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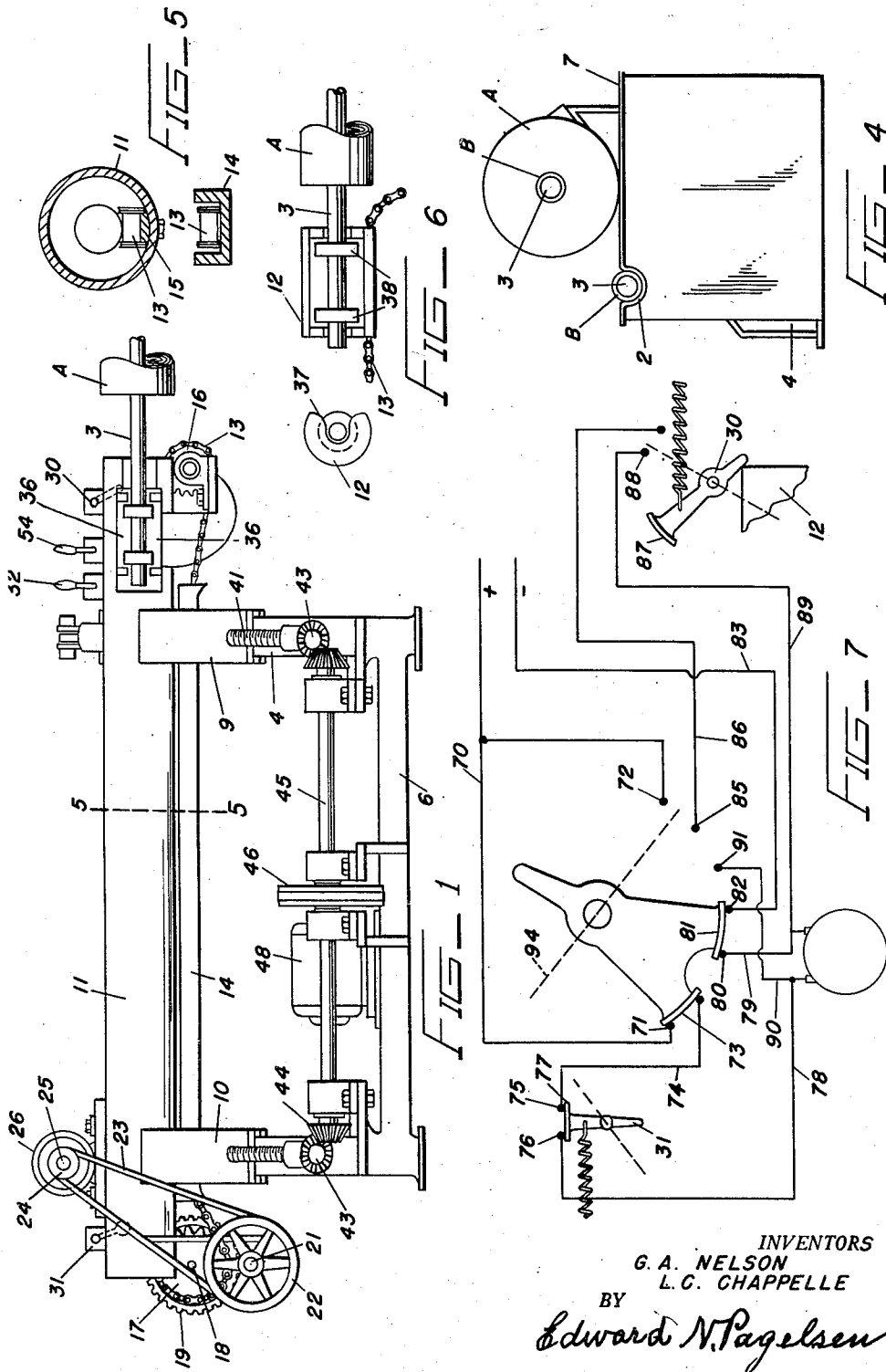
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SHAFT PULLER

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2 Sheets-Sheet 1



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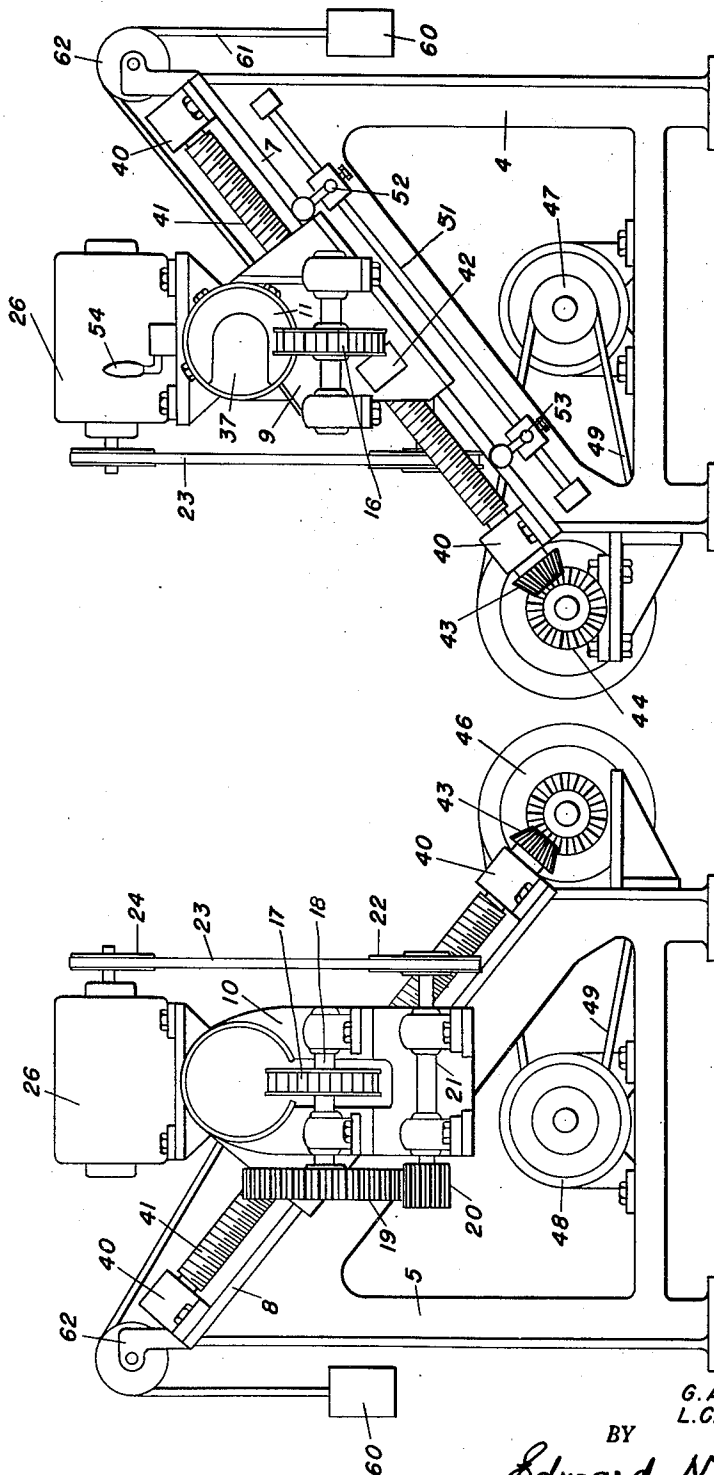


FIG. 2

FIG. 3

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SHAFT PULLER

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2 Claims. (Cl. 214—1)

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In the manufacture of paper, cellophane or other thin flexible bands or sheets which issue from the producing machine and which are wound onto spindles or shafts to form rolls, the rolls often cling so tightly to the shafts that it is very difficult to pull the shafts out of the rolls. To facilitate such removal a light tubular core or wrapper, preferably of paper is employed into which the shaft is inserted and which core is of such internal diameter that the shaft can be freely withdrawn after the sheet or band has been wound thereon.

Our invention therefore relates to means for withdrawing the shaft from the roll, support and carry the shaft to proper position in alignment with a prepared core, and then slide the shaft into the core. It further relates to means for supporting the roll and core in co-operative positions relative to the operating positions of the shaft puller.

In the accompanying drawing, Fig. 1 is a front elevation and Figs. 2 and 3 are end elevations of a machine embodying our invention. Fig. 4 is an end elevation of the roll supporting table. Fig. 5 is a section on the line 5—5 of Fig. 1. Fig. 6 is a detail of the clutch which engages the shaft to be removed from the roll of paper. Fig. 7 is a diagram of electric circuits adapted to be used in this machine.

In Fig. 4 a roll A of paper or other material is shown resting on the table 1. The table is shown provided with a trough 2 adapted to hold the core B ready to receive the shaft 3 after it has been pulled out of the roll A. The purpose of the machine is therefore to pull the shaft 3 out of the roll A, move it down and laterally into alignment with the core B in the trough 2 and slide it into this core.

The machine shown in the drawing comprises two side-frames 4 and 5 connected by a cross frame 6. These side-frames have inclined surfaces or ways 7 and 8 on which the shaft puller carriage is slidably mounted. This carriage comprises the slides 9 and 10 connected by the chuck casing 11 which may be of any desired cross section but is shown tubular, such tubes being obtainable of any desired length. Within this casing is slidable the clutch 12 to whose ends is connected a chain 13 which may slide on the lower support 14 and on the guide bar 15 within the casing and is used to move the chuck back and forth within the casing. The chain passes around the idler sprocket wheel 16 and the driving sprocket wheel 17 on the shaft 18. On this shaft is a gear 19 meshing with the pinion 20 on

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the countershaft 21 which also carries a pulley 22. A belt 23 extends from pulley 22 to the pulley 24 on the shaft 25 of the electric motor 26 of any desired reversible type.

Mounted on the casing 11 are switches 30 and 31 whose operating arms are in the path of the clutch. These switches may be of any well known "spring-closed" design. A four point master switch 32 is conveniently mounted and is used to open the circuit to an open switch and close the circuit to a closed switch, thus reversing the current to the motor. A diagram of proper electric circuits is shown in Fig. 7 and will be discussed later on.

The casing 11 has a gap 36 and the clutch 12 a gap 37 to receive the end of the shaft 3 which may be provided with one or more collars 38. When the casing is moved up until its central line is level with the line of the shaft in the roll on the table, the roll can be rolled to carry the end of the shaft into the clutch. The master switch 32 is then operated to cause the motor to move the clutch to the left (Fig. 1) thus pulling the shaft out of the roll.

Mounted on the sides 4 and 5 in bearings 40 are screws 41 which engage in nuts 42 carried by the guides 9 and 10. The screws have bevel gears 43 at their lower ends meshing with gears 44 on the shaft 45 which carries a pulley 46 connected to the pulley 47 on the shaft of the reversible electric motor 48 by means of the belt 49.

Mounted on frame 4 is a bar 51 on which are adjustably mounted the switches 52 and 53 of any well-known "spring-closed" type. These switches are in circuit with the master switch 54 mounted in any convenient position and are opened by a slide to stop the motor 48 when the casing has reached a desired position.

It will be understood that the machine is permanently positioned relative to the table 1 and that the casing 11 is of proper length to contain the shafts 3. The diameters of the rolls A may vary so that the elevation of the chuck must correspond to the height of the shaft in the roll. The position of the switch 52 would be changed if the diameters of the rolls vary greatly. The position of the switch 53 is permanent as it is positioned to cause the shaft in the casing to align with the core B.

In operation, the casing 11 and chuck 12 are moved up to where the roll may be rolled to carry the end of the shaft into the end of the casing. The master switch 32 is swung to cause the motor 26 to move the clutch to the left in Fig. 1, pulling the shaft out of the roll into the casing, this

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movement being stopped when the clutch engages the operating arm of the switch 31, opening the switch. The master switch 54 is then swung over to cause the motor 48 to move the casing and shaft down the inclined guides until the shaft is in alignment with the core B. The switch 32 is then actuated to cause the mechanism to slide the shaft into the core. The casing is then moved upwardly to receive another shaft. The clutch sometimes raises the adjacent end of the shaft a small distance as the clutch moves up, but the shaft soon drops back and the casing can be raised to proper position to receive a fresh roll.

The weight of the casing and of the parts connected thereto may be counterbalanced by the weights 60 on the cables 61 which pass over the rollers 62 and connect to the slides 9 and 10.

The switch mechanism for motor 26 (that for motor 48 being about the same) is diagrammatically shown in Fig. 7. The feed wire 70 connects to contacts 71 and 72. When the master switch arm is in the position shown, contact plate 73 connects contact 71 to wire 74 and contact 75 which is connected to contact 76 by plate 77 of the spring-closed switch 31. From 31, current passes over wire 78 to the motor and over wire 79 to contact 80, plate 81 and contact 82 to return line wire 83. The switch 30 had been opened by the chuck 12. When the chuck engages the operating arm of the switch 31, it will be opened and the motor stopped. When the master switch is swung to the position indicated by the dotted line (switch 30 being moved to its dotted line position by its spring) current will pass over line wire 70, contact 72, plate 81, contact 85, wire 86, plate 87 of switch 30, contact 88 and wire 89 to the motor, thence by wire 90, plate 71 and contact 82 to return wire 83.

We claim:

1. A machine to pull a shaft from a roll of paper and to move it to a new position, compris-

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ing a frame having inclined guides, a shaft receiver slidably mounted on said guides, means to move the receiver on the guides, a chain within the receiver and a chuck connected to the chain and adapted to engage and end of the shaft, means to actuate the chain to pull the shaft from the roll into the receiver and to move the shaft from the receiver when the receiver has been moved to a second predetermined position.

2. A machine to pull a shaft from a roll of paper and move it to a new position comprising a frame having guides inclined to the horizontal, a shaft receiver mounted on said guides, screws to move the receiver laterally back and forth on said guides and a reversible electric motor to actuate the screws, a chain carried by the receiver and a clutch attached to the chain and adapted to engage an end of the shaft, means to actuate the chain and clutch to draw the shaft into the receiver, a reversible electric motor to move the chain, clutch and shaft, and switches to limit the movements of the parts of the machine.

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