Oct. 20, 1931. F. L. MORSE 1,828,506

CHAIN MANUFACTURE

Filed Dec. 22, 1928 4 Sheets-Sheet 1

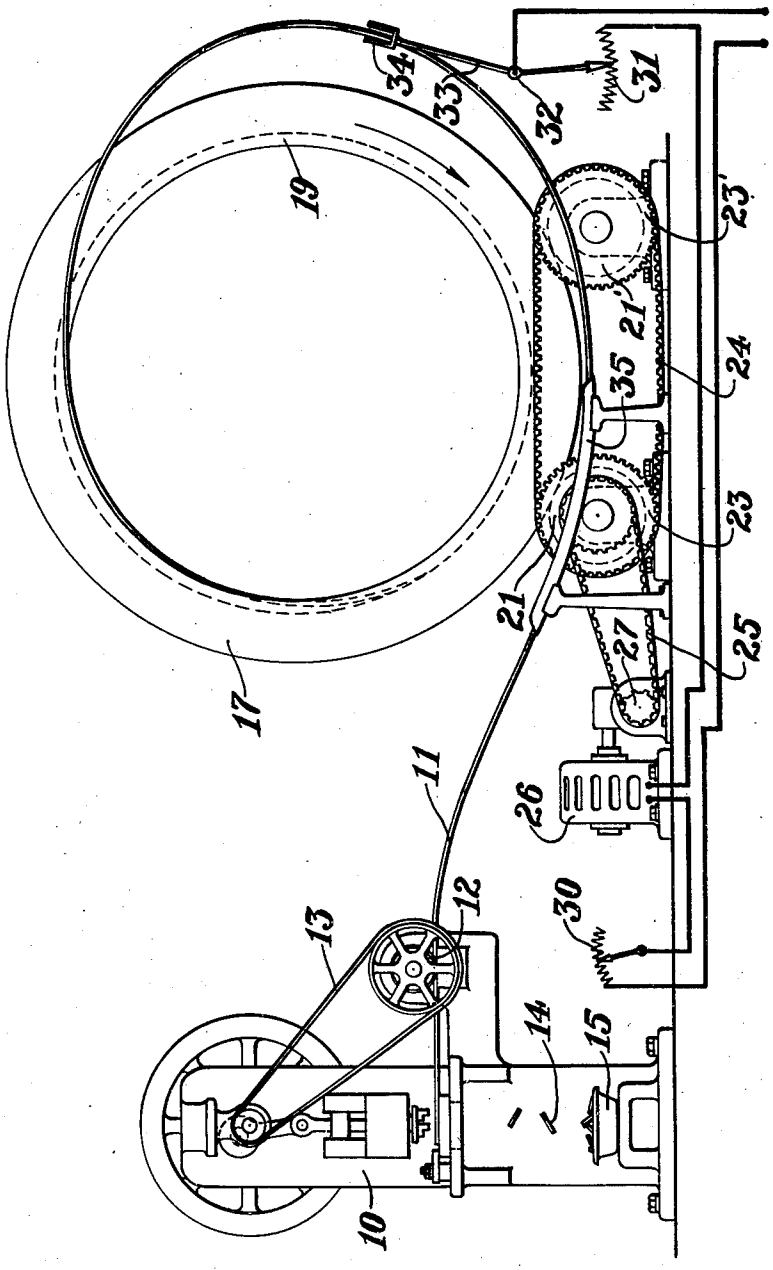


Fig. 1

FRANK L. MORSE INVENTOR.

BY Robt V. Morse

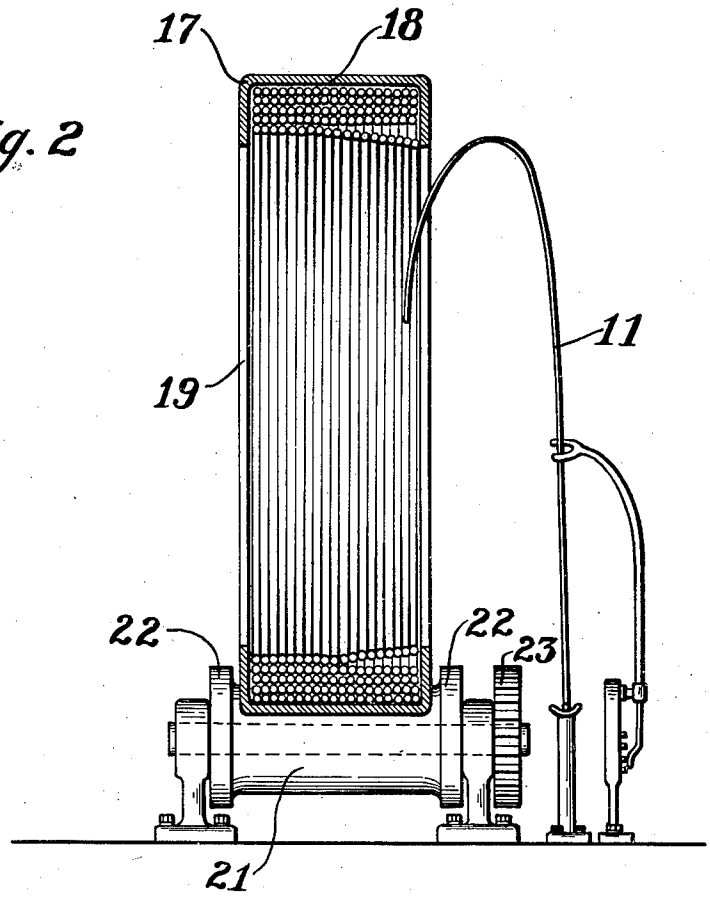
ATTORNEY.

Oct. 20, 1931. F. L. MORSE 1,828,506

CHAIN MANUFACTURE

Filed Dec. 22, 1928 4 Sheets-Sheet 2

Fig. 2



FRANK L. MORSE INVENTOR.

BY Richard V. Morse

ATTORNEY.

Oct. 20, 1931. F. L. MORSE 1,828,506

CHAIN MANUFACTURE

Filed Dec. 22, 1928 4 Sheets-Sheet 3

Fig. 3

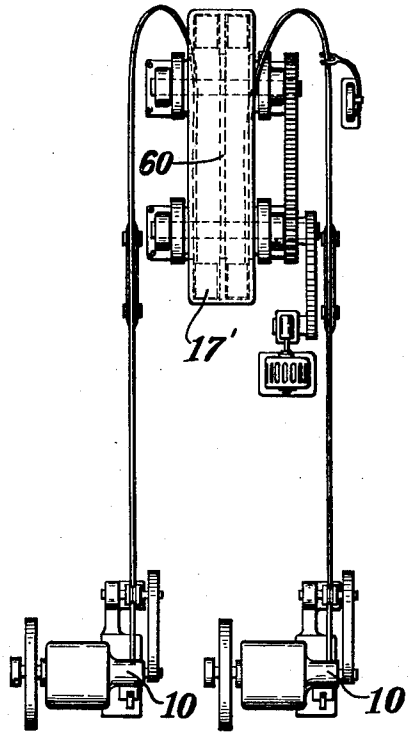
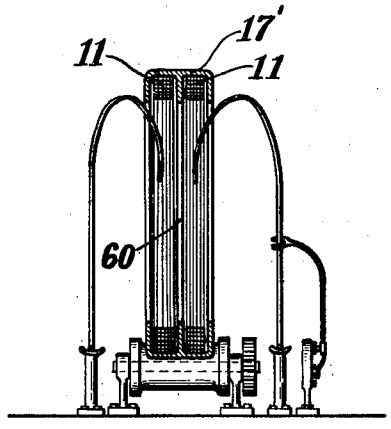


Fig. 4



FRANK L. MORSE INVENTOR.

BY Robt V. Morse

ATTORNEY.

Oct. 20, 1931. F. L. MORSE 1,828,506

CHAIN MANUFACTURE

Filed Dec. 22, 1928 4 Sheets-Sheet 4

Fig. 5

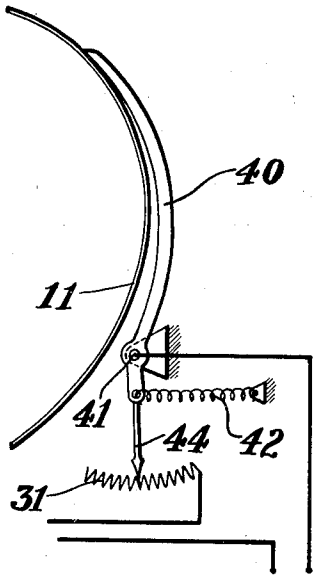
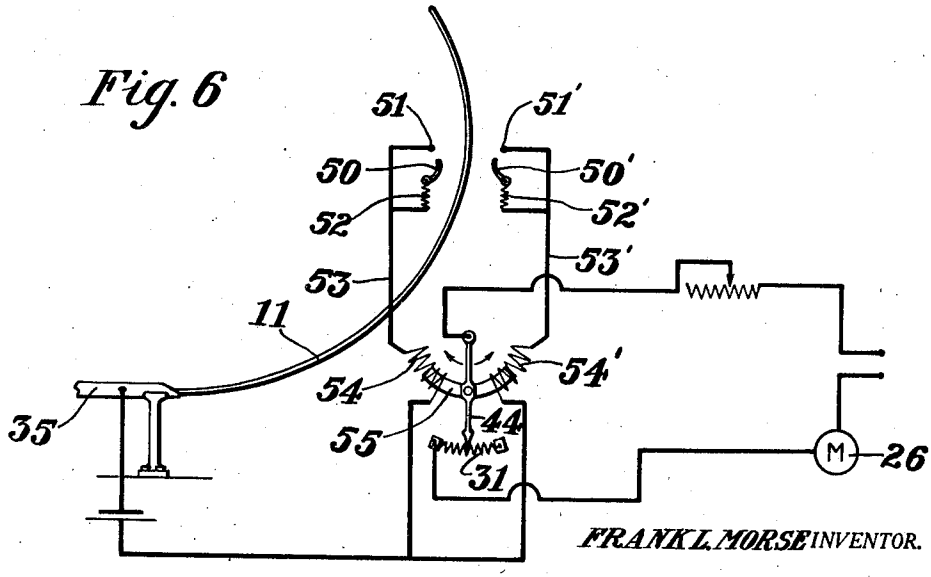


Fig. 6



FRANK L. MORSE INVENTOR.

BY Robt V Morse

ATTORNEY.

Patented Oct. 20, 1931

1,828,506

UNITED STATES PATENT OFFICE

FRANK L. MORSE, OF ITHACA, NEW YORK

CHAIN MANUFACTURE

Application filed December 22, 1928. Serial No. 327,872.

This invention relates to the art of manufacturing drive chains, that is, chains such as are commonly used for the transmission of power. These chains are generally composed of link plates, pintle parts, and various other small parts, the material for which is usually rolled or drawn before it is punched or cut up into the individual parts from which the chain is assembled. In parts of relatively small cross-section, such as some of the pintle parts for example, material rolled and drawn from a single billet eventually might become several hundred or even thousands of feet long, so that it was considered necessary to cut it into fairly short lengths, such as twenty or thirty feet, which could be readily handled, before it was fed into the punch presses.

The object of the present invention is to improve on the older process by eliminating some of the steps and handling, and to provide a method by which the material can go directly from the rolling mill to the punch presses, and be fed thru the punch presses in one long continuous piece,—thus not only saving the cutting and handling, but also reducing the labor and attention required at the punch presses. The improved method also saves the wastage of end pieces which occurred with the old process. These and various other objects will become apparent as the description proceeds. In general the invention is directed toward simplifying, cheapening and improving the manufacture.

Referring now to the drawings, Fig. 1 is a side elevational view of a typical installation;

Fig. 2 is a vertical cross-section thru the drum of Fig. 1;

Fig. 3 is a plan view of a multiple-drum installation;

Fig. 4 is a vertical cross-section of a multiple drum;

Fig. 5 is a detail of a modified form of controller;

Fig. 6 shows another modification of the controller.

The general plan of operation in a typical installation is illustrated in Fig. 1 and Fig. 2, in which 10 is a punch press operating on a long piece of material 11, which passes thru feed rollers 12 driven by a belt, chain or other suitable transmission 13, which may be connected to the shaft of the punch press 10. Parts 14 cut from the material 11 by the action of the punch press 10 are shown falling into a pan 15. This portion of the mechanism is similar to that heretofore employed.

The material 11 may come from a single billet weighing several hundred pounds, and when reduced to the cross-section of some of the parts used in chain making becomes of great length, so that it has been impracticable to feed it directly into the punch presses without repeated cutting and handling. To overcome this difficulty, the present invention takes the material 11 as it comes from the rolling or drawing mill and coils it internally within annular drums 17, from which it can be unwound from the inside thru openings in the sides of the drum, as shown in Fig. 1. A typical drum is shown in Fig. 2 in cross-section, having an outer annular wall 18, side walls or rings 19 extending part way in, and no inside wall, so that there is a large opening or hole thru the center. When the material 11 coming from the rolling or drawing mills is led in thru this hole, the natural spring or elasticity of the material 11 will throw it against the inside of the outer wall 18, and the material 11 can accordingly be readily coiled within the drum 17. These drums 17, being large, will accommodate a great length of material 11, and can then be rolled or otherwise transported to the punch presses.

Upon reaching the punch press room the drums 17 are placed on rollers 21 and 21′ having flanges 22 (see Fig. 2) which hold the drums in place. The rollers 21 and 21′ are provided with gear wheels or sprockets 23 and 23′ connected by a chain 24, which is driven by a second chain drive 25 which receives its power from a motor 26 thru a reducing gear 27.

The reduction between the motor 26 and the drum 17 is great so that the rotation of the drum 17 is relatively slow. It is required that the material 11 be unrolled from the drum 17 according to the rate at which the material 11 is used by the punch press 10. Even if the

punch press 10 is kept running at a constant rate the speed of rotation of the drum 17 must necessarily vary, as the material as it unwinds from the drum will come out at different diameters. An automatic control is therefore provided to maintain a substantially steady rate of feed.

One form of automatic control is shown in Fig. 1 and Fig. 2. The line current in passing from a suitable switch to the motor 26 is conducted thru one or more resistances, preferably two in number. One of these resistances 30 is arranged for manual operation and is preferably located near the operator of the punch press, so that he can set the speed of the feed at any desired amount, or stop it entirely by throwing the variable resistance 30 to the zero or open circuit position. The other resistance 31 has its movable contact pivoted at 32 and connected to an arm 33 having a fork 34 thru which a loop of the material 11 is passed. The material 11 then passes thru a guiding shoe 35 and on thru the feed rollers 12 to the punch press 10.

The general speed of operation is usually set by the rheostat 30. As the work progresses, if the speed of the drum 17 is a little too fast, the loop of excess material 11 passing thru the fork 34 will gradually grow larger and swing the arm 33 to the right, thus introducing more resistance at the rheostat 31 and reducing the speed of the motor 26 and the speed of the feed. On the other hand, if the punch 10 uses up the material 11 faster than the drum supplies it, the arm 33 will be swung to the left and the speed of the feed accordingly increased.

Other forms of automatic control for a similar purpose are shown in Fig. 5 and Fig. 6,—only those parts being shown that differ materially from the form shown in Fig. 1. In Fig. 5 a curved horn or movable shoe 40 is arranged to press lightly against the material 11. The shoe 40 is pivotally mounted at 41 and a spring 42 serves to provide the necessary pressure. As the loop of the material 11 expands and contracts the shoe 40 is moved to the right or the left as in the operation described in connection with Fig. 1, and moves the contact finger 44 of the variable rheostat 31 to control the speed of the feed as described.

In the modification shown in Fig. 6, instead of movable shoes or forks in mechanical contact with the material 11, electrical contacts are provided with the material 11 acting as part of a servo or relay control circuit. This latter circuit is introduced to the material 11 thru the shoe or guide 35. The circuit is picked up again thru one of the yielding contacts 50 or 50′, or thru one of the fixed contacts 51 and 51′. These contacts 50, 50′, 51, 51′, are spaced apart so that the material 11 may pass between them without touching any of them. If the feed is too slow, so that the loop of the material 11 shortens, the material 11 will touch the spring contact 50, and the current will flow thru the contact 50, resistance 52, conductor 53, and solenoid 54. This draws the solenoid core 55,—which is attached to the contact finger 44,—to the left and reduces the resistance of the rheostat 31 so as to speed up the motor 26 and unwind the drum 17 faster. If the feed is still too slow, the material 11 also touches the contact 51, which, not having the resistance 52 in its circuit, still further energizes the solenoid 55 and increases the speed of the motor 26. Similarly, any desired number of steps or gradations of control may be provided by contacts such as 50 with various amounts of resistance in their circuits.

On the other hand, if the feed of the drum 17 is too fast, the loop of the material 11 will grow larger and touch the contact 50′, thus closing the circuit thru the resistance 52′, conductor 53′, and solenoid 54′, which will be energized to draw the solenoid core 55 to the right so as to swing the contact finger 44 in such a direction as to increase the resistance of the rheostat 31 so as to slow down the motor 26. Various other contacts such as 50′ may be provided with various amounts of resistance, and located so as to come into action successively, with a contact such as 51′ for the last or extreme position. While I have shown the solenoid core 55 operating directly on the contact finger 44 of the rheostat 31, it will be understood by those skilled in the art that the operation may also be effected by suitable relays, if desired.

In cases where the punch presses 10 are arranged in batteries it may be desirable to feed two or more presses from the same drum or drums, and one example of this is shown in Fig. 3 and Fig. 4 in which the drum 17′ is divided into two sections by a partition 60,—each of the sections containing a coil of material 11. These are fed out of opposite sides of the drum to the punch presses 10, 10 as shown in Fig. 3.

While I have in the foregoing described the invention in certain embodiments, it will be understood that these are merely by way of illustration and the invention is not limited to the particular details shown, but is susceptible to various modifications and adaptations in various installations as will be apparent to those skilled in the art without departing from the scope of the invention as defined and set forth in the following claims.

I claim:—

1. In the method of unreeling a metallic strip from the interior of the coil for feed to a constant speed feeding device, the step of unreeling the strip under compression and varying the speed of unreeling through such compression on change in diameter of the coil to maintain substantially constant linear rate of feed of the material.

2. In unreeling apparatus, the combination of a reel inside of which a metallic strip is coiled, means for rotating said reel, means for guiding the material in a loop under compression from the inside of the coil to a constant speed feeding device, and means adapted to be operated by said loop to vary the speed of rotation of the reel on change in diameter of the coil so that the linear rate of feed of the material is maintained constant.

In testimony whereof I have hereunto signed my name this 13th day of December, 1928.

FRANK L. MORSE.