, crown 3 and uprights 4 are all securely fastened together by suitable tie rods as is standard practice. A slide 5 which is slidably mounted between the uprights 4 is reciprocated by crankshafts 6, mounted in the crown 3, through connecting rods 7. The crankshafts 7 are rotated in opposite directions by a motor 8 through suitable gearing 9. A stationary die 10 is secured to the base 2 and a cooperating movable die 11 is secured to and reciprocated by the slide 5.

A roll feed 12, which may be any one of several types which are now available, is mounted at one side of the press 1. Sheet metal stock 13 in ribbon form is fed from my improved uncoiler, generally indicated by the numeral 14, into the roll feed 12 where it is drawn over straightening rolls 15 and fed into the press between the dies 10 and 11, through an opening 16 in one of the uprights 4. The roll feed is controlled by a timer 17 which effects the delivery of predetermined lengths of

stock into the press while the slide 5 is in its up position.

My improved uncoiler 14 embodies a base or frame 18 which is divided into two sections 19 and 20. The section 19 of the base 18 comprises a bottom 21, a double front wall 22, a double rear wall 23, left side 24 and right side wall 25, as viewed in Figs. 1 and 2.

A carriage generally indicated by the numeral 26 which is disposed within the section 19 of the base comprises a bottom 27, spaced front walls 28, spaced rear walls 29, left side wall 30 and right side wall 31, as viewed in Figs. 1, 2 and 8. The front and rear walls 28 and 29 of the carriage 26 extend up beyond the side walls 30 and 31 thereof and have therein aligned bearings 32 in which opposed slides 33 are slidably mounted. Each of the slides 33 has a disc 34 secured to the inner end thereof. The slides 33 are adjusted back and forth to vary the distance between the discs 34, and are held in adjusted position by screws 35 which are operated by cranks 36 secured to the outer ends thereof.

The carriage 26 is mounted in the base 19 upon bearings 37 and 38 so that it can be oscillated from the position shown in Fig. 6 to the position shown in Fig. 7 when a new coil of stock is being inserted. The bottom 27 thereof is inclined upwardly towards the wall 31, as indicated at 39 to permit this oscillation. The bearing 37 consists of a sleeve which is removably secured to and projects inwardly from the inner front wall 22 of the base 19, and the bearing 38 comprises a stud which is carried by the rear walls 29 of carriage 26 and projects outwardly therefrom into an aperture in rear walls 23 of the base 19.

A pair of rocker arms 40 and 41 are rotatably mounted, adjacent the front wall 28 of the carriage 26, upon short shafts 42 and 43 which are supported by bosses 44 extending upwardly from the bottom 27. A pair of similar rocker arms 45 and 46 are rotatably supported adjacent the rear wall 29 of the carriage 26. The arm 45 is mounted upon a short shaft or stud 47 projecting inwardly from the rear wall 29 of the carriage 26, and the arm 46 is mounted upon the inner end of the bearing stud 38. Another pair of rocker arms 48 and 49 are rotatably mounted, intermediate the rocker arms 40—45 and 42—46, upon shafts 50 and 51 carried by bosses 52 extending up from the bottom 27 of the carriage. The shafts 42, 50 and 47 are disposed in axial alignment with each other, and the shaft 43 and 51 and the bearing stud 38 are disposed in axial alignment. Shafts 53 and 54 are rotatably supported in suitable bearings in the rocker arms 40, 48 and 45, the shaft 53 being on one side of the supporting shafts for the rocker arms and the shaft 54 being on the other side thereof. Shafts 55 and 56, similar to the shafts 53 and 54, are rotatably supported in suitable bearings in the rocker arms 41, 49 and 46, the shaft 55 being on one side of the supporting shafts for the rocker arms 41, 49 and 46, and the shaft 56 being on the other side thereof. The shafts 53 to 56 each have a plurality of supporting rolls 57 rigidly secured thereon. The rolls 57 are adapted to support a coil of sheet metal stock which is to be uncoiled and fed into the press, as is clearly shown in Figs. 6 and 7. They may be made of any suitable wear resisting material which will not mar or scratch the sheet metal stock in contact therewith. The particular manner of mounting the shafts 53 to 56 in their respective rocker arms enables the rolls 57 to always remain in contact with the outer convolution of the coil of stock as the diameter thereof decreases as the stock is uncoiled by the rotation of the shafts 53 to 56 and the rolls 57 secured thereon.

The mechanism through which the shafts 53 to 56 are all rotated in unison in the same direction will now be described. Each of the shafts 53 and 54 has a gear 58 keyed to one end thereof. These gears 58 are in mesh with a gear 59, intermediate the gears 58, which is keyed to the inner end of a short shaft 60 rotatably supported in suitable bearings mounted in the front walls 28 of the carriage 26. Each of the shafts 55 and 56 has a gear 61, similar to the gears 58, keyed to one end thereof, in alignment with the gears 58. The gears 61 are in mesh with a gear 62, intermediate thereof, which is keyed to the inner end of a shaft 63 which is rotatably supported, in axial alignment with the bearings 37 and 38, in suitable bearings mounted one within the sleeve bearing 37 and the other in the inner front wall 28 of the carriage 26. The shaft 60 has a gear 64 keyed thereon between the front walls 28 of the carriage 26, and the shaft 63 has a gear 65, similar to the gear 64, keyed thereon in alignment with the gear 64. The gears 64 and 65 each mesh with an intermediate gear 66 rotatably supported on a short shaft 67. The shaft 63 has a worm gear 68, keyed to the outer end thereof, which is in constant mesh with a worm 69 on a shaft 70 rotatably supported in suitable bearings between the front walls 22 of the base 19. The shaft 70 and worm 69 thereon are driven by a motor 71 through a standard type hydraulic drive 72. The worm 69 drives the shaft 63 through the worm gear 68, and the shaft 63 through the gears 62 and 61 drives the shafts 55 and 56. The shaft 60 is driven by the shaft 63 through the gears 65, 66 and 64, and the shaft 60 in turn drives the shafts 53 and 54 through the gears 59 and 58. In operation a coil of stock is placed in the carriage 26 upon the rolls 57 between the discs 34 which are provided to prevent a coil of stock from shifting laterally during uncoiling. The adjustability of the discs 34 towards and away from each other accommodates the device to rolls of stock of varying widths between the maximum and minimum capacity of the apparatus. During operation the shafts 53 to 56 are driven in the proper direction to rotate the coil of stock therein in the direction to unwind the stock thereof. The shafts 53 to 56 are driven in timed relation to the roll feed 12 so that the stock is unwound at approximately the same rate that it is fed into the press by the roll feed 12.

With all types of uncoiling devices in use prior to my invention it was necessary to stop the operation of the press after the feeding of each coil of stock into the press, and wait until a fresh coil of stock was brought from stock, and placed in the uncoiler. This generally necessitated the use of a crane, and as a crane was not always available, due to it being in use in another part of the plant, these shut downs were sometimes quite lengthy which materially reduced the production of the press. To overcome this loss of production I have provided means associated with my uncoiler which makes it possible to bring a fresh coil of stock from the stock pile, while the previous coil is being uncoiled and fed into the press, and to place this fresh coil in position to be immediately loaded into the uncoiler upon the completion of the unwinding of the previous coil therein.

To accomplish this object I provide an inclined platform 75, in the section 20 of the base 18.

which slopes downwardly towards the carriage 26. A fresh coil of stock 76 may be brought from the stock pile and placed upon this platform at any time during the uncoiling of the previous coil of stock placed in the uncoiler. A suitable stop mechanism 77 is provided to hold the coil 76 in position on the platform 75, as shown in Fig. 2. To load a fresh coil of stock from the platform 75 into the uncoiler upon the rolls 57 the carriage 26 is rotated on its pivotal supports 37 and 38 from the position shown in Figs. 1 and 6 to the position shown in Figs. 2 and 7. The stop mechanism 77 is then operated through the medium of a lever 78 and shaft 79 to release the coil of stock 76 which then rolls by gravity down the inclined platform 75 into the carriage 26 as shown in Fig. 7. The carriage with the fresh coil of stock therein is then brought back to the position shown in Fig. 6 ready for operation.

The carriage 26 is oscillated between the positions shown in Figs. 6 and 7 by a reversible motor 80 which drives a shaft 81 through suitable reduction gearing 82. The shaft 81 is supported in suitable bearings mounted in the base 19, and has keyed thereon laterally spaced pinion gears 83 which mesh with arcuate racks 84 secured to the wall 30 of the carriage 26.

From the foregoing it will be apparent to those skilled in this art that I have provided a very simple and efficient mechanism for carrying out the objections of my invention. It is to be understood that I am not limited to the specific construction shown and described herein as various modifications can be made thereto within the scope of the appended claims.

Having thus described my invention I claim:

1. In a device of the character described, the combination of a frame, an inclined platform adapted to releasably support a fresh coil of stock prior to uncoiling, a carriage pivotally mounted in said frame adjacent the lower end of said inclined platform, a plurality of rolls rotatably mounted in said carriage and adapted to support and rotate a coil of stock during the entire uncoiling thereof as the stock is being fed into a sheet metal working machine, a drive shaft carried by said carriage in axial alignment with the pivoted axis of said carriage, operative connections between said drive shaft and said rolls through which said rolls are rotated by said drive shaft, and means for rotating said carriage preparatory to said carriage receiving therein a fresh coil of stock from said inclined platform.

2. In a device of the character described the combination of a frame, an inclined platform adapted to releasably support a fresh coil of stock prior to uncoiling, a carriage pivotally mounted in said frame adjacent the lower end of said inclined platform, a plurality of pairs of rolls adapted to support and rotate a coil of stock during the entire uncoiling thereof as the stock is being fed into a sheet metal working machine, each pair of rolls being supported by a pair of shafts, a plurality of rocker arms rotatably supporting each pair of shafts, a plurality of studs carried by said carriage, each of said studs pivotally supporting one of said rocker arms intermediate the shafts supported thereby, a drive shaft carried by said carriage in axial alignment with the pivotal axis of said carriage, operative connections between said drive shaft and said rolls through which said rolls are rotated by said drive shaft, and means for rotating said carriage preparatory to said carriage receiving therein a fresh coil of stock from said inclined platform.

3. In a device of the character described the combination of a frame, an inclined platform adapted to releasably support a fresh coil of stock prior to uncoiling, a carriage pivotally mounted in said frame adjacent the lower end of said inclined platform, a plurality of rolls rotatably mounted in said carriage and adapted to support and rotate a coil of stock during the entire uncoiling thereof as the stock is being fed with a sheet metal working machine, a gear case secured to one side of said carriage, a drive shaft extending into said gear case in axial alignment with the pivotal axis of said carriage, gearing in said gear case through which said rolls are all driven in unison by said drive shaft, and means for rotating said carriage preparatory to said carriage receiving therein a fresh coil of stock from said inclined platform.

4. In a device of the character described the combination of a frame, an inclined platform adapted to releasably support a fresh coil of stock prior to uncoiling, a carriage pivotally mounted in said frame adjacent the lower end of said inclined platform, a plurality of rolls rotatably mounted in said carriage and adapted to support and rotate a coil of stock during the entire uncoiling thereof as the stock is being fed into a sheet metal working machine, a gear case secured to one side of said carriage, a drive shaft extending into said gear case in axial alignment with the pivotal axis of said carriage, gearing in said gear case through which said rolls are all driven in unison by said drive shaft, and means for rotating said carriage preparatory to said carriage receiving therein a fresh coil of stock from said inclined platform, said last mentioned means comprising arcuate racks secured to said carriage, a shaft rotatably supported by said frame, pinions on said shaft meshing with said arcuate racks, and means for rotating said shaft.

5. In a device of the character described the combination of a frame, an inclined platform adapted to releasably support a fresh coil of stock prior to uncoiling, a carriage pivotally mounted in said frame adjacent the lower end of said inclined platform, a plurality of rolls rotatably mounted in said carriage and adapted to support and rotate a coil of stock during the entire uncoiling thereof as the stock is being fed into a sheet metal working machine; a pair of opposed discs, for engaging the ends of a coil of stock and holding said coil in position on said rolls as said coil of stock is being unwound, carried by said carriage; a drive shaft carried by said carriage in axial alignment with the pivotal axis of said carriage, operative connections between said drive shaft and said rolls through which said rolls are rotated by said drive shaft, and means for rotating said carriage preparatory to said carriage receiving therein a fresh coil of stock from said inclined platform.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,054,347	Waldorf	Sept. 15, 1936
2,070,444	Mikaelson et al.	Feb. 9, 1937
2,140,928	Talbot et al.	Dec. 20, 1938
2,285,358	Rode et al.	June 2, 1942
2,321,878	Tyrrell	June 15, 1943