

Jan. 18, 1966

R. A. PANNIER

3,229,625

DIFFERENTIAL TURRET STYLE TINPLATE PRINTER

Filed Dec. 27, 1962

5 Sheets-Sheet 1

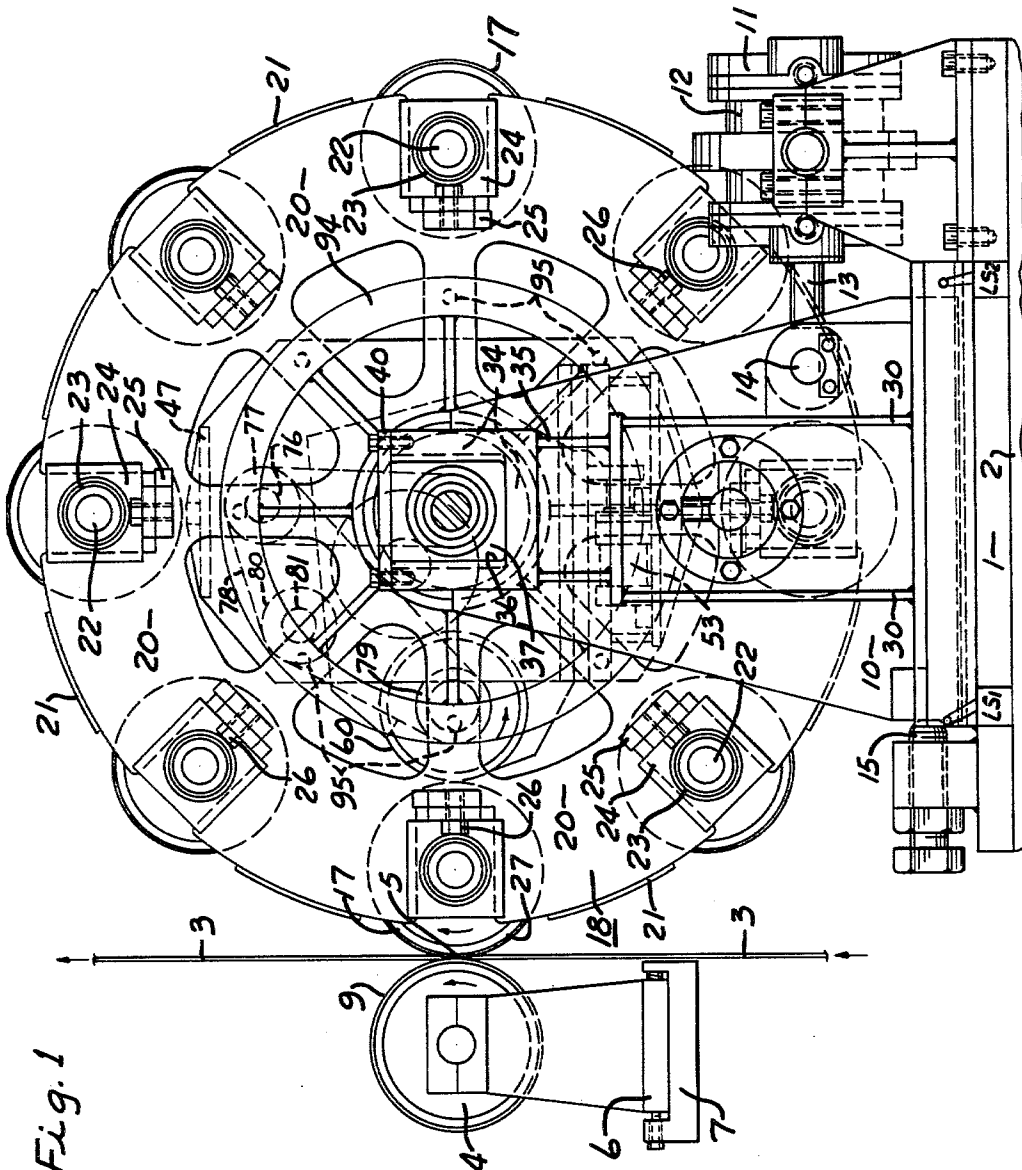


Fig. 1

INVENTOR

RALPH A. PANNIER

BY

William D. Carother

HIS ATTORNEY

Jan. 18, 1966

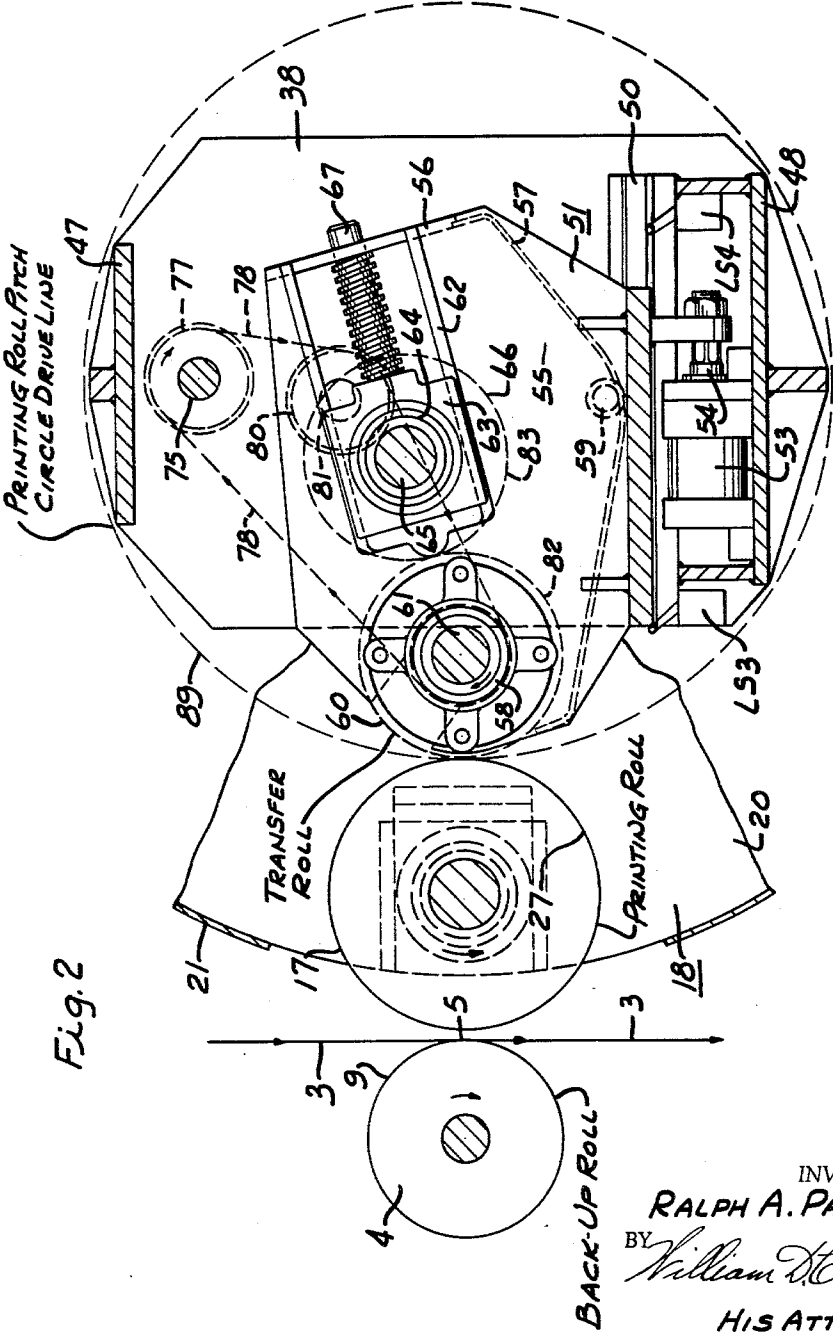
R. A. PANNIER

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R. A. PANNIER

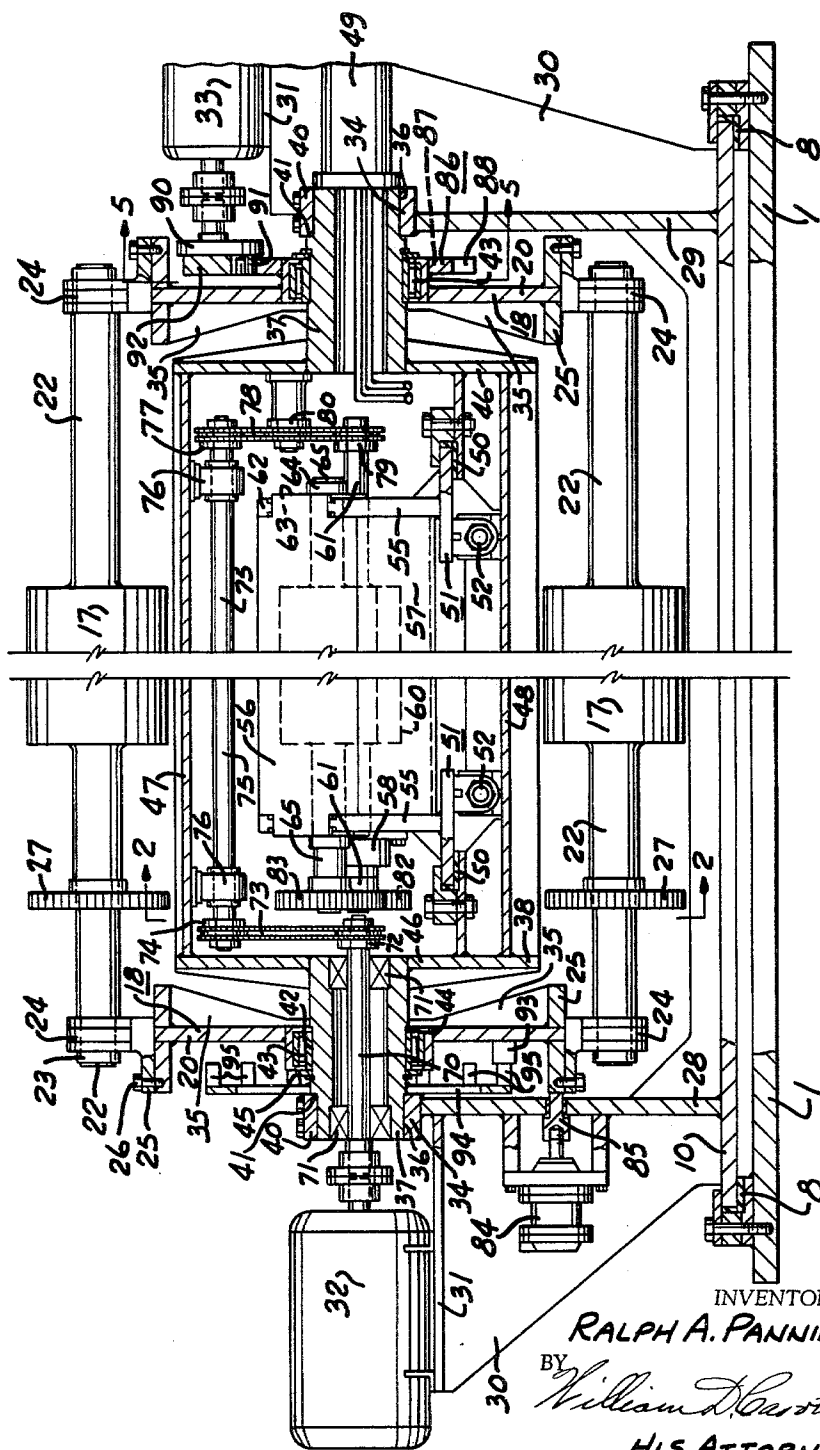
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Fig. 3



INVENTOR

RALPH A. PANNIER

BY

William D. Carothers

HIS ATTORNEY

Jan. 18, 1966

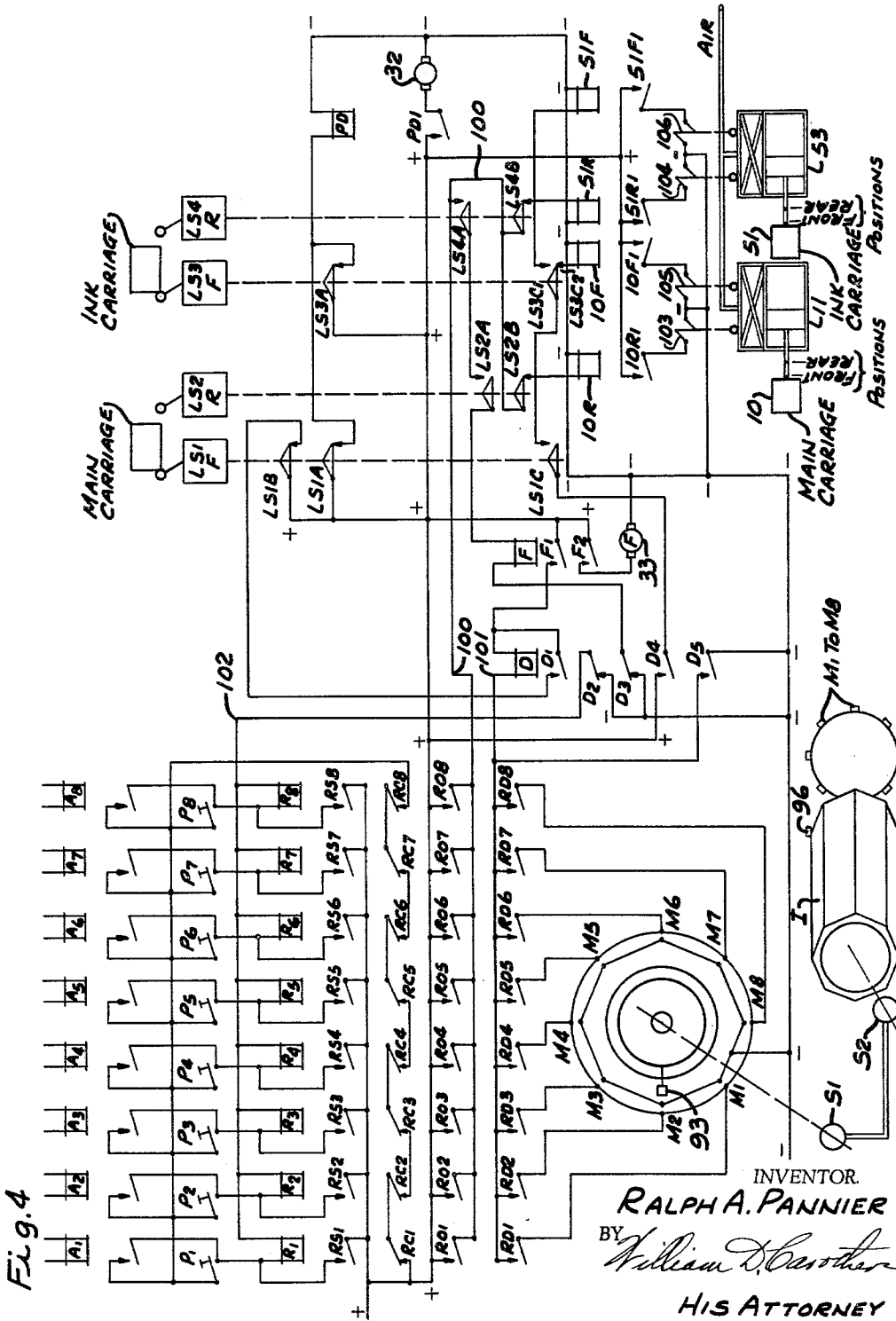
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Fig. 5

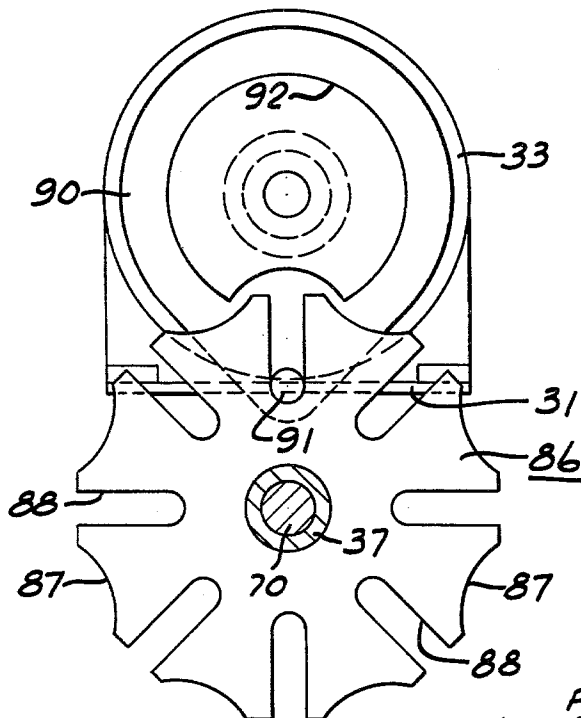
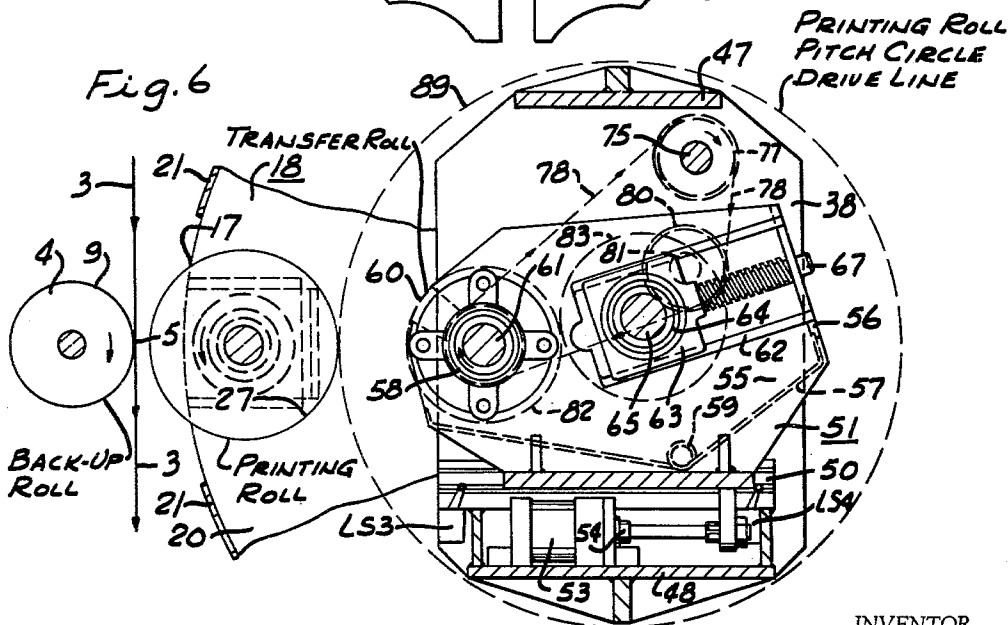


Fig. 6



INVENTOR.

RALPH A. PANNIER

BY

BY
William D. Crother

HIS ATTORNEY

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3,229,625

DIFFERENTIAL TURRET STYLE TINPLATE PRINTER

Ralph A. Pannier, McCandless Township, Allegheny County, Pa., assignor to The Pannier Corporation, Pittsburgh, Pa., a corporation of Pennsylvania
Filed Dec. 27, 1962, Ser. No. 247,741
14 Claims. (Cl. 101—92)

This invention relates generally to printers for marking travelling material such as tin-plate strip and more particularly to an automatic control for changing the printing marking rolls for different applications to the travelling material such as the character and thickness of the plating on the tin plate.

The problem of changing the marking on a travelling strip of tin plate has in the past required the mill to be shut down which, for a relatively short period of time, can be very expensive and the accuracy of the selected printer roll is subject to personal error.

The principal object of this invention is the provision of an automatic machine to withdraw and change the printing roll automatically in accordance with the changing of the characteristics of the material such as the character and thickness of the tin plating on both sides of the travelling strip. The printing rolls are automatically changed by the actual changing of the tin-plate coating on either or both sides. Thus there is no chance of misprinting as well as requiring an interruption of the operation of the mill. A few feet of material may go unmarked during the transition but this is relatively nil as an expense in comparison to the shutting down the mill which may amount to the loss of several thousands of dollars for a very short period of time.

Other objects and advantages appear hereinafter in the following description and claims.

The accompanying drawings show for the purpose of exemplification without limiting the invention and claims thereto certain practical embodiments illustrating the principles of this invention wherein:

FIG. 1 is a view in side elevation illustrating the printing machine in its extended position.

FIG. 2 is a sectional view taken on the line 2—2 of FIG. 3 illustrating the printing machine in its extended position.

FIG. 3 is a view in transverse section of the printing machine.

FIG. 4 is a circuit diagram showing the control of this automatic printing machine.

FIG. 5 is a sectional view taken on the line 5—5 of FIG. 3.

FIG. 6 is a sectional view illustrating the retraction of the printing roll and the transfer roll.

Referring to FIGS. 1 to 3 of the drawings 1 indicates the base upon which the printing machine is mounted. This base is supported on a foundation 2 on one side of the travelling strip 3 of material which is to be marked. The strip 3 of material in this instance is a tin-plate strip that is travelling upwardly as indicated by the arrow. The strip 3 may travel in either direction. If needed the strip 3 may have a backup roll 4 at the printing station 5 from a suitable fixed foundation 7. This back-adjustable frame 6 supported to move relative to the station 5 from a suitable fixed foundation 7. This backup roll 4 may be rotated as hereinafter described.

The base 1 is provided with the ways 8 that slidably support the carriage 10 which has attached thereto the power means 11 in the form of the air cylinder 12 containing a piston attached rod 13 pivotally connected at 14 to the carriage 10. For convenience two such power means 11 may be provided at opposite ends of the carriage

but the both are connected to function in unison with a single control and are connected to exhaust one side of the pistons when pressure is applied to the opposite side.

The power means 11 reciprocates the carriage from the adjustable stop 15 in its extended position to the extent of the piston travel in the opposite or retracted position. The limit switches LS1 and LS2 are actuated by the carriage in its opposite positions as shown.

When the carriage 10 is retracted the printing rolls 17 are withdrawn from the printing station 5 at the nine o'clock position as shown in FIG. 2 and the limit switch LS1 is released and the limit switch LS2 is engaged. Thus the printing rolls 17 are withdrawn from engagement with the travelling strip at the station 5. There are eight different printing rolls 17. Each roll of this series of printing rolls is rotatably mounted in the perimeter of the Ferris wheel 18 which is made up of a pair of spaced wheels 20 secured to each other by means of the arcuate plates 21 which make a rigid rotary frame. Each roll 17 is mounted on a shaft 22 set in bearing 23 set in the bearing blocks 24 that are secured to the pillow blocks 25, by the bolts 26. The bearings 23 and blocks 24 at opposite ends of the printing roll shaft 22 support the rolls 17 but each shaft has secured thereto a gear 27 for rotating the printing roll at the same peripheral speed as the liner speed of the strip 3.

The wheels 20 of the Ferris wheel 18 are supported by the main frame members 28 and 29 on the carriage 10. These frames are upright members that are braced with spaced outwardly projecting plates 30 that carry the platform 31. A variable speed motor 32 is supported by the platform 31 of the frame member 28 and the motor 33 is supported by the platform 31 of the main frame 29.

The upper portion of each frame carries an upwardly open journal box 34 braced by the angle members 35 on their respective platforms. Each journal box has an upwardly open square cavity to receive the squared end 36 of the tubular supports 37 that hold the inner frame member 38. A cap plate 40 is secured to the top of the journal box 34 and holds the tubular support 37 in place. A shoulder 41 is formed where the squared portion 36 ends. These corners 41 gauge the distance between the frames 28 and 29.

A cylindrical surface 42 is turned on the tubular support 37 to receive the antifriction bearings 43 that rotatably support the wheels 20 at each end of the Ferris wheel 18. The bearings 43 are held against the shoulder 44 and the lock and split ring combination 45. Thus the Ferris wheel 18 is supported for rotation on the reciprocal carriage 10 and carries eight or any desired number of printing rolls 17 each with a gear 27. This Ferris wheel encloses over the inner frame member that supports the inking device.

