Nov. 29, 1955

R. M. PAYNE

PUNCHING APPARATUS FOR STRIPS OF SEALS AND THE LIKE

2,725,100

Filed Oct. 27, 1951

6 Sheets-Sheet 1

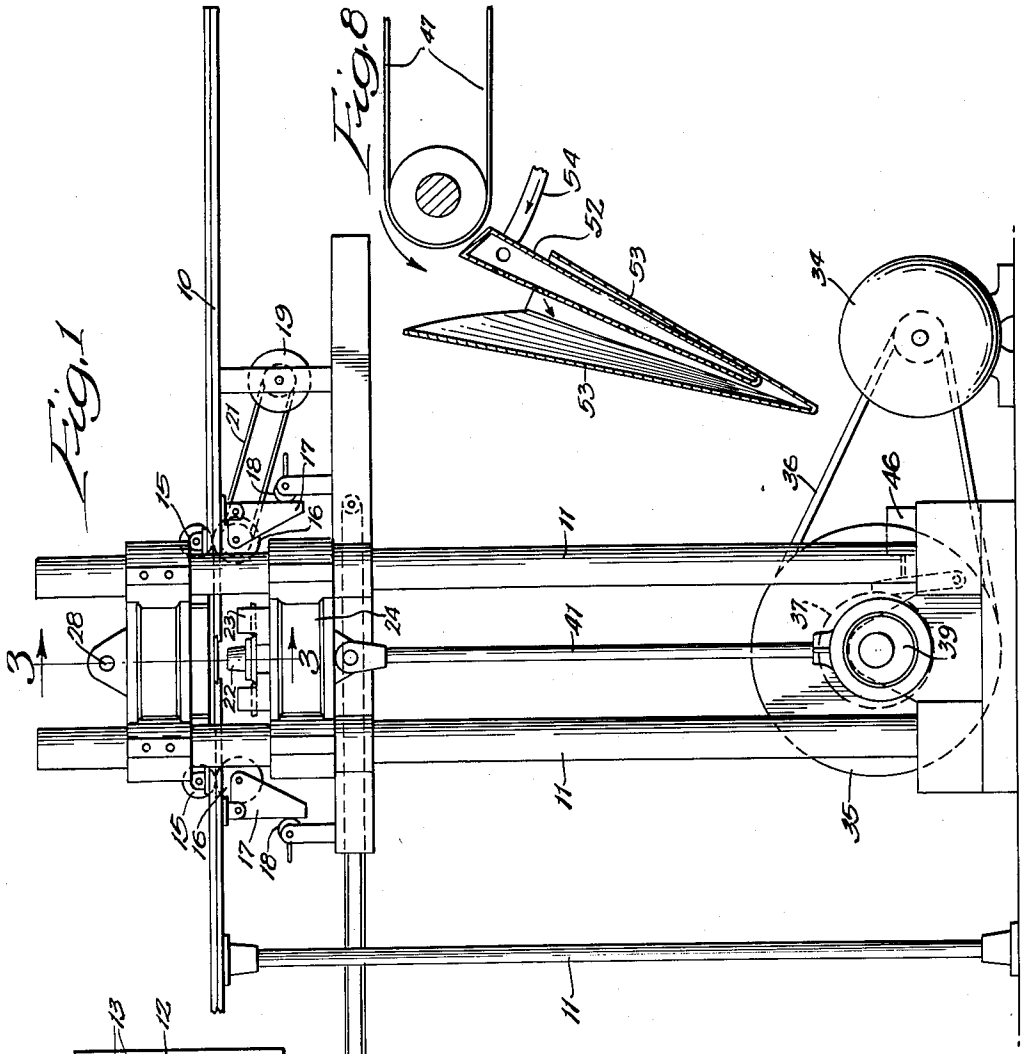


Fig. 1

Fