

[54] **MACHINE FOR WEIGHING, PRINTING AND PUNCHING WORKPIECES**

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[51] Int. Cl. **G01g 23/38, E41f 17/00**

[58] Field of Search **177/1, 5, 10, 11-13, 177/25, 52, 59, 60, 245, DIG. 1; 101/37, 40, 43-44, 93 C, 18, 19, DIG. 3; 198/39**

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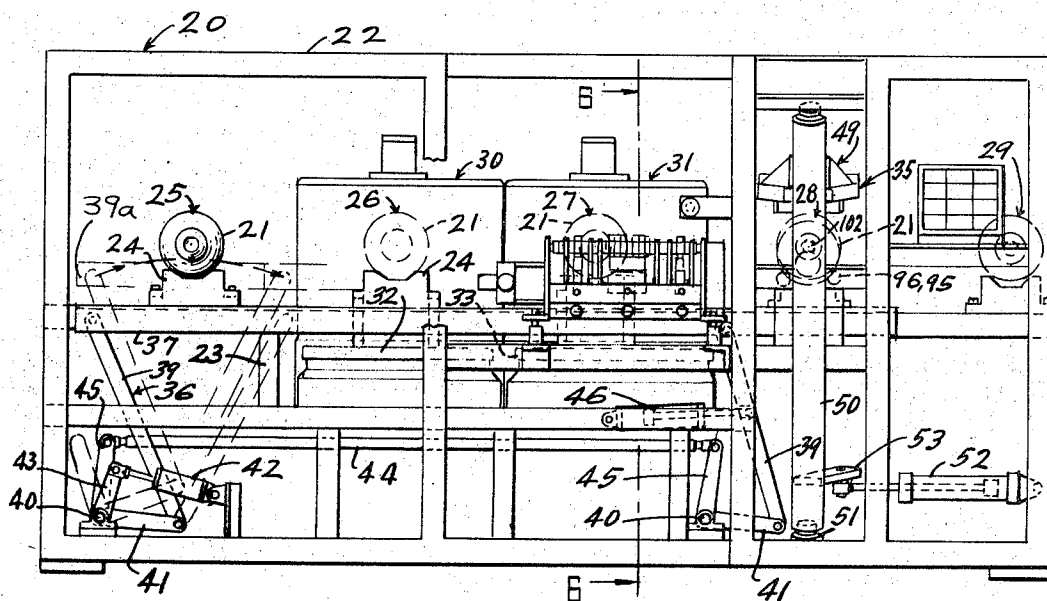
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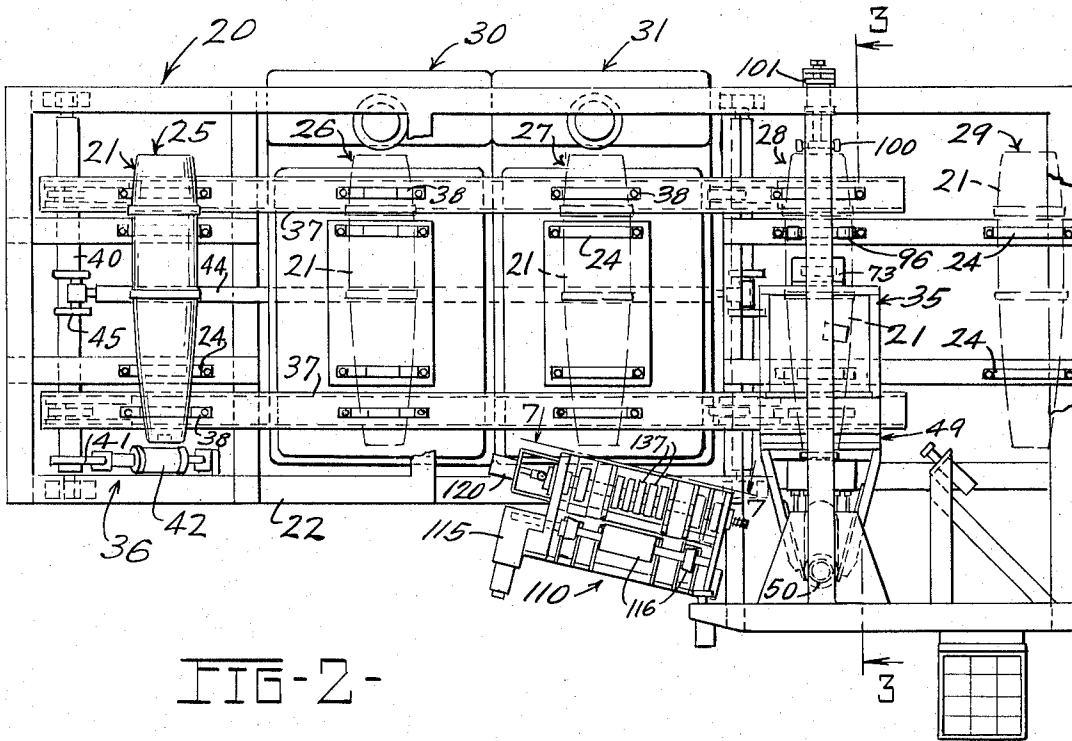
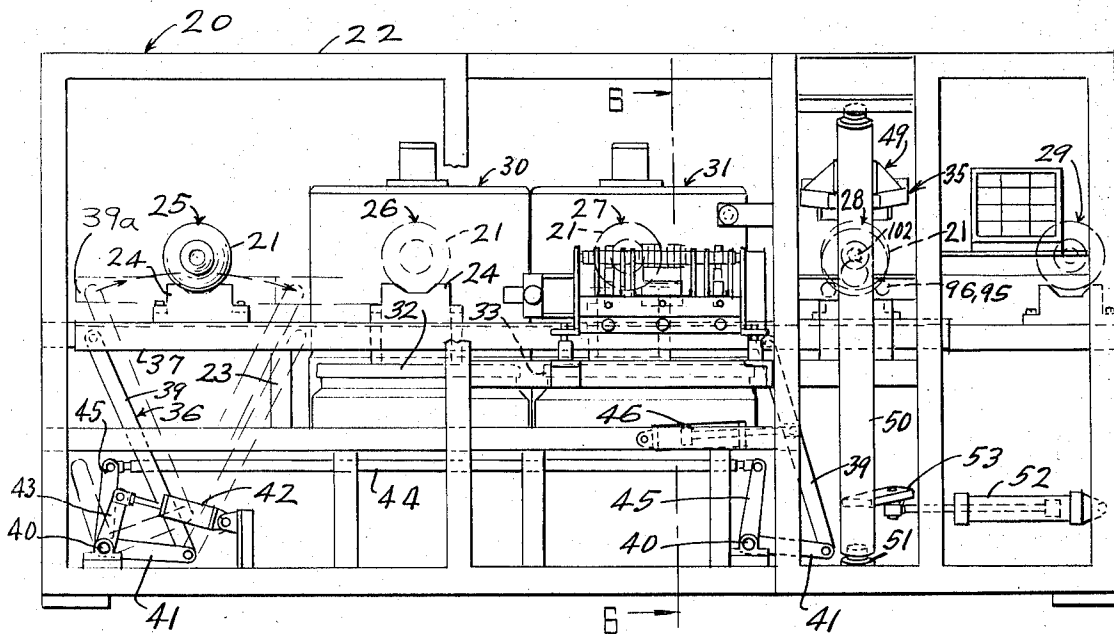
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[57] **ABSTRACT**

A printing and punching machine, which is particularly adaptable for the weighing, printing and punching indicia on artillery shells. The machine includes a loading station, two weighing stations, a printing and punching station and an unloading station. Preferably the stations are equally spaced apart and a walking beam mechanism advances an individual artillery shell to successive stations after it has initially been manually placed at the loading station. The artillery shell is weighed at the first weighing station and then weighed again at the second weighing station. If the two weights compare, the proper printing pad and the proper punches are automatically actuated in the printing mechanism. The printing and punching mechanism then moves from a home position and is inked by a multiple roller inking mechanism. The printing and punching mechanism then passes over and engages the artillery shell which is in the printing station. At the end of a cycle, the printing mechanism returns to its home position and the walking beam mechanism advances the shell to the unloading station where it is manually unloaded.