The inner frame member is thus stationary relative to the carriage 10. The inner frame member consists of the end plates 46, secured to the inner ends of the tubular supports 37, which are secured together by the upper and lower longitudinal plates 47 and 48. Above the lower plate 48 the end plates 46 carry the ways 50 upon which is reciprocally supported the inking carriage 51 which is reciprocated by the motor means 52 which are spaced from the air cylinders 53 mounted on the lower plate 48 having their piston rods 54 secured to the inking carriage 51.

The inking carriage 51 has the spaced upright frame members 55 connected by the back plate 56 and the under basin-like tray 57. Drain plugs 59 are provided in the ends 55 of the carriage 51 from which to drain the basin 57 of any ink drippage although the ink is of the character that it is applied by spraying or flowing and is

not in quantities that would be in excess to cause an overflow.

The inking carriage frames 55 carry spaced bearings 58 to rotatably support the ink transfer roll 60 carried by the shaft 61.

The ink carriage frame members 55 each have a rearwardly open slot 62 which slidably carry the bearing blocks 63 that fixedly support the antifriction bearings 64 in which the shaft 65 is journaled. The shaft 65 carries the inking roll 66 and the plate 56 is provided with the pressure screws 67 which bear against their respective bearing blocks 63 to determine the pressure between the inking roll 66 and the ink transfer roll 60. As previously stated the inking device 68 is supported on the inner face of the plate 56 and may spray or flow the ink on the roll 66 in a quantity sufficient to be carried to and transferred by the transfer roll 60 to the printing roll 17 and thence to the strip 3. Thus it makes little difference which direction the rolls 66 and 60 travel as they are not transferring an ink that is of extremely low viscosity or a thin ink.

The motor 32 on the platform 31 is coupled to the shaft 70 carried by the antifrictional bearings 71 within the tubular member 37 and extending to within the inner frame 38. The end of the shaft 70 carries the sprocket 72 to drive the chain 73 and the sprocket 74 on the cross shaft 75 carried by the bearings 76 on the underside of the upper plate 47 of the inner frame 38. The other end of the cross shaft 75 carries the sprocket 77 to drive the chain 78 and the sprocket 79 on the end of the ink transfer roll shaft 61. As shown in FIG. 1 the strip 3 is travelling upward so the chain 78 and the sprocket 77 with its shaft 75 are travelling in a counter clockwise direction in which case the idler sprocket 80 is mounted on the shaft 81 on the push side of the chain the pull side being directly from the sprocket 79 to the sprocket 77.

If the strip 3 is travelling down the idler roll 80 and its shaft are placed on the down side as shown in FIG. 2 and the shaft 75 with its sprocket 77 is travelling clockwise and the straight or pull side of the chain 78 is on the top side.

Thus this printer can be used for printing strip travelling up or down by merely switching the idler 80 and its shaft 81 and rotating the motor 32 in the opposite direction. Obviously this printer is designed to work on a vertical pass of the strip but it could readily be converted to operate on a horizontal pass of the strip 3 and be positioned either on top or bottom of the travelling strip.

When the shaft 61 of the ink transfer roll 60 is rotated the gear 82 on the opposite end from the sprocket 79 is caused to rotate. Since the gear 82 is in mesh with the gear 83 on the inking roller shaft 65 the inking roller is rotated in timed relation and the pitch line of the gears 82 and 83 are substantially the same diameter as their respective rolls 60 and 66 thus they travel in surface contact with each other with pressure exerted therebetween by the screws 67.

Any reciprocal movement of the inking carriage 51 is thus assumed by the idler sprocket and the rolls 60 and 66 will continue to run regardless of the position of the inking carriage 51. The only time that the inking roll 66 would not be in contact with the ink transfer roll 60 would be when the bearing blocks 63 would be moved outwardly in the slots 62 at which time the motor 32 would, of course, not be rotating.

When inking carriage 51 is moved forward on the ways 50 the driving gear 82 of the ink transfer roll shaft 61 engages the gear 27 on the printer roll shaft 22 and thus drive the printer roll 17 that is positioned at the nine o'clock location as shown in FIG. 1. The motor 32 that drives the shaft 61 and the gears 82 and 27 when meshed to rotate the printing roll 17, before engaging the constantly moving strip, constitutes one form of roll driving means. The speed of the motor 32 is selected so that through this chain and gear drive the peripheral

speed of the printing roll 17 will be the same as the lineal speed of the strip 3.

At this time the carriage 10 may be moved forward to permit the selected printing roll 17 to become engaged in moving surface contact with the travelling strip 3 and thus ink fed to the inking roll 66 is transferred by the transfer roll 60 to the printing roll 17 and thus print the travelling strip 3. The inking carriage power means or motors 53 may be adjusted through their piston rods 54 to apply the proper pressure through the surface contact between the transfer roll 60 and the printing roll 17.

The gears 27 and 82 will always properly mesh because their teeth are sharpened and being made of a plastic such as nylon or other suitable material they will not hang upon each other. This is particularly true when the motor 32 is kept running and the Ferris wheel is being changed to change printing rolls. The backup roll 4 may also be provided with a gear 9 to mesh with gear 27 and drive the same with the strip travelling therebetween if both are the same diameter.

To change the printing roll the carriage 10 is withdrawn and the inking carriage 51 is withdrawn which leaves the Ferris wheel 18 free. The cylinder 84 is de-energized to permit its biasing spring to withdraw the dent lock member 85 from the Ferris wheel 18 and allow the latter to be rotated to position another selected printer roll 17 in printing location at the nine o'clock position after which the Ferris wheel is relocked and the inking carriage is returned to engage and rotate the new printing roll and the carriage 10 is extended to have the newly positioned printing roll engage and print on the travelling strip 3.

In order to rotate the Ferris wheel 18 the end opposite that of the motor 32 is provided with the Geneva wheel 86 which is fixed to the Ferris wheel 20 at the right end in FIG. 3. The Geneva wheel is provided with eight arcuate dwell surfaces 87 and eight radial slots 88 for moving the Geneva wheel through the eight positions. Thus each dwell position 87 is centered relative to a printing roll and regardless of the actual positions of the Geneva wheel 10.

The Geneva driver 90 has one cylindrical dwell part which represents a printing roll locking position. The Geneva driver 90 has the roller 91 to descend into the slots 88 and move the eight position Geneva wheel from one printing roll position to another. During the dwell period the wheel remains stationary when the cylindrical portion 92 of the driver is in mesh with the dwell portion of the wheel 86. The driver 90 is rotated by the motor 33.

