Dec. 31, 1968 R. A. PANNIER 3,418,934

LINE BAND SELECTOR FOR DIFFERENTIAL TIN PLATE MARKER

Filed Nov. 18, 1965 Sheet 1 of 3

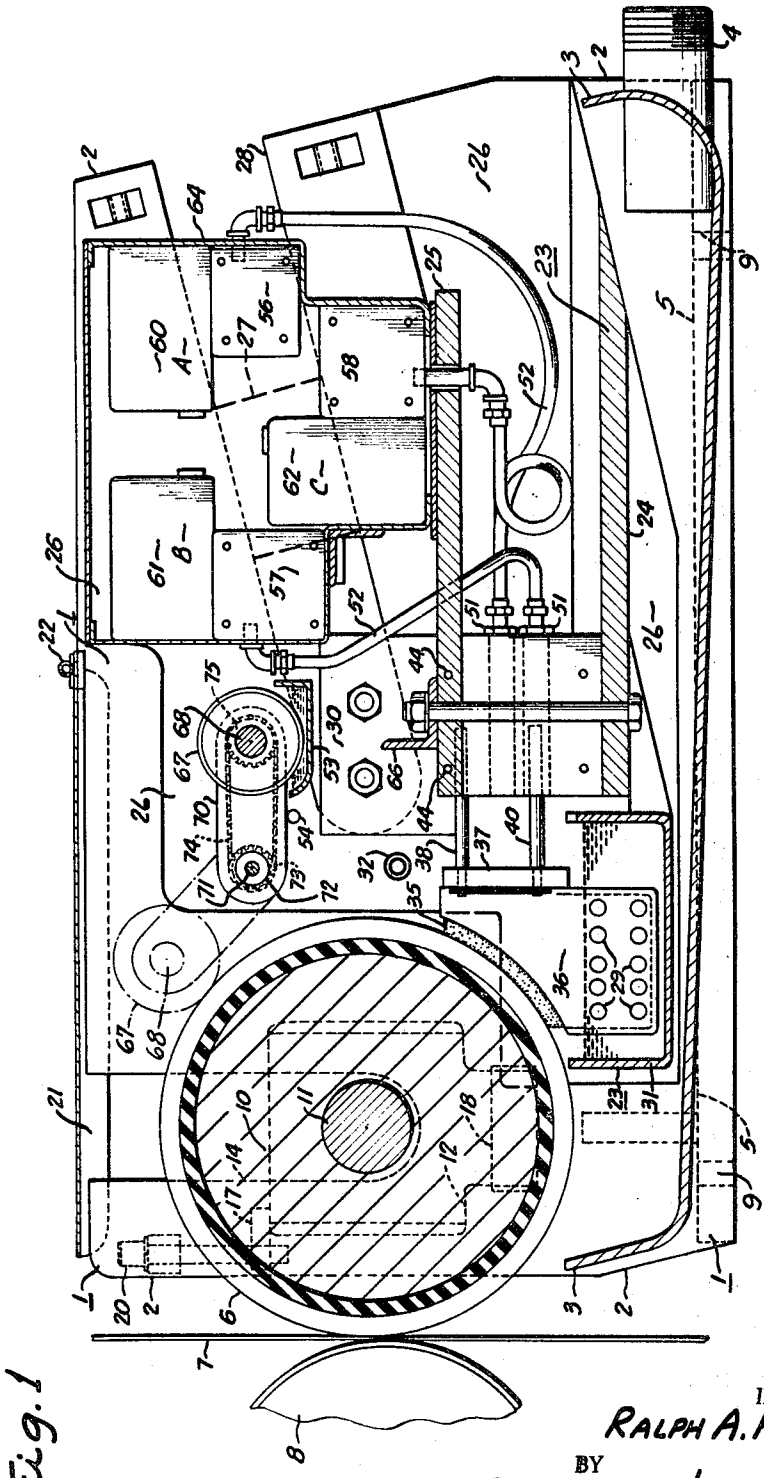


Fig. 1

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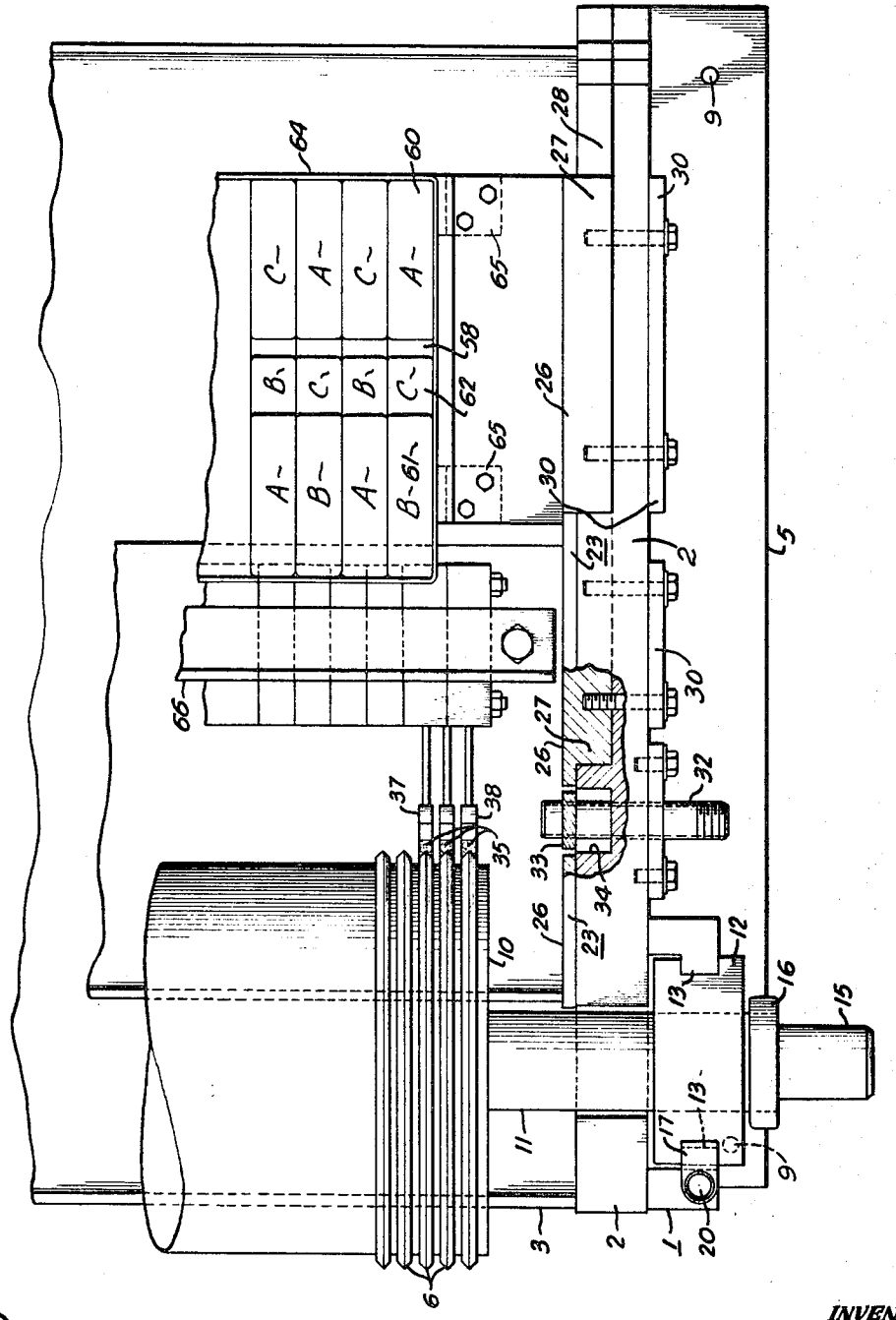


Fig. 2

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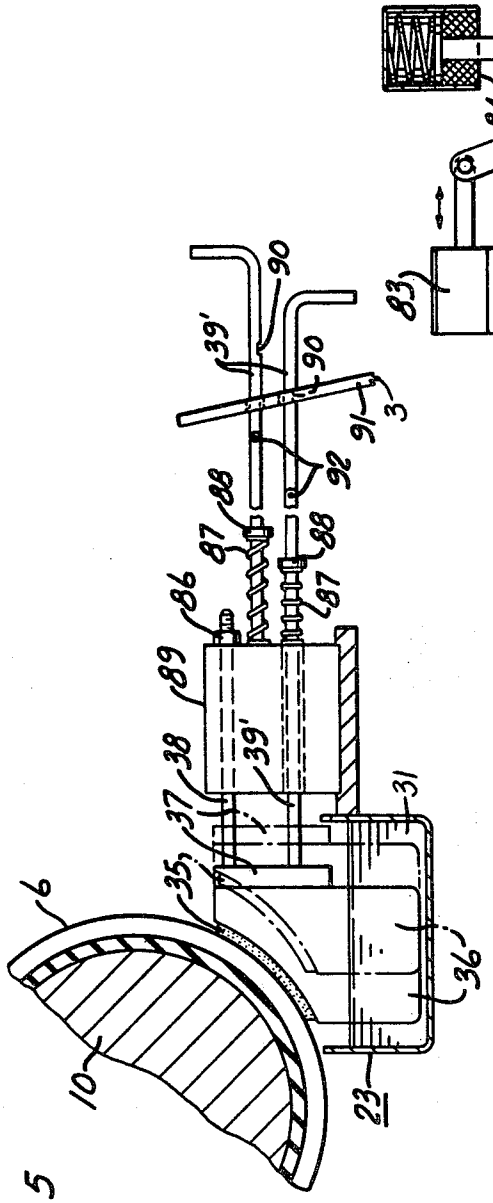


Fig. 5

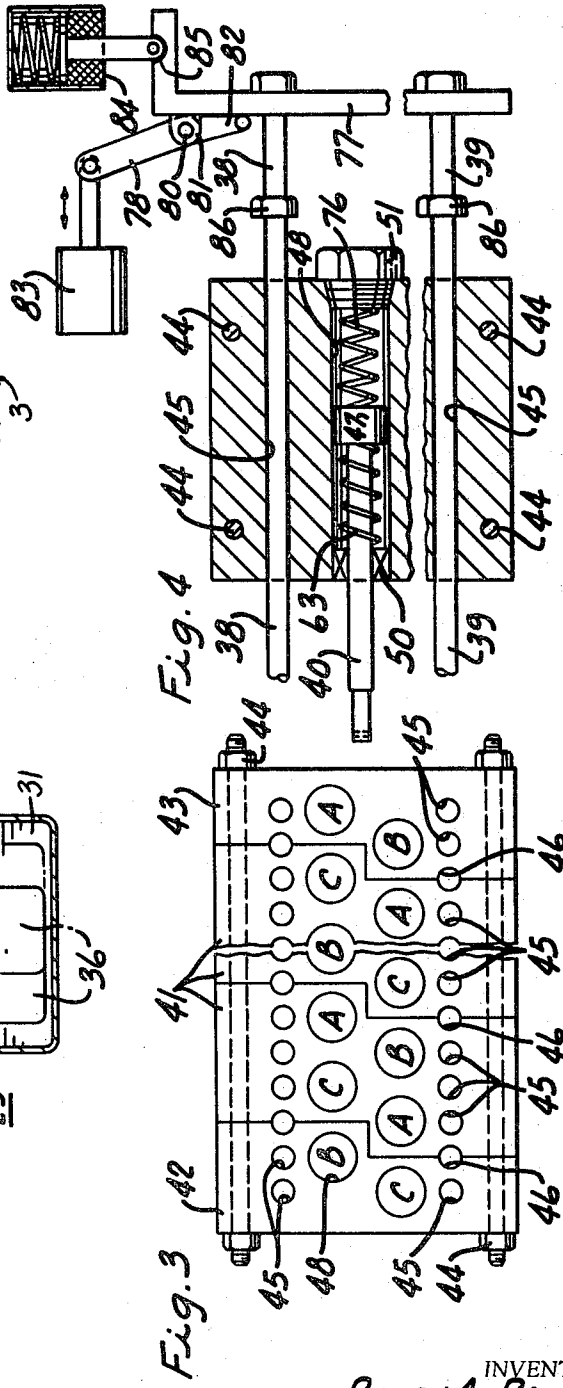


Fig. 4

Fig. 3

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3,418,934

LINE BAND SELECTOR FOR DIFFERENTIAL TIN PLATE MARKER

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11 Claims. (Cl. 101—328)

ABSTRACT OF THE DISCLOSURE

This invention is a simplified band printer for a differential tin plate line having a series of uniformly spaced annular printing bands on a rotary cylinder mounted on a base and synchronously driven to have continuous contact with a travelling strip of material. The printing bands maintain continuous contact with the travelling strip. The selective printing bands print on the running strip of material by selectively moving their applicator into engagement with their respective printing band. Each applicator is continuously supplied with ink and is slidably supported from the base by guide and piston rods which rods are selectively reciprocal to advance and engage each applicator with its respective printer band to transfer ink to the band and thence to the travelling strip to selectively code mark the same while the applicator is in engagement with its band, and when the applicator is retracted it ceases to supply ink to the printing band which is still in continuous contact with the travelling strip. The printing bands always operate in continuous contact with the travelling strip which is the crux of this invention. The applicators are continuously supplied with ink. They are reciprocally mounted and may be selectively advanced or retracted to engage their respective printing band to print a specific code and identify the mill, the character of the sheet, the character of the coating, the date and any number of different intelligence by merely selectively reciprocating the applicators without stopping the basic code printing or the line. The reciprocation of the applicator may be manual with hand levers or locks. An applicator may be power actuated and locked in its advanced or retracted position may be power released from either position or manually released if power locked.

This invention relates generally to tin plate line band printers having a roll with a series of printing bands for legend marking a traveling strip of tin plate, and more particularly to a selector for changing the legend without interrupting the fast movement of the tin plate strip.

A line band tin plate strip travels at a high rate of speed through the process of tin plating the surfaces of the strip. The thickness of the tin plate coating are required to be changed on one or both sides of the strip for different purposes and uses. The legend plate marking is applied to the strip and is covered by the tin plate.

The legend may provide a readable key to the character and thickness of the tin plate, the manufacture and the particular line on which the strip was run. The line band printer comprises a rotary driven roll longer than the tin plate strip is wide and carrying thereon a series of printing bands which are approximately one-half inch apart. Thus, a strip five feed wide may have as many as one hundred and twenty lines to produce the legend and identify the character and thickness of the tin plate and the identity of the manufacturer.

A single solid printer roll, with a printing band every half inch of its length, must be capable of selectively

marking the traveling tin plate without interruption of its rotation. This is accomplished by withdrawing the marking solution from the particular printing bands not incorporated in the particular selected code or legend. This withdrawal of the particular marking solutions is accomplished by a cleaning of the printing bands so that those not to be in use will have no solution and those in use remain moistened by the marking solution.

Thus only the inkers or marking solution transfer applicators may be withdrawn and the printing bands cleaned, or all of the marking solution applicators may be removed and all of the printing bands then cleaned, and only the selected applicators returned to renew the wetting of the selected printing bands making up the code legend. These applicators are preferably electrically controlled. They may be actuated by single or double acting pneumatic pistons energized through electrically operated valves. This electronic control may be preset by cords or tape which also control the tin plate characteristics so that both the actual tin plate and the legend are simultaneously changed by a predetermined order that is automatically set in motion to a computer type control. The mill thus continues to run automatically, changing the tin plate coating and the legend automatically until the termination of the order or series of orders previously stored in the computer control.

The principal object of this invention is the provision of a battery of cylinder blocks embraced by end pieces to house independent cylinders and operating pistons with guides for reciprocally supporting individual applicators in their operating position, non-operating position or further retracted to their lock out position. These independent applicators function through at least two electrically operated pneumatic valves wherein three valves are in alignment with each other since they are wider than the cylinders which are on half inch centers. These electrically operated pneumatic valves are supplemented by an electric lock out and a latch release member, which may be manually operated or released. This lock out holds the applicator further retracted and out of service. It is used in those instances where the selected line band is not normally employed but the band is always present when needed. Thus the electric lock outs are supplemented by a manual lock out and released.

The wiping roll is pivoted to the common frame that supports the liquid marking applicators and the operating structure therefor. This is inserted as a unit to operate with existing structures. The wiping roll is rotatably mounted on an axis that is pivoted to swing the whole of the roll into surface contact with the printing bands. The roll is preferably made of a material that has absorption qualities as well as good wiping characteristics such as a felt or plastic surface that has some resistance. This type of wiping roll is preferably driven by the line band printing surfaces so that there may be some slippage that actually aids in wiping these printing surfaces of the bands.

The weight of the long wiping roll may be supplemented by a drive to add pressure for the wiping action.

While in retracted position the wiping roll may be in a bath for cleaning and be turned manually or by any other suitable means through the center of its pivoted axis. Sunch a drive may also be employed to provide a positive slippage between the printing roll bands and the wiping roll.

Through use, this wiping roll may have slight grooves worn in its surface. Such grooves aid in cleaning the side edges of the printing band marking surfaces which insures a clean printing surface so that when it engages the tin plate, it will not mark the same if its marking applicator has been withdrawn.

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 or claims thereto, certain practical embodiments illustrating the principles of this invention wherein:

FIG. 1 is a view in vertical section illustrating the cooperative arrangement of the several parts of the printing band selector for a differential tin plate line band printer.

FIG. 2 is a plan view with parts broken away of the structure shown in FIG. 1.

FIG. 3 is an end view of a modified form of the air cylinder blocks of the operating structure.

FIG. 4 is a view partly in section and partly in elevation of one air cylinder block at a larger scale.

FIG. 5 is a view in vertical section with parts broken away showing a manually operated applicator.

Referring to FIGS. 1 and 2 of the drawings the main frame **1** has the side walls **2** integrally connected by the upwardly open pan **3** which has a drain return indicated at **4**. As shown in FIGS. 1 and 2 the end walls **2**, only one being shown, have the laterally outwardly extending on opposite sides of the frame **1** mounting plates **5** only one being shown, with forward and aft mounting holes **9** to adjustably support the entire assembly so that the printing bands **6** will engage the upwardly traveling strip **7** to be tin coated. A back up roll **8** supports the strip **7** offset from the point of tangency of the printing bands **6**.

The printing roll **10** is mounted on the shaft **11** journaled in the vertical slide block bearings **12** at each end of the roll and outside of the side walls **2**. Each bearing block has outwardly open vertical grooves slidable on the vertical inturned ways **13** secured on the outer face of the side walls **2**. A slot **14** is in each end wall to receive the shaft **11**. The end **15** of the shaft **11** is provided with suitable means, not shown, to drive the line band printing roll **10**. A bearing collar **16** is provided on each end of the shaft **11** to retain the printing roll **10** in alignment relative to the bearings **12**.

A shaft bearing bracket lock **17** holds the foot of the slide bearing block **12** on the gage block **18** at each end of the shaft. This lock bracket **17** is held by the bolts **20** against the top of the way **13** and the top of the slide bearing block **12** as shown in FIGS. 1 and 2.

The top of the side walls **2** support the hinged lid **21** pivoted at the hinge **22**.

The main frame **1** contains an inner independently removable frame **23** which has the bottom plate **24** and the upper mounting bars **25**. The bottom plate **24** is secured to the side walls **26** which in turn are detachably secured to the end walls **2** so that the inner frame **23** may be independently retracted and removed, taking all of the operating structure from the vicinity of the main frame. In this way a whole unit may be changed for cleaning and repairs requiring a short time to replace the unit. The tin plate line may be operating and the loss of marking is very small in percentage of the whole strip. Thus, if any malfunction in the unit occurs, it may be quickly replaced by a spare unit while the other unit is cleaned and repaired as a spare.

In order to readily remove this inner frame or unit **23**, its side walls **26** have the laterally extending and upwardly slanting slide bars **27** shown in FIG. 2 which slide in the inwardly open slots **28** in the inner faces of the main frame side walls **2**. The rear portion of the slots **28** are upwardly open as shown in FIG. 1 to allow the whole inner frame **23**, with the extending slide bars **27**, to be slide rearwardly and raised from the main frame **1** only after the bolts have been withdrawn from the caps **30**. Then the ends of the slide bars **27** pass out of the opposed upwardly open slots **28** permitting the whole of the inner frame **23** with everything attached thereto to be raised upwardly and rearwardly as a unit.

The forward end of the inner frame **23** supports marking liquid reservoir **31** which is closed at opposite ends by the walls **26**. This marking liquid may be any suitable liquid such as sodium dichromate solution which is supplied through the pipe nipple **32**. The pipe nipple **32** has a fixed collar **33** retractable into the recess **34** so as to free the frame **23** for removal.

The applicator for this marking liquid from the well or trough **31** is a sponge rubber member **35** mounted as shown in FIGS. 1 and 2 between a connected pair of plates **36** having a mounting bar **37** secured to the guide bar **38**. The plates **36** are provided with a series of holes **29** for the ingress of the marking fluid from the trough **31**. As shown in FIG. 2, these applicators have little clearance between each other. A piston rod **40** is connected to the mounting bar **37**.

As shown in FIG. 3, there are two guide rods **38** and **39** and one piston rod **40** are mounted in blocks **41** each of which carries four cylinders, two in each row offset vertically and spaced vertically and horizontally one-half inch. Each of the intermediate blocks may be as many as twenty-six four cylinder blocks **41** with one end block **42** and the other end block **43**, all of which are bolted together by the four bolts **44**. The blocks must have an offset to properly fit together but this offset requires that the upper and lower guide bars **38** and **39** to occupy guide holes **45** some of which are half in each adjacent block. This arrangement permits at least one guide slot cylinder **48** for each piston to be in the solid block while other pistons have only one guide slot **45** in the solid block while the other guide slot **46** is in the split between adjacent blocks.

Each piston **47** is operable in its guide slot cylinder **48**. The piston rods **40** extends through the rod bearings **50** and a compression spring **63** is positioned between the bearing **50** and the piston **47**. The bearing **50** permits the end of the cylinder to allow the ingress and egress of ambient air. The other end of the cylinders **48** have the adapters **51** to receive each respective flexible tube **52** that lead to their respective electrically operated valve **56**, **57** and **58**. Each cylinder **48** progressively from the right end of the clamped cylinder blocks **41**, **42** and **43**, are connected by their respective tubes **52** in turn and to their respective operating valve in sequence to the top cylinder A and the bottom cylinder B of the end block **43** and the top cylinder C of the first two cylinders and to their respective pneumatic valves A rear **56**, B front **57**, and C bottom **58**. The next sequence is A front, B bottom, C rear and these are repeated. Each of these pneumatic valves are actuated by their counterpart electrical means such as the solenoids **60**, **61** and **62** as respectively attached thereto indicated in FIG. 1 to control the operation of their respective piston **47**. These solenoid operated pneumatic valves are similar to those disclosed in FIG. 7 of U.S. Patent 2,112,688.

As shown in FIG. 4, if each of the pistons **47** are provided with the compression spring **63** on their respective piston rods **40**, this spring will return the piston as shown.

The tubing **52** may be bent to readily make these connections but this sequence keeps them from crossing or interfering with one another. Their electric controls and pneumatic valves are mounted in a box **64** which is mounted by brackets **65** to the walls **26** of the inner frame **23**. The brackets **66** clamp the piston block assembly **41**, **42** and **43** together and to the bottom **24** of the inner frame **23**.

The sides **26** of the inner frame **23** also rotatably support the wiper roll **67** which may alternately be swung to engage and clean the printing band **6** as shown in dotted lines in FIG. 1, or be immersed in the bath **53** as shown in full lines. The roll **67** may be freely rotated with some friction to make a wiping contact with the line printing band **6** when positioned as shown in dotted lines in FIG. 1 or it may be independently rotated. The

roll 67 is on the shaft 68 which is rotatably supported on the arms 70 pivoted on the shaft 71 journaled in the wall 26 of the inner frame 23. This first shaft 71 carries the outer shaft 72 having the sprocket 73 and chain 74 to drive the sprocket 75 fixed to the roll 67. Thus, relative motion may be provided between this felt wiper roll 67 and all of the line printing bands 6. The bath 53 is provided for cleaning solution to clean the felt roll 67 of any marking solution deposited thereon. The stops 54 support the arms 70 and the roll 67 suspended in the bath 53 as shown in solid lines in FIG. 1.

All of the pistons 47 may be retracted by exhausting the air from their respective cylinders through their electrically controlled valves 56, 57 and 58 and after the printing bands have been cleaned the respective selected bands 6 have their cylinders energized to print the proper legend on the traveling strip 7.

As shown in FIG. 4, each piston 47 may also be provided with a second spring 76 which with the spring 63 centers the piston within the cylinder 48. This makes a good stop position for the pistons 47, as previously described and also has a further advantage in conjunction with a manual lockout or an electrically operated lock out or performed by the use of the latch bar 77 or the lock bars 91. The purpose of the lockout is to insure the nonuse of selected printing bands. This may be arranged manually or electronically by computer control.

It is preferable to tie the guide rods 38 and 39 together at opposite ends. This is done by the latch bar 77 which is secured to both guide rods for each piston 47 and has an electrically controlled crank arm 78 pivoted at 80 and provided with a spring return 81 which permits the crank to return when de-energized. The arm 82 on the crank is independently pivoted at 80 to permit this arm to return in front of the latch bar 77. The solenoid 83 rotates the crank arm 78 to rearwardly move the latch bar 77 and the compressed spring biased core of the solenoid 84 until the core catches in the abutment 85 as shown to retain the crank arm 78 in this position so as to maintain the piston 47 retracted by the guides 38 and 39 regardless of the pneumatic pressure. When solenoid 84 is energized the spring biased solenoid core is withdrawn from the abutment 85 and the crank arm 78 is released and the piston 47 is returned to the position where the control valve is effective to again operate it and move that particular applicator into contact with the line printing band 6. This latch bar 77 may be manually set by pushing it rearwardly and released by manually forcing the spring biased solenoid core from the abutment 85 thus lifting the crank arm 78.

A similar manual control is shown in FIG. 5 wherein each of the two guides 38 and 39′ for each mounting bar 37 are passed through the block 89 and one guide is short and provided with a stop 86 while the other guide is provided with a compression spring 87 between the block 89 and the abutment 88. This is purely a manual operation requiring the operator to force the selected respective rods 39′ forward to compress their respective springs 87 and latch their respective notches 90 in their respective lock bar 91 as it passes therethrough as shown in the drawing, which latch bar may be mounted on the back wall of the under pan 3 as shown in FIG. 1 to force the respective applicators into contact with its respective printing band 6. The rods 39′ are shown to have clearance in the block 89 and are preferably alternately high and low in the block 89 as were the pneumatic pistons. Thus, the independent means to retain each applicator is the notch 90 in each lock rod 39′ which catches in the lock bar 91. Again, the play in the hole in the block permits the lock rod 39′ to be readily raised and lowered to latch and unlatch the position of its applicator 35. The springs 87 readily return the applicators when released. The foreportion of the rod 39′ may function as a guide rod. A pivot in the rods 39′ may be provided between the spring abutment 88 and the lock bar 91 as indicated at 92 so that the lock rods 39′ are easily locked into position or released therefrom for selectively determining the printing code of the band 6 by manually manipulating the latch bars 77 in the lock bar 91.

I claim:

1. A printing band selector for a differential tin plate line band printer having a series of uniformly spaced annular printing bands mounted on a rotatable printing cylinder synchronously driven for legend marking on a travelling strip of material, characterized by a base rotatably supporting said cylinder with all of the printing bands in continuous contact with the travelling strip of material and including for each printing band an applicator continuously supplied with marking solution and slidably supported from said base by guide and piston rods to be selectively reciprocal to advance and engage each applicator with its respective printing band to supply marking solution to each predetermined printing band while in engagement therewith and when retracted cease to supply marking solution to each printing band, independent power means connected to actuate each respective piston rod to reciprocate each applicator and selectively advance and retract said applicator for engagement with and retraction from their respective printing band while the latter maintains contact with the travelling strip of material.

2. The printing band selector of claim 1 wherein said guide means includes a handle for manually advancing and retracting each applicator, a locking abutment for each handle to hold its applicator retracted, and releasable lock means to retain said locking abutment in each handle with its applicator retracted in its locked position.

3. The printing band selector of claim 2 wherein said releasable lock means is manually releasable.

4. The printing band selector of claim 2 wherein said releasable lock means is power actuated

5. The printing band selector of claim 3 wherein each of said manually releasable lock means is a pivoted lever, and said piston rod operated by a spring return pneumatic piston energized by a solenoid valve to electrically and remotely control the operation of said manually releasable lock means.

6. The printing band selector of claim 1 wherein each of said independent power means includes a spring biased to return pneumatic piston connected to its respective piston rod and having a solenoid valve to electrically and remotely control the pneumatic operation of said piston and reciprocal applicator, said spring to withdraw said piston and applicator when pneumatic pressure is released by said solenoid valve.

7. The printing band selector of claim 2 wherein each of said independent power means connected to each piston rod includes opposed biasing springs centering a pneumatic piston in its retracted position and having an electrically actuated valve with means to electrically and remotely control the operation of said pneumatic piston to reciprocate its respective piston rod and applicator, one of said springs is compressed when pneumatic pressure is applied and withdraws said piston and applicator when pneumatic pressure is released by said electrically operated valve, and said other of said springs to return said piston and applicator from its locked open position to its retracted position.

8. The printing band selector of claim 7 wherein said releasable lock means has a power actuated means having a solenoid to electrically and remotely control the operation to release said lock means.

9. The printing band selector of claim 8 wherein said guide means includes a pair of rods, one above and one below its respective pneumatic actuating piston, said guide rods connected to said applicator at one end and to said releasable lock means at its other end.

10. A printing band selector for a differential tin plate line band printer having a series of uniformly spaced annular printing bands mounted on a rotatable printing cylinder synchronously driven for legend marking on a

travelling strip of material, characterized by a base rotatably supporting said cylinder with all of the printing bands in continuous contact with the travelling strip of material and including for each printing band an applicator continuously supplied with marking solution and slidably supported from said base by guide and piston rods to be selectively reciprocal to advance and engage each applicator with its respective printing band to supply marking solution to each predetermined printing band while in engagement therewith and when retracted cease to supply marking solution to each predetermined printing band, independent means to independently and selectively retain each applicator in contact with its respective printing band, and means to independently and selectively withdraw each applicator from contact with its respective printing band.

11. The printing band selector of claim **10** wherein said independent means to retain each selected applicator in contact with its printing band is a control rod having a

lock notch to receive and lock on a lock bar to retain its applicator in engagement with its printing band, and spring means to hold said control rod of said selected applicator locked on its notch and to retract said applicator when said notch is released from said lock bar.

References Cited

UNITED STATES PATENTS

410,154	9/1889	Dean et al.	118—221
2,952,204	9/1960	Sherman	101—1 XR
3,244,139	4/1966	Brown et al.	118—221 XR

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U.S. Cl. X.R.

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