16 Claims, 12 Drawing Figures





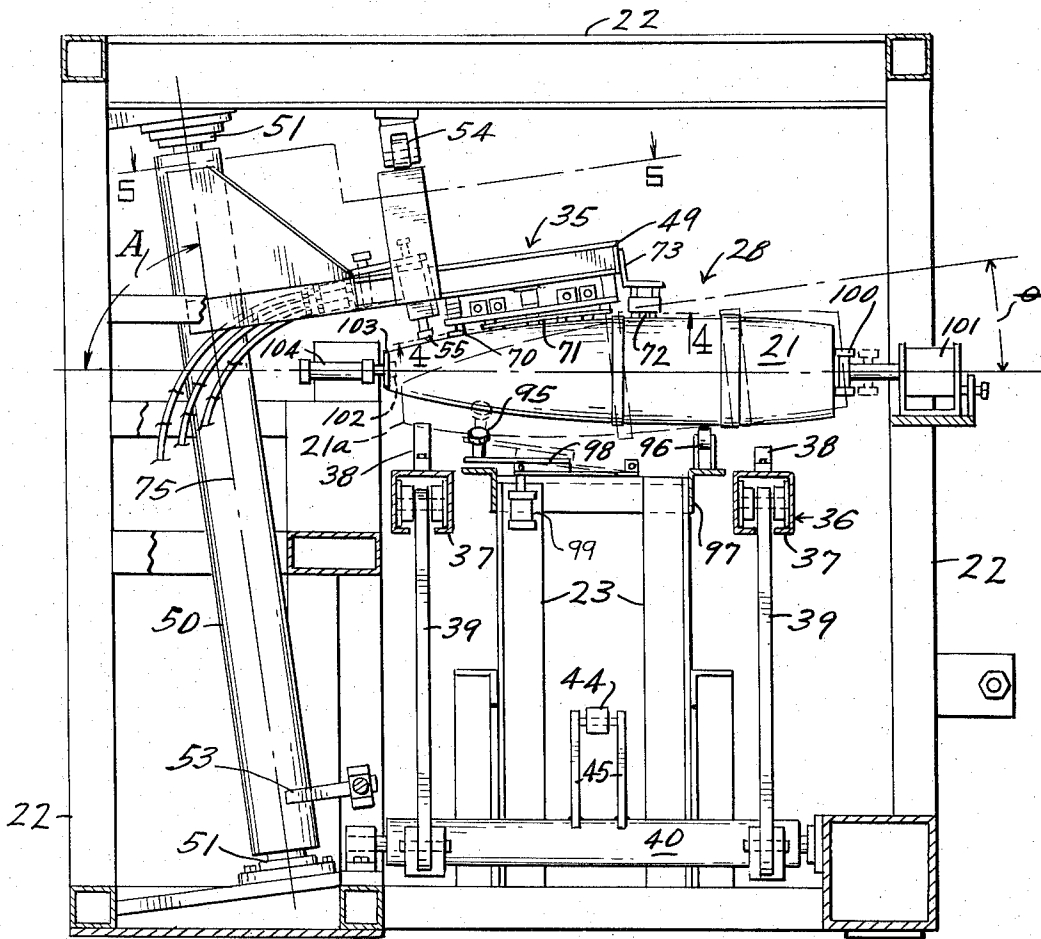


FIG-3 -

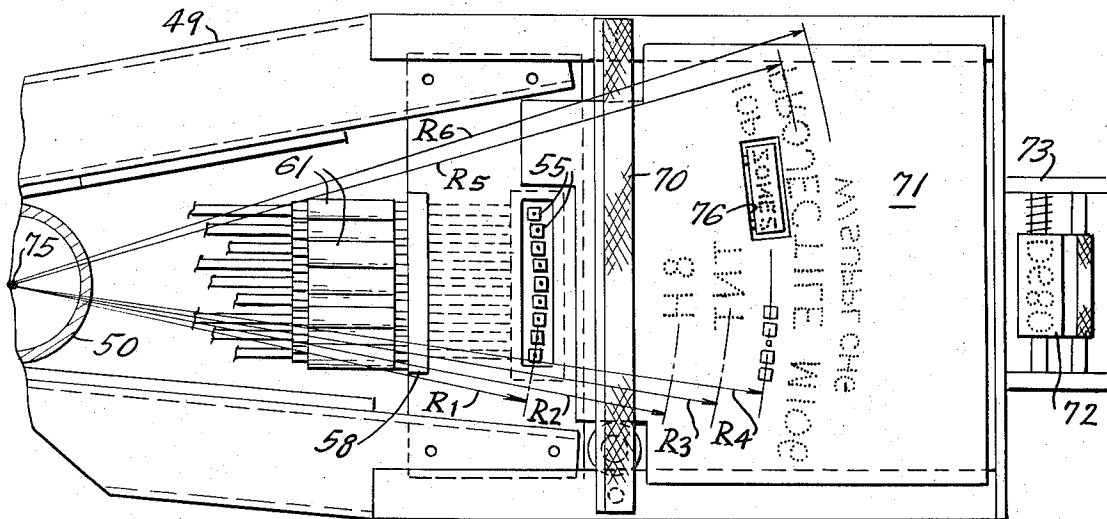
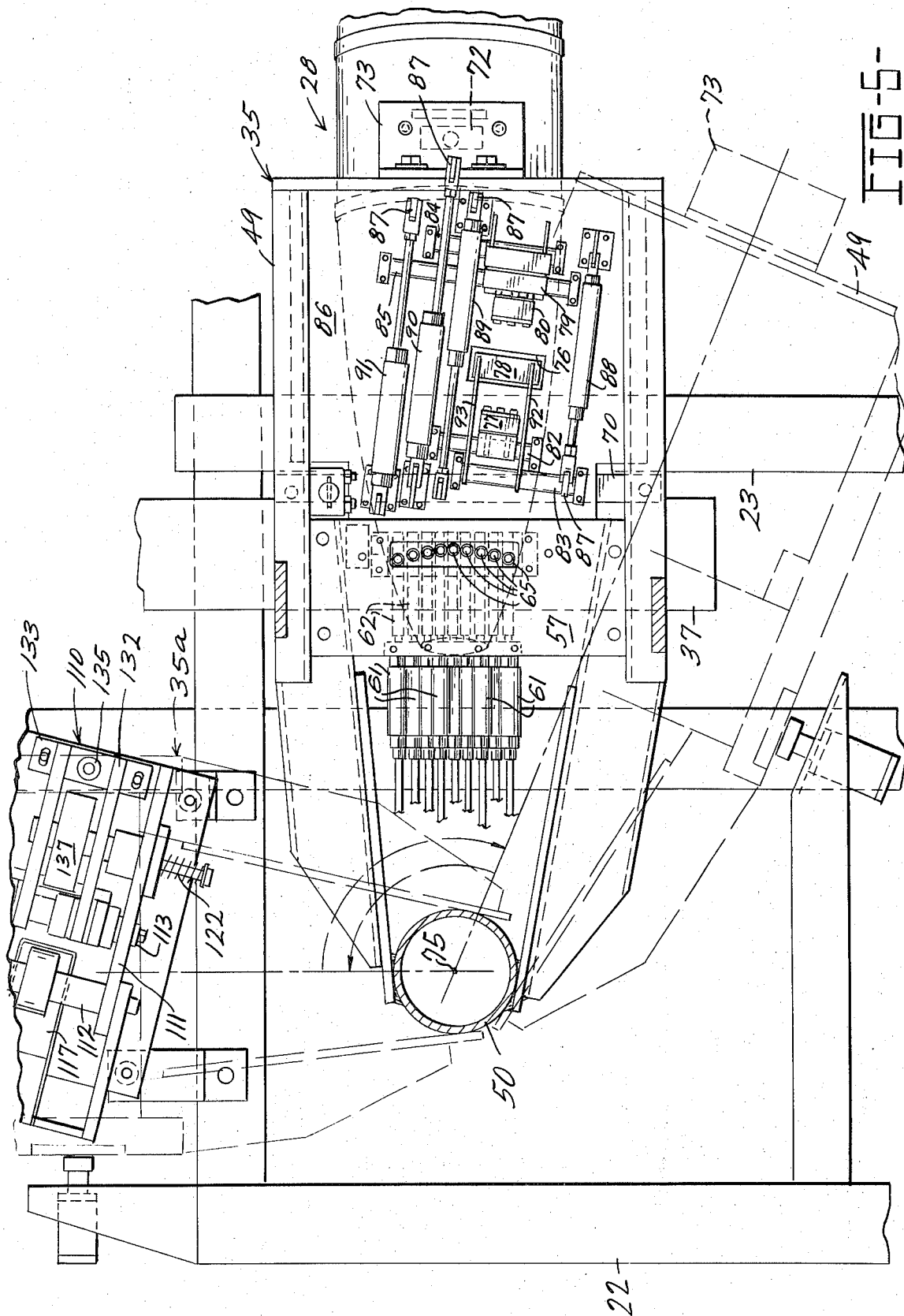
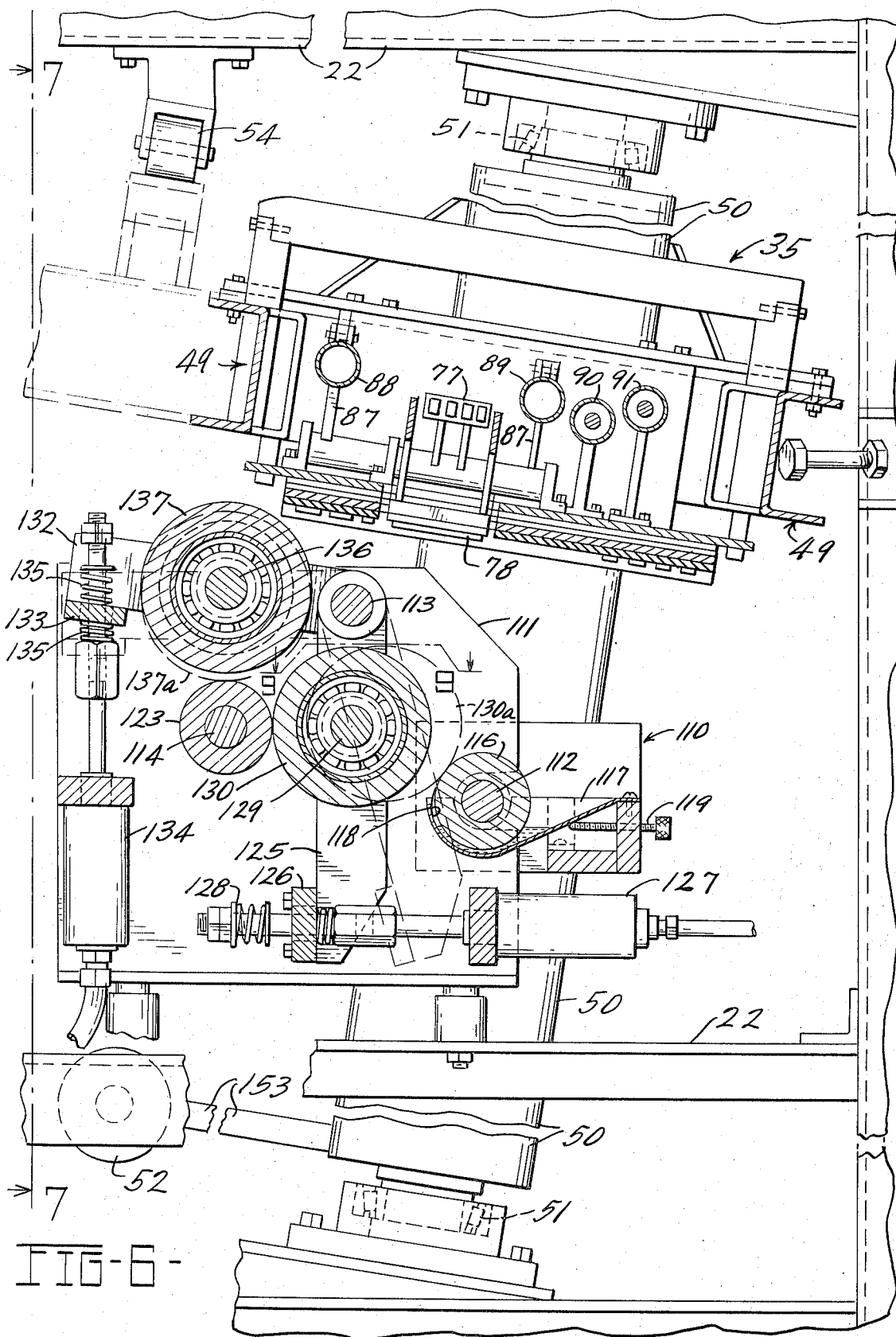
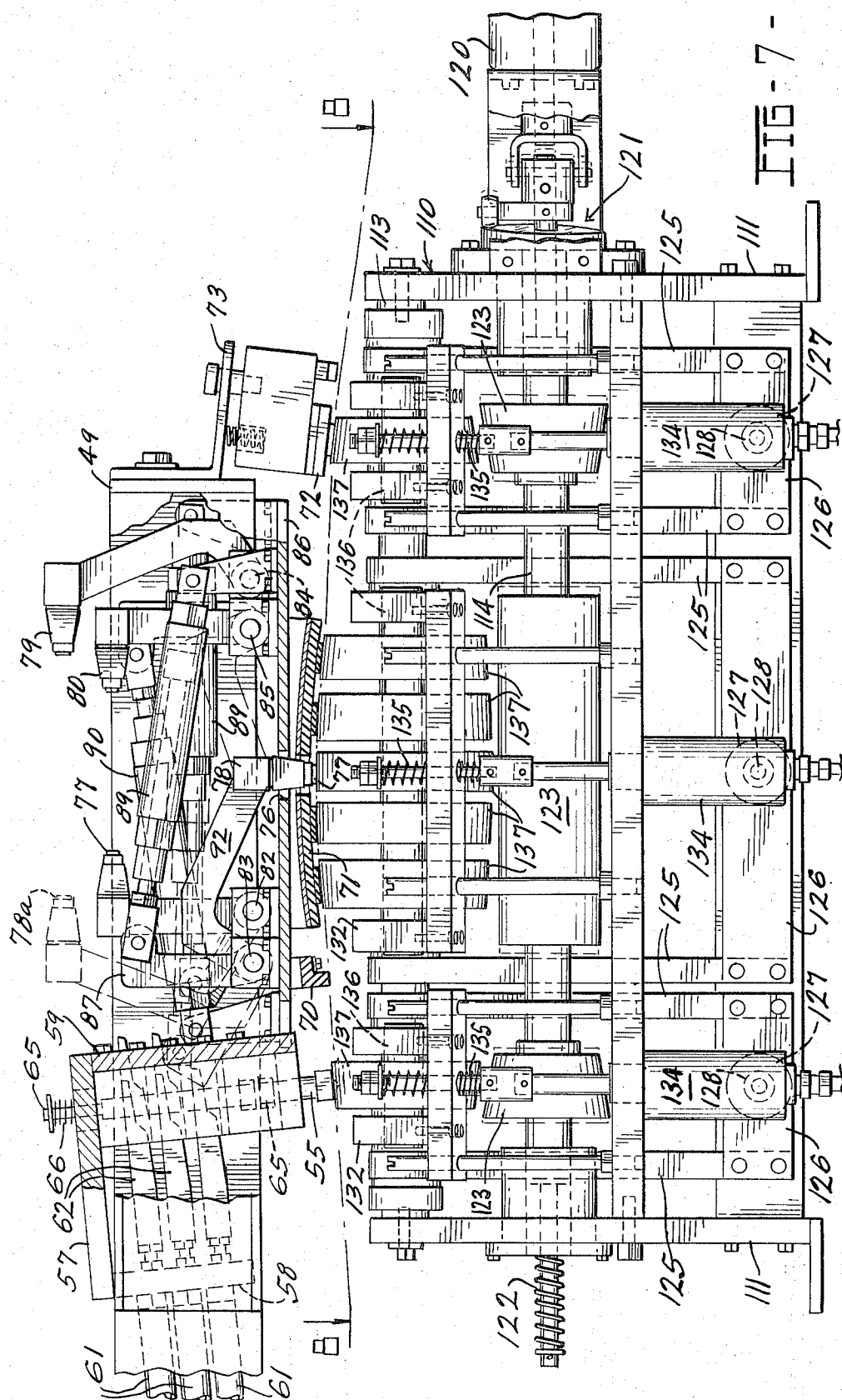
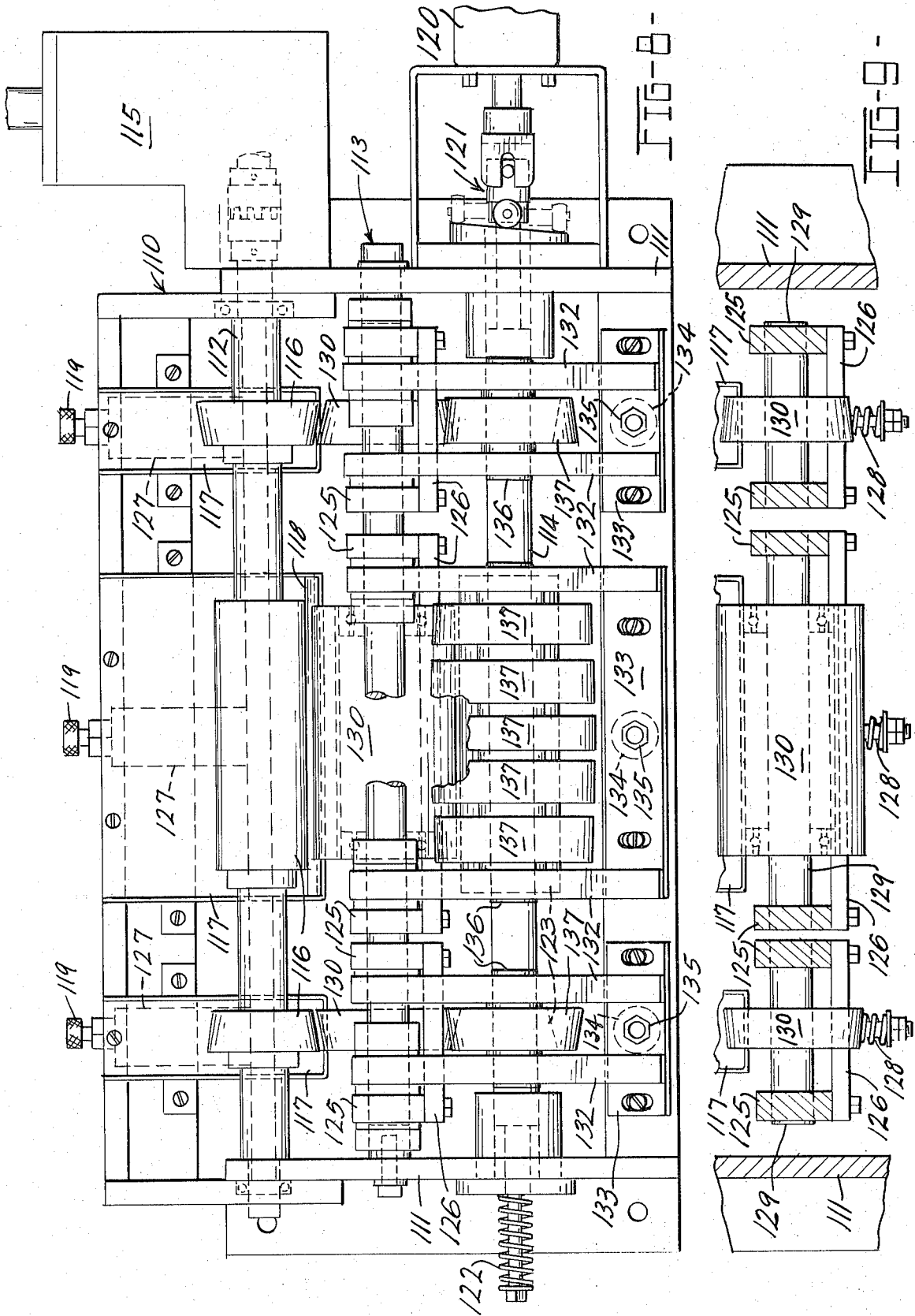


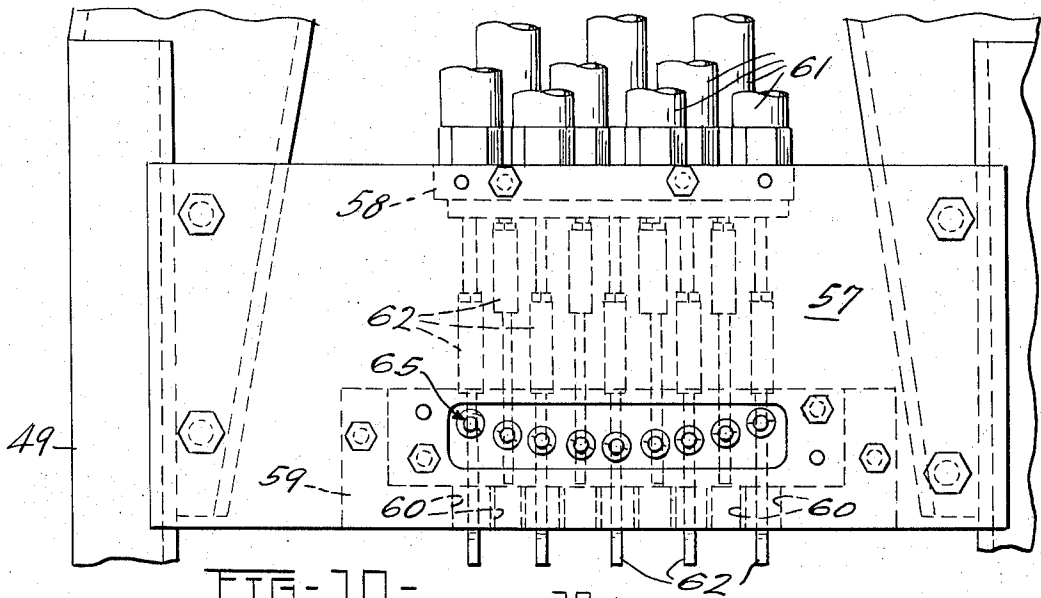
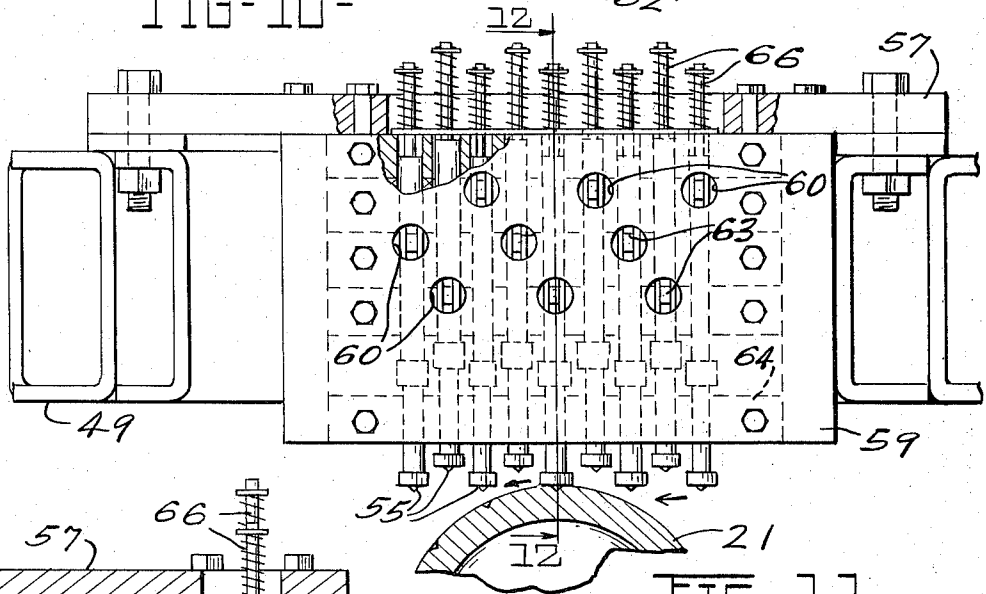
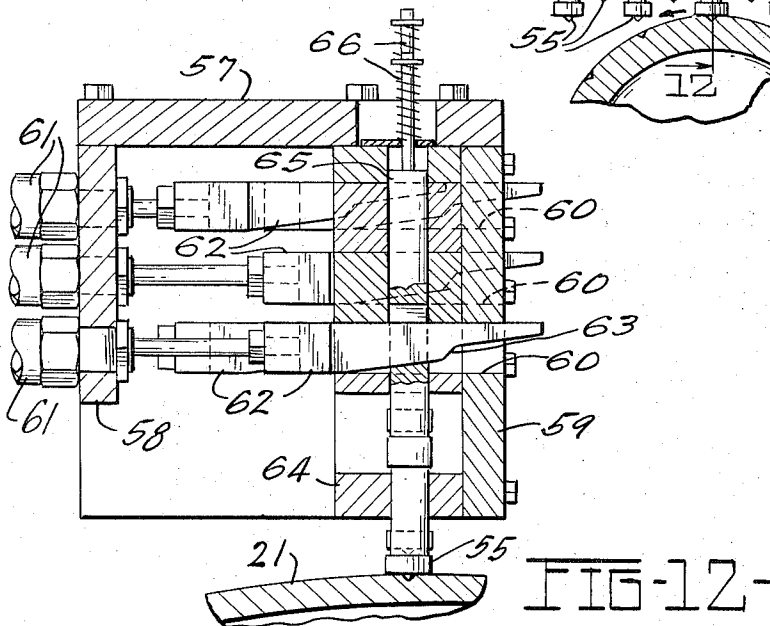
FIG-4 -











MACHINE FOR WEIGHING, PRINTING AND PUNCHING WORKPIECES

BACKGROUND OF THE INVENTION

Workpieces, for example, artillery shells, are encoded with both printed material and also with a punched code. Often the punched code is a code which is complementary with fire control mechanism at its point of use.

The printed material and the punched material may indicate various information, however, one critical piece of information is the weight of the shell. It is obvious that a small weight differential in an artillery shell will substantially vary its trajectory. Any punching and printing mechanism which indicates the weight of an individual artillery shell must be both accurate with respect to the weight and also must be clearly read both visually and, in the case of the punched information, mechanically or electronically. In the past, this has been a problem because some of the printing and punching operations must be performed on an ogival surface, namely the nose surface of the artillery shell.

SUMMARY OF THE INVENTION

The present printing and punching machine, which is particularly adaptable for the printing and punching of artillery shells, includes a longitudinally extending frame which defines a series of work stations. Walking beam means indexes workpieces in a sequential manner through the various work stations. Two of the work stations comprise weighing stations. After the weight is determined at the first weigh station, the weight is compared at the second weigh station and if the weight tolerances are met, a signal is sent to the printing and punching mechanism which is pivotally mounted adjacent the printing station.

In response to the signal from the weighing stations, the correct printing indicia and the correct punches are moved into position. At this time, the printing mechanism is actuated and the mechanism passes over an inking assembly and then over the artillery shell located in the printing station. After the printing and punching operation, the apparatus is recycled.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view showing a printing and punching machine, according to the present invention;

FIG. 2 is a plan view of the machine shown in FIG. 1;

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 2;

FIG. 4 is a sectional view of a portion of the printing and punching assembly, taken along the line 4—4 of FIG. 3 and shown on an enlarged scale;

FIG. 5 is a sectional view of a portion of the printing and punching apparatus, taken along the line 5—5 of FIG. 3 and shown on an enlarged scale;

FIG. 6 is a sectional view showing the printing and punching apparatus together with the inking assembly;

FIG. 7 is a side elevation of the inking assembly taken along the line 7—7 of FIG. 6 and showing parts broken away for clarification;

FIG. 8 is a plan view of the inking assembly taken along the line 8—8 of FIG. 7;

FIG. 9 is a partial sectional view taken along the line 9—9 of FIG. 6 and showing the ink transfer roll assembly;

FIG. 10 is a plan view of the punching assembly;

FIG. 11 is a side elevational view, with parts broken away, of the punching assembly shown in FIG. 10; and

FIG. 12 is a sectional view taken along the line 12—12 of FIG. 11.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A printing and punching machine, according to the present invention, is generally indicated by the reference number 20. The machine 20 shown in the drawings is specifically an artillery shell machine for printing indicia and punching indicia on artillery shells 21. The machine 20 includes a box-like frame 22. Referring to FIG. 3, the frame 22 includes an inner table frame 23 having work supports 24 mounted thereon. Referring to FIG. 2, a plurality of work stations are shown with artillery shells 21 indicated by dashed lines. An initial or loading work station is generally indicated by the reference number 25. A first weigh station is generally indicated by the reference number 26 and a second weigh station is generally indicated by the reference number 27. Similarly, a punching and printing station is indicated by the reference number 28 while an unloading station is generally indicated by the reference number 29.

Scale mechanism 30 and 31 are located at the first and second weigh stations 26 and 27, respectively. The scale mechanism 30 and 31 is known in the art and includes platforms 32 having the work supports 24 mounted thereon rather than on the table frame 23. In the present scale mechanism 30 and 31, load cells are positioned beneath the platforms 32. The scale mechanism 30 and 31 are, for example, electronic analog-type scales. After the artillery shell 21 is weighed at the first weigh station 26, it is transferred to the second weigh station 27 and weighed a second time. The scale mechanism 30 and 31 have interrelated controls which compare the two weights. If the weights are within the allowable tolerances, a series of signals is sent to the printing and punching mechanism, generally indicated by the reference number 35.

The scales utilized are well known in the art, for example, Model 9460 units manufactured by Toledo Scale Company, Division of Reliance Electric Company. Such a prior art scale is disclosed in U. S. Pat. No. 3,275,135 granted Sept. 27, 1966. While one scale mechanism can be utilized, two scale mechanisms are disclosed in the preferred embodiment. This is in response to federal government regulations directed to the weighing of artillery shells. As indicated in the above-identified patent, the scale controls include a load cell such as a linear differential transformer. If the two scale mechanisms compare with the standard weight and are within tolerances, the printing and punching mechanism is actuated.

The machine 20 also includes walking beam mechanism generally indicated in FIGS. 1, 2 and 3 by the reference number 36. The walking beam mechanism 36 includes a pair of horizontally spaced beams 37 which are on opposed sides of the table frame 23 at, for exam-

ple, the load station 25. The beams 37 have supports 38 mounted on their upper surfaces for receiving individual ones of the artillery shells 21. The supports 38 are adapted to receive individual ones of the artillery shells 21 as the beams 37 are moved vertically upwardly. When this occurs, the artillery shells are removed from the work station supports 24. When elevated, the beams 37 are horizontally translated advancing the artillery shells 21 to the next successive work station. The shells 21 are then lowered and deposited on the work supports 24 located at that respective work station.

Referring to FIG. 1, the walking beam mechanism 36 includes pairs of arms 39 which are pivotally connected at their upper ends to the beams 37. Cross tubes 40 (see FIG. 2) extend across the lower portion of the frame 22. Links 41 are pivotally mounted to the lowermost end of the arms 39 and are fixedly connected at their opposite ends to the respective cross tubes 40. A pivotally mounted cylinder 42 is connected to the upper end of a link 43. The lower end of the link 43 is fixed to one of the cross tubes 40. The walking beam mechanism 36 also includes a horizontally extending connecting rod 44 which is pivotally mounted to the upper ends of links or levers 45 which are in turn mounted at their lower ends to the respective cross tubes 40.

Referring to FIG. 1, the solid line position shows the walking beam mechanism 36 in its lowered position wherein the artillery shells 21 are resting upon the work supports 24. After a completed artillery shell 21 is removed from the unloading station 29, the rod of the cylinder 42 is extended which rotates the cross tube 40. The links 43 and 41 act as a bell crank lever and because the two pairs of arms 39 are tied together by the connecting rod 44, both of the arms 39 are moved vertically upwardly to the dashed line indicated by the reference number 39a in FIG. 1. When in this position, the artillery shells 21 are moved upwardly from their respective work supports 24 being retained on the supports 38 located on the uppermost surface of the parallel and opposed beams 37. A second cylinder 46 is interconnected between the frame 22 and one of the arms 39. The second cylinder 46 is extended which moves the beams 37 horizontally until the artillery shells 21 are located over the work supports 24 at the next successive work stations. The cylinder 42 is then retracted which lowers the artillery shells 21 to the work supports 24 and lastly the cycle is completed by retracting the cylinder 46 which moves the beams 37 to the left, as shown in FIG. 1.

The operation of the walking beam mechanism 36 is an automatic cycle and the sequential steps occur as described above. The artillery shells move from left to right, as shown in FIG. 1, one work station per one complete cycle of the walking beam mechanism. However, manual controls are provided which enable the walking beam mechanism 36 to be operated in reverse for moving artillery shells 21 from right to left, as shown in FIG. 1, for the purpose of calibrating the scale mechanism 30 and 31 and also for test printing and punching.

Referring to FIG. 3, the printing and punching mechanism 35 includes a support frame 49 which is connected for rotation with a generally perpendicular torque tube 50. The torque tube 50 is mounted to the main frame 22 by upper and lower radial and thrust bearings 51. Referring to FIGS. 1 and 3, a cylinder 52

is pivotally connected to an arm 53, which has its other end fixed to the torque tube 50. Extension and retraction of the cylinder 52 rotates the torque tube 50 and moves the support frame 49 between its printing position shown in FIG. 3 and its "home" position which is 90° removed from the position shown in FIG. 3.

A cam roller 54 is supported on the main frame 22 and is directly above prick punches 55. The cam roller 54 absorbs the vertical forces generated during the print-punching operation and also tends to keep the print pads in contact with the artillery shell 21 during the punching and printing operation. The prick punches 55 both print and punch the artillery shell 21 at the same time. Referring to FIGS. 10-12, the prick punches 55, in the present embodiment, each comprise one-half inch square printing blocks having a punch in its center. There are nine punches 55 in the present printing and punching machine 20. The scale mechanism 30 and 31 are programmed to determine weight zones. In the present embodiment, the nine prick punches 55 are utilized to punch five different formats which represent different weight zones. Referring to FIGS. 10-12, the support frame 49 includes a top plate 57. A back plate 58 depends from the top plate 57 as does a front plate 59. The front plate 59 defines a series of openings 60 which are aligned with individual ones of a plurality of cylinders 61. The rods of the cylinders 61 mount camming wedges 62, having camming surfaces 63. The front ends of the camming wedges 62 extend through respective ones of the openings 60. Support blocks 64 have aligned vertical openings which receive punch support rods 65 which are spring biased upwardly by return springs 66.

Control mechanism (not shown) sends a signal from the scale mechanism 30 and 31 which actuates one or more of the punch cylinders 61 depending upon which weight zone has been read. When one of the cylinders 61 is actuated, the cam wedge 62 and its camming surface 63 urges a respective one of the prick punches 55 downwardly into its operating position, as shown in FIG. 12. After the printing and punching operation is completed, the cam wedges 62 are retracted and the return spring 66 urges the previously operative prick punches 55 to their upper positions.

Referring to FIGS. 3, 4 and 7, a drive bar 70, which is rubber covered and spring loaded, is supported by the frame 49 on a line generally perpendicular to the longitudinal axis of the artillery shell 21. The purpose of the drive bar 70 is to force the shell 21 to rotate at the same surface speed as the prick punches 55 and a main print pad 71. A secondary print pad 72 is mounted on a bracket 73 which is connected to the support frame 49. The secondary print pad 72 is spring mounted to permit horizontal motion with respect to the printer support frame 49. In FIG. 3, the center line axis of the torque tube 50 is indicated by the reference number 75 and represents the axis of rotation of the printing and punching mechanism 35. As shown in FIG. 3, the main print pad 71 and the prick punches 55 rotate around the axis 75 which is at an angle A with respect to the longitudinal axis of the artillery shell 21. Horizontal motion is provided with respect to the secondary print pad 72 because the main print pad 71 and the prick punches 55 are printing on an ogival surface using rolling contact. Therefore, the angle A and the respective radii, indicated by R1-R6 in FIG. 4, must be maintained to prevent smearing. However, the second-

dary print pad 72 is on the major diameter or cylindrical surface of the shell 21 and is therefore traveling at a slightly different surface speed.

As shown in FIG. 4, several of the indicia which are printed on the main print pad 71 are uniform for a large series of artillery shells 21. However, as is true with the prick punches 55 described above, one portion of the printing on the main pad 71 changes with each shell 21. An opening 76 is provided in the main print pad 71 and a single one of a plurality of printing pads 77-80 is positioned through the opening 76 to form a part of the printing surface of the main print pad 71. Again, the individual print pads 77-80 operate in response to signals received from the scale mechanism 30 and 31. As best shown in FIGS. 5 and 7, four cross shafts 82-85 are mounted for rotation on a plate 86 of the support frame 49. Arms 87 are fixed to individual ones of the cross shafts 85 and extend outwardly from such shafts. A plurality of cylinders 88-91 are connected to the arms 87. Each one of the cylinders 88-91 is capable of rotating a single one of the cross shafts 82-85. A pair of supports 92-93 extend outwardly from each of the cross shafts 82-85 and mount at their outer ends one of the printing pads 77-80.

In operation, after the scale mechanism 30 and 31 compares the weight, a signal is sent to the printing and punching mechanism 35. Initially, a "clock" stepper device, for example any prior art type of electronic or electro-mechanical "clock" device is utilized to send sequential signals to the scale mechanisms 30 and 31 and to the respective cylinders. The "clock" stepper energizes the walking beam cylinders 42 and 46 and a main cylinder 52 through control mechanism including prior art pneumatic logic control gates or valves manufactured by Double A Products Co., Manchester, Mich. and other manufacturers. Similarly, if the scale weights are within tolerances, a further signal is also sent to the printing and punching mechanism 35. In addition to operating the prick punches 55, as described above, one of the cylinders 88-91 is actuated. As the cylinder is extended, the respective one of the cross shafts 82-85 is rotated by the force of the cylinder rod being applied to the arm 87. This in turn rotates the respective supports 92 and 93, moving the respective one of the print pads 77-80 into an operative position. As shown in FIG. 5, the print pad 78 has been moved into operating position through the opening 76. The above-described operation occurs when the printing mechanism 35 is in its home position which is shown in dashed lines in FIG. 5 by the reference number 35a.

Referring to FIG. 3, when the artillery shell 21 is initially placed at the punching and printing station 28, it assumes the dashed line position indicated by the reference number 21a. When in this position, the shell 21a is supported by a front double cam roller 95 and a rear double cam roller 96. The rear double cam roller 96 is mounted on a bracket 97 which is fixed to the table frame 23. The front double cam roller 95 is mounted on a lift plate 98 which is pivotally mounted at its rear end to the table frame 23. A cylinder 99 is connected to the lift plate 98 to pivotally move the plate 98. When the cylinder 99 is extended, the front double cam roller 95 is moved upwardly.

A rear bearing 100 is mounted to the frame 22 adjacent the rear of the shell 21a and is moved horizontally by a cylinder 101. A nose bearing mandrel 102 is mounted adjacent the front end of the shell 21a along

the center line of rotation of the shell 21. An ejector plate 103, which is horizontally movable by a pair of ejector cylinders 104, receives and is mounted adjacent the nose bearing mandrel 102.

After the shell has been placed in the dashed line position indicated by the reference number 21a (see FIG. 3), the cylinder 99 is actuated, pivoting the lift plate 98 and the cam roller 95 upwardly. The cylinder 101 is then actuated which moves the shell 21 to the left, as shown in FIG. 3, until it is in the solid line position indicated in FIG. 3 by the reference number 21. As the shell 21 is moved to the left, it is received by the nose bearing mandrel 102. The cylinder 99 is retracted before the printing cycle begins so that the roller 95 does not scratch the shell. After the printing and punching operation has been completed, the ejector cylinders 104 are actuated which moves the completed shell 21 to the right into position 21a, as shown in FIG. 3, thereby disengaging the shell 21 from the nose bearing mandrel 102. The reason the shell is in position 21a when the printer returns to its home position is so that the main print pad 71 does not engage the shell for the second time. The printing and punching mechanism 35 is then returned to its home position 35a. The walking beam mechanism 36 is then actuated and the shell 21 is moved to the next successive station, namely the unload station 29 as described above.

As the printing and punching mechanism 35 is moved from its home station, indicated in FIG. 5 by the reference number 35a, to the printing station shown in solid lines in FIG. 5, the print pads and the punches are moved across an inking assembly generally indicated by the reference number 110 in FIGS. 6, 7 and 8. The ink transfer mechanism 110 includes a frame 111, which mounts three cross shafts, more specifically, a pick-up roll shaft 112, a pivot shaft 113 and an oscillating roll shaft 114. The pick-up roll shaft 112 is driven by an air motor generally indicated in FIG. 8 at 115. The shaft mounts a plurality of pick-up rolls 116. In the present embodiment, the pick-up rolls 116 have different configurations depending upon the surfaces of the print pads of the printing and punching mechanism 35. It is understood that the configuration and number of rolls will vary with respect to different embodiments of the present invention.

Referring to FIG. 6, the pick-up rolls 116 depend downwardly into a series of ink reservoirs 117, which include doctor blades 118 having adjusting screws 119. The adjusting screws 119 adjust the doctor blades 118 to vary the thickness of the ink film deposited on the individual pick-up rolls 116. The oscillating roll shaft 114 is driven by a motor 120 through a wedge cam drive generally indicated in FIG. 8 at 121. The oscillating roll shaft 114 both rotates and also reciprocates along its longitudinal axis in response to the forces generated by the wedge cam drive 121. A biasing spring 122 is provided on the end of the oscillating roll shaft 114 in opposed relationship to the wedge cam drive 121. The shaft 114 mounts a plurality of oscillating rolls 123.

Referring to FIGS. 6, 7, 8 and 9, the pivot shaft 113 pivotally mounts a plurality of arms 125 having cross plates 126 at their lowermost ends. Three cylinders 127 have their rods slidably connected to the respective cross plates 126. Springs 128 are provided on the cylinder rods in opposed relationship to each of the cross plates 126 (see FIG. 6). Idler shafts 129 are mounted

between respective ones of the arms 125 and mount ink transfer rolls 130 (see FIG. 9). Referring to FIG. 6, actuation of the cylinders 127 pivotally move the ink transfer rolls 130 between the solid line position and a dashed line position indicated by the reference number 130a. When in the dashed line position, the ink transfer rolls 130 receive ink from the pick-up rolls 116. When the cylinders 127 are extended, the ink transfer rolls 130 return to the solid line position shown in FIG. 6 and transfer ink from their surfaces to the oscillating rolls 123.

In a similar manner, the pivot shaft 113 pivotally mounts a second plurality of arms 132. Cross plates 133 (see FIG. 8) extend between respective ones of the arms 132. Three cylinders 134 are mounted on the frame 111 and have rods which extend upwardly through the respective cross plates 133. Opposed springs 135 are positioned on each side of the respective cross plates 133. A plurality of intermediate print roll shafts 136 are positioned between respective ones of the arms 132 and mount a plurality of print rolls 137.

Referring to FIG. 6, when the cylinders 134 are extended, the print rolls 137 are elevated and in a position to transfer ink from their surfaces to the punches 55, main print pad 71, secondary print pads 72 and one of the individual print pads 77-80. When the cylinders 134 are retracted, the print rolls move downwardly to the position shown in dashed lines at the reference number 137a and engage the oscillating roll 123 to pick up ink. Oscillation or reciprocation of the rolls 123 insure a uniform application of ink to the print rolls 137.

After the printing and punching mechanism 35 has moved across the ink transfer mechanism 110, continued operation of the cylinder 52 pivots or rotates the printing and punching mechanism 35 over the shell 21 at the punching and printing station 28 as shown in FIG. 3. The print pads and the punches strike the shell 21 and relative rotary movement occurs. The drive bar 70 controls the movement, insuring precise printing and punching on the aligned surface of the shell 21. After the printing and punching operation has been completed, the printing and punching support frame 49 is pivoted back to its home station and the operation is repeated.

It has been found that the printing and punching machine 20, according to the present invention, provides apparatus which is both fast and accurate with respect to printing indicia and punching indicia on a workpiece.

Having described the invention, we claim:

1. A machine for printing and punching indicia on workpieces comprising, in combination, a longitudinally extending main frame having defined thereon a plurality of spaced work stations for supporting individual workpieces, means for advancing an individual workpiece from one work station to the next successive work station, weighing means at at least one work station for weighing a workpiece, means for printing and punching a workpiece and inking means for supplying ink to said printing and punching means, wherein said means for printing and punching includes a support frame mounted for rotation between a home position and an operative printing position, a main print pad mounted on said support frame, said main print pad defining an opening therethrough and a plurality of in-

dividual print pads pivotally mounted above said main print pad, means for moving a selected one of said individual print pads through said opening into and out of a printing position, a plurality of prick punches mounted by said support frame and cylinder means connected to each of said punches for moving an individual punch into an operative position.

2. A machine, according to claim 1, including a drive bar mounted by said support frame adjacent said main print pad, said drive bar having a resilient outer surface for frictionally engaging the surface of a workpiece.

3. A machine, according to claim 1, wherein said moving means comprises a plurality of horizontal cross shafts mounted above said main print pad, a pair of arms extending outwardly from each of said cross shafts, each pair of arms mounting one of said individual print pads at their distal ends, and a cylinder operatively connected to each of said cross shafts, whereby said cylinder rotates the respective cross shaft to move its attached individual print pad through said opening into and out of the printing position.

4. A machine, according to claim 1, including a generally vertical torque tube mounted for rotation on said main frame, said support frame of said printing and punching means being mounted on said torque tube and cylinder means operatively connected to said torque tube for rotating said support frame between its home position and its operative position.

5. A machine for printing and punching indicia on workpieces comprising, in combination, a longitudinally extending main frame having defined thereon a plurality of spaced work stations for supporting individual workpieces, means for advancing an individual workpiece from one work station to the next successive work station, weighing means at at least one work station for weighing a workpiece, means for printing and punching a workpiece, said printing and punching means including a plurality of prick punches mounted adjacent a work station and cylinder means connected to each of said punches for moving an individual punch into an operative position and inking means for supplying ink to said printing and punching means, wherein said inking means includes an ink frame assembly mounted on said main frame, a plurality of ink reservoirs defined by said ink frame assembly, a plurality of ink pick-up rolls in communication with said reservoirs, a plurality of print rolls for transferring ink to said printing and punching means and intermediate roll means for transferring ink from said pick-up rolls to said print rolls.

6. A machine, according to claim 5, including a doctor blade assembly in each ink reservoir for metering ink transferred from said reservoir to a respective pick-up roll, said doctor blade assembly including an adjusting screw for adjusting the position of a respective doctor blade.

7. A machine, according to claim 5, wherein said intermediate roll means includes a plurality of transfer rolls mounted adjacent said pick-up rolls and a plurality of oscillating rolls mounted between said pick-up rolls and said print rolls.

8. A machine, according to claim 7, including motor means for rotating said oscillating rolls and cam drive means between said motor means and said oscillating means for reciprocating said oscillating rolls along their axis of rotation.

9. A machine, according to claim 7, including a pivot shaft horizontally mounted by said ink frame assembly, a plurality of arm assemblies pivotally mounted on said pivot shaft, said transfer rolls being mounted for rotation by a first plurality of said arm assemblies and first cylinder means connected to said first plurality of arm assemblies for moving said transfer rolls between said pick-up rolls and said oscillating rolls.

10. A machine, according to claim 5, including motor means for rotating said ink pick-up rolls.

11. A machine, according to claim 9, wherein said print rolls are mounted for rotation by a second plurality of said arm assemblies and including second cylinder means connected to said second plurality of arm assemblies for moving said print rolls between said oscillating rolls and the print pads of said printing and punching means.

12. A machine, according to claim 1, wherein said printing and punching means includes a plurality of vertically movable prick punches mounted on said support frame, spring means biasing said punches upwardly, a plurality of horizontally movable cam wedges for urging said punches downwardly and a cylinder operatively connected to each of said cam wedges.

13. A machine, according to claim 1, wherein said advancing means comprises a pair of walking beams extending longitudinally in an opposed spaced relationship to one another, a plurality of pairs of work supports mounted on said beams for supporting respective ones of the workpieces, and means for vertically and horizontally translating the position of said beams.

14. A machine, according to claim 13, wherein said translating means comprises two pairs of arms pivotally connected at their upper ends to said walking beams, a cross tube extending transversely of said beams adjacent the lower ends of each pair of said arms, first links having first ends fixed to said tubes and having second ends pivotally connected to the lower end of one of said

arms of a respective pair of said arms, a cylinder link having one end fixed to one of said cross tubes, a first cylinder connected to the other end of said cylinder link, two connecting links, each having one end fixed to a respective one of said cross tubes, a connecting rod pivotally connected at its opposed ends to the other ends of said connecting links, and a second cylinder pivotally connected to one of said arms, whereby operation of said first cylinder translates said beams vertically and operation of said second cylinder translates said beams horizontally.

15. A machine, according to claim 1, wherein said weighing means comprise first and second weighing scales located at two successive work stations.

16. A machine for printing and punching indicia on workpieces comprising, in combination, a longitudinally extending main frame having defined thereon a plurality of spaced work stations for supporting individual workpieces, means for advancing an individual workpiece from one work station to the next successive work station, weighing means at at least one work station for weighing a workpiece, means for printing a workpiece, said printing means including a support frame mounted for rotation between a home position and an operative printing position and a main print pad mounted on said support frame, punching means adjacent one of said work stations for applying individual indicia to such workpieces, and inking means for supplying ink to said printing means, wherein said inking means includes an ink frame assembly mounted on said main frame, a plurality of ink reservoirs defined by said ink frame assembly, a plurality of ink pick-up rolls in communication with said reservoirs, a plurality of print rolls for transferring ink to said printing means and intermediate roll means for transferring ink from said pick-up rolls to said print rolls.

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