The end of the Ferris wheel 18 adjacent the motor 32, is provided with a permanent magnet 93 which is positioned relative to the printer rollers on the Ferris wheel. Thus its location, regardless of just where it is, has a fixed relation to the position of the Ferris wheel 18. A disc 94 is secured to the vertical frame member 28 and is provided with eight independent switches 95 or series M1 to M8 operable to close a circuit when the permanent magnet 93 is adjacent thereto. These switches have the same spacing as the printing rolls 17 and thus each switch represents a printing roll and when the magnet 93 is opposite a switch it will function. These magnetically operated switches will actuate when the magnet passes so their circuit must be arranged to function when the permanent magnet stops at the selected printing roll position. These magnetic switches may have front and back multiple contacts and the wiring to the stationary disc 94 carrying these switches M1 or 95 need be wired with sufficient play to allow for reciprocal movement of the carriage 10.

The motor end 33 of the Ferris wheel 18 is above the tubular member 37 which is employed to carry the pneumatic tubing for the operation of the air motors 53 in reciprocating the inking carriage 51. The valve that applies the air to one side of their piston in these fluid motors also exhausts air from the other side of the piston.

Thus dual lines of both motors 53 are connected together and only two lines are brought out of the Ferris wheel and the control valves are outside.

To automatically control this marking machine a set of selection relays A1 to A8 are controlled by the machine which in this instance changes the type of tin plate coating on the travelling steel strip 3. This circuit means for automatically controlling the positioning of a selected roller 17 may have as many as eight different printing roll combinations and if the mill is capable of having more a printer with more rolls must be employed although it would otherwise be the same as that shown and described. Thus the relay series A1 to A8 represents a function of changing the coating of tin plate on the strip and as a result of this change one of the relay series A1 to A8 is energized. These are impulse relays and once energized they drop out. The contacts of these relays are in parallel with their respective push button series P1 to P8 which permit a manual selection of the printing roll. If the selection is made through the push button series the same selected function takes place and to initiate this operation the selected circuit first energizes one of the series of selection R relays R1 to R8 by the impulse of the push buttons P or the relay series A. To become energized the selected A relay or selected push button P must first check through the RC back contacts of the R relay series. If none of these relays is energized then the A relay or push button P is effective in closing its energizing circuit and the selected R relay becomes energized closing its own front contact stick circuit RS.

Upon the energization of a selected R relay its closed front contact R9 to line 100 and set up its front de-energizing contact RD to line 101 which is on the ground side of relay D.

The circuit of each R relay is made from + or positive through its front stick contact RS to one side of the operating coil and thence through 102 to back contact D2 of the de-energizing relay D to — or negative.

When line 100 is energized it supplies current through the normally closed back contacts LS2B and LS4B both of which are the limit switches for the forward and retracted position of the main carriage 10 and the inking carriage 51 respectively. Since both of these carriages are in their forward position these back contacts are closed and both of the carriage reversing relays 10R and 51R are energized simultaneously to retract both carriages by closing their front contacts 10R1 and 51R1 to energize their respective solenoids 103 and 104 to supply air to the front of the respective motor cylinders and exhaust air from the rear causing the respective carriages to move from front to rear. This movement of the carriages open the back contacts of LS2 and LS4 thus de-energizing 10R and 51R leaving the carriages retracted.

When in their forward position both carriages 10 and 51 maintain limit switches LS1 and LS3 closed and their normally closed contacts when the carriages are forward are LS1A and LS3A which are in parallel and supply current from + to relay PD or printing drive relay. When PD relay is energized its front contact PD1 supplies current to motor 32 to drive the ink transfer roll 60 the inking roll 66 and the printing roll 27 and any other roll connected therewith. Thus when the carriage 10 and 51 are retracted this printing drive relay PD is de-energized by the withdrawal of the carriages 10 and 51 from the limit switches LS1 and LS3 respectively.

As soon as LS1 is disengaged by carriage 10 LS1B is engaged. LS1B supplies current to the front contact D1 of the de-energizing relay which is not energized.

When both carriages 10 and 51 are fully retracted LS2 and LS4 open their back contacts LS2B and LS4B to de-energize relays 10R and 51R which may be impulse relays as the motors 11 and 53 are impulse acting but these open contacts prevent their further energization. At the same time LS2A and LS4A are closed. These contacts are connected in series from the control line 100 to the Ferris

wheel operating relay F the other side of which is connected to ground return — through the back contact D3 of de-energizing relay D. The Ferris wheel relay F is then energized closing its front contacts F1 and F2. Front contact F1 puts a positive connection to the operating coil of the de-energizing relay D but the ground side of this relay is connected to line 101 which is not closed by any front contact of the RD series of relays R since the permanent magnet 93 on the Ferris wheel 18 is not opposite the proper relay 95 or series M relays.

The contact F2 of the Ferris wheel relay F energizes the motor 33 to rotate the driver 90 of the Geneva and inturn rotate the Geneva wheel 86 by consecutively passing the roller 91 through the slots 88 between the consecutive dwell stations 87. When the permanent magnet 93 reaches the dwell position opposite the selected relay M which when closed will complete the ground circuit for the de-energizing relay D through the selected front contact RD series then D closes its front stick contact D1 and remains energized until the LS1B contact is opened.

The energization of the D relay opens contact D2 to de-energize the selected relay R which would open all the front contacts RD which would drop D but for the parallel ground contact D5 which maintains D energized until the carriage 10 is returned to its forward position to actuate LS1 and open LS1B.

The opening of contact D3 de-energizes relay F which opens the pickup circuit of D through F1 and stops the motors 33 through F2.

The closing of contact D4 supplies positive potential to LS1C the normally open but now closed front contact LS1C1 supplying the same potential is supplied through the normally open but presently closed contact LS3C1 to relay 51F which through its contact 51F1 energizes solenoid 106 to supply air to the rear of the cylinder 53 and move the inking carriage 51 to its forward position. As soon as this is done contact LS3C1 is opened to de-energize relay 51F. When the inking carriage engages limit switch LS3 its contact LS3A energizes PD to close PD1 and start the motor 32 to rotate the rolls 60 and 66 after the gear 82 engages the gear 27 of the printing roll 17.

When the inking carriage 51 is forward LS3C1 is opened and LS3C2 is closed. The latter contact is connected to energize relay 10F its front contact 10F1 which when closed actuates solenoid 105 which moves the carriage 10 to its forward position. All of the rolls 60, 66 and 17 are rotating at this time and the peripheral speed of roll 17 is selected to synchronize with the lineal speed of the strip 3. Thus the inking carriage 51 is returned first and must be in position before the carriage 10 is returned to printing position. Thus relay D is maintained energized until the carriage 10 is moved to its forward or operating position at which time LS1B opens to de-energize relay through its own stick contact D1.

The limit switch LS1 also opens LS1C when the carriage is forward thus the circuit is in readiness for the next impulse of line 100 whether it be the same or another relay of the R series. Even if the same relay R as the present printing roll selection is made the carriages will be retracted but the relay F will merely pulse and the motor 33 will not turn the Ferris wheel and the carriages will be immediately returned. This completes the circuit means for actuating the operating means to automatically change a printing roll.

Said Ferris wheel 18 has connected thereto a Selsyn motor S1 which is electrically interconnected with a second Selsyn motor S2 that is preferably mounted in the control center for the mill which may not be the pulpit or local control station but where the whole of the mill is controlled and operated. The motor S2 is connected to an indicator I that has eight indicating stations that correspond with the eight printing rolls thus the actual position of the printing rolls 17 at the printing station 5 is shown in the control room and may be used as a monitor check with magnetic relays M such as employed

on the actual Ferris wheel and a permanent magnet 96 to operate the same as indicated schematically in FIG. 4. In the structure of FIG. 1 both the Ferris wheel carriage 10 and the inner inking carriage 51 are shown in their forward position with the gear 60 in mesh with the gear 27 to drive the roll 17 in the same linear speed as the strip 3.

In FIG. 2 although the strip 3 is travelling in the opposite direction the carriage 10 supporting the Ferris wheel has been retracted. However, the inking carriage 51 still remains forward with the gears 60 and 27 in engagement. As shown in FIG. 2 the pitch circle drive line 89 for each of the printing rolls 17 is indicated as a large circle which actually encircles the inner frame member 38 and since the gear 60 is shown in mesh with the gear 27 in FIG. 2 this pitch circle drive line passes through the pitch circles of each of these gears.

As shown in FIG. 6 both the Ferris wheel carriage 10 and the inking carriage 51 have been retracted so as to withdraw the gear 60 from the printing roll pitch circle drive line. Thus the three views, FIGS. 1, 2 and 6 illustrate the relative positions of the carriages 10 and 51.

I claim:

1. A multiroll printer for selectively marking one of a plurality of designs on a travelling strip of material which consists of a base, fixed relative to the travelling strip, a carriage reciprocally mounted on said base to move forward and back, a Ferris wheel rotatably mounted on a fixed axis on said carriage, a plurality of printing rolls each rotatably mounted in peripheral spaced relation to each other on said Ferris wheel and with their printing surfaces extending beyond the perimeter of said Ferris wheel, a stationary inner frame supported within said Ferris wheel through said fixed axis from said carriage, an inking carriage reciprocally mounted to move forward and back on said inner frame, an inking roller rotatably mounted on said inking carriage and having one portion for receiving ink to be applied in printing, an ink transfer roll rotatably mounted on said inking carriage to engage said inking roll, means to adjust the pressure of said inking roll against said transfer roll, gear means on each of said rolls, drive means extending through said fixed axis to rotate said ink transfer roll to drive said ink roll, means to reciprocate said carriages forward to connect the drive means between said transfer roll and a selected of said printing rolls and to move the latter into printing engagement with the travelling strip of material, and means to adjust said drive to rotate said selected printing roll at a peripheral speed synchronized with the lineal speed of said travelling strip of material.

2. A differential tin-plate printer for marking a plurality of different designs in accordance with the tin-plate coating characteristics consisting of a base fixed relative to the travelling tin-plate strip, a carriage frame reciprocally mounted on said base, power means on said base connected to said carriage frame to reciprocally extend and retract the same, a Ferris wheel rotatably mounted on a fixed axis on said carriage frame, a plurality of printing rolls each rotatably mounted in peripheral spaced relation with each other on said Ferris wheel and with their printing surfaces extending beyond the perimeter of said Ferris wheel, a stationary inner frame, a support for said inner frame extending through said fixed axis from said carriage frame to within said Ferris wheel, an inking carriage reciprocally mounted to extend and retract on said inner frame, a reciprocal motor on said inner frame connected to said inking carriage to reciprocally extend and retract the same in the same directions as the reciprocation of said carriage frame, an inking roller rotatably mounted on said inking carriage and having one portion for receiving the ink to be applied in printing, an ink transfer roll rotatably mounted on said inking carriage with its perimeter engaging said inking roller, means to adjust the pressure of said inking roll against said transfer roll, a rotary drive shaft means ex-

tending through the support of said inner frame and connected to drive said transfer roll, and drive means between said transfer roll and said inking roll and a selected printing roll when said inking carriage is extended.

3. A multiroll printer for selectively marking one of a plurality of designs on a continuously travelling strip of material which consists of a rotatably supported Ferris wheel mounted on a reciprocal carriage and carrying a series of peripherally spaced rotatable printing rolls to be selectively positioned by the Ferris wheel at a strip printing position to print on said travelling strip, means to advance and retract said Ferris wheel carriage and a selected printing roll to and from the strip printing position, means to rotate said Ferris wheel when retracted, circuit means for actuating said first means for automatically positioning a selected printing roll in alignment with the strip printing position by sequentially first retracting the Ferris wheel carriage by said first means then actuating said second means to rotate the Ferris wheel to position a selected roll for printing then advancing the carriage of the Ferris wheel by said first means with the newly selected roll to the strip printing position.

4. The multiroll printer of claim 3 which also includes a roll driving means including an inner power operated carriage reciprocally mounted to advance and retract within said Ferris wheel to respectively engage and disengage said roll driving means to said printing rolls, said circuit means also actuating said power actuated inner carriage to retract said inner carriage while retracting said Ferris wheel carriage to disengage said roll driving means before rotating said Ferris wheel, a rotary motor to operate said driving means, said circuit means also interrupting the operation of said rotary motor when both carriages are retracted.

5. The multiroll printer of claim 3 which also includes a roll driving means including an inner power operated carriage reciprocally mounted to advance and retract within said Ferris wheel to respectively engage and disengage said roll driving means to said printing rolls, said circuit means also actuating said power actuated inner carriage to retract said inner carriage while retracting said Ferris wheel carriage to disengage said roll driving means before rotating said Ferris wheel, a limit switch means actuated by each carriage when in its retracted position, said circuit means to retract said carriages being supplied through normally closed contacts in said limit switch means.

6. The multiroll printer of claim 3 which also includes a roll driving means including an inner power operated carriage reciprocally mounted to advance and retract within said Ferris wheel to respectively engage and disengage said roll driving means to said printing rolls, said circuit means also actuating said power actuated inner carriage to retract said inner carriage while retracting said Ferris wheel carriage to disengage said roll driving means before rotating said Ferris wheel, a limit switch means having a contact actuated by each carriage when in its retracted position, said circuit means completing through said contact means in series, a circuit through a Ferris control relay to rotate said Ferris wheel.

7. The multiroll printer of claim 6 which also includes a selecting circuit actuated by the position of the selected roll on said Ferris wheel to close a circuit including a de-energizing relay, a back contact opened by said de-energizing relay to open the circuit of said Ferris control relay and stop the rotation of said Ferris wheel.

8. The multiroll printer of claim 7 which also includes a de-energizing relay back contact in series with said circuit means to position a selected printing roll.

9. A multiroll printer for selectively marking one of a plurality of designs on a continuously travelling strip of material which consists of a rotatably supported Ferris wheel mounted on a reciprocal carriage and carrying a series of peripherally spaced rotatable printing rolls to

be selectively positioned by the Ferris wheel at a strip printing position to print on said travelling strip, means to advance and retract said Ferris wheel carriage and a selected printing roll to and from the strip printing position, means to rotate said Ferris wheel when retracted, circuit means for actuating said first means for automatically positioning a selected printing roll in alignment with the strip printing position by sequentially first retracting the Ferris wheel carriage by said first means then actuating said second means to rotate the Ferris wheel to position a selected roll for printing then advancing the carriage of the Ferris wheel by said first means with the newly selected roll to the strip printing position, a roll driving means including an inner power operated carriage reciprocally mounted to advance and retract within said Ferris wheel to respectively engage and disengage said roll driving means to said printing rolls, said circuit means also actuating said power actuated inner carriage to retract said inner carriage while retracting said Ferris wheel carriage to disengage said roll driving means before rotating said Ferris wheel.

10. A multiroll printer for selectively marking one of a plurality of designs on a continuously travelling strip of material which consists of a rotatably supported Ferris wheel mounted on a reciprocal carriage and carrying a series of peripherally spaced rotatable printing rolls to be selectively positioned by the Ferris wheel at a strip printing position to print on said travelling strip, means to advance and retract said Ferris wheel carriage and a selected printing roll to and from the strip printing position, means to rotate said Ferris wheel when retracted, circuit means for actuating said first means for automatically positioning a selected printing roll in alignment with the strip printing position by sequentially first retracting the Ferris wheel carriage by said first means then actuating said second means to rotate the Ferris wheel to position a selected roll for printing then advancing the carriage of the Ferris wheel by said first means with the newly selected roll to the strip printing position, a selection relay having a back contact and three front contacts for each specific printing roll for each relay includes the following, a pickup circuit initiated through the back contact of each of said selection relays, a stick circuit for each relay through the first front contact, an operating circuit for each relay through its second front contact, and a de-energizing circuit for each relay through its third front contact.

11. The multiroll printer of claim 10 which also includes a de-energizing relay energized by the positioning of the selected printing roll in printing position and having a back contact that interrupts the stick circuit through the first front contact of the selection relay when the selected printing roll is in printing position.

12. The multiroll printer of claim 10 which also includes a magnetic relay actuated by a permanent magnet position on said Ferris wheel and actuating said magnetic relay when the selected roll has been positioned in printing position.

13. A multiprinter for selectively marking one of a plurality of indicia on a continuously traveling subject from one of a plurality of printing rolls placed at a printing position to print on the subject at a printing position which consists of a base, a Ferris wheel rotatably mounted on aligned journals supported from said base, said printing rolls each rotatably mounted in peripheral spaced relation to each other on said Ferris wheel with their printing surfaces touching a common imaginary circle, each printing roll to print on the traveling subject when moved into said printing position means to selectively position one of said printing rolls into said printing position to print on the traveling subject, a frame supported on said aligned journals within said Ferris wheel, ink roll means mounted on said frame within said Ferris wheel for ink transferring engagement with the printing roller being positioned into said printing position to print on the traveling subject, a motor supported from said base, drive means supported by said frame within said Ferris wheel and driven by said motor to rotate said ink roll means and said printing roll being positioned into said printing position at a peripheral speed equal to that of the traveling subject being printed and before engaging the continuously traveling subject matter to print thereon.

14. A multiprinter for selectively marking one of a plurality of indicia on a continuously traveling subject from one of a plurality of printing rolls placed at a printing position to print on the subject which consists of a base, a Ferris wheel rotatably mounted on aligned journals supported from said base, said printing rolls each rotatably mounted in peripheral spaced relation to each other on said Ferris wheel with their printing surfaces touching a common imaginary circle, each printing roll to print on the traveling subject when moved into said printing position, means to selectively position one of said printing rolls into said printing position to print on the traveling subject, ink roll means supported from said base for ink transferring engagement with the printing roller before reaching said printing position to print on the traveling subject, a motor supported from said base, drive means supported from said base and driven by said motor to rotate said ink roll means and said printing roll being positioned at a peripheral speed substantially equal to the speed of the traveling subject before said printing roll being positioned engages the traveling subject to print thereon.

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ROBERT E. PULFREY, *Primary Examiner*.

WILLIAM B. PENN, *Examiner*.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,229,625

January 18, 1966

Ralph A. Pannier

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 8, line 14, for "when", first occurrence, read
-- wheel --.

Signed and sealed this 10th day of January 1967.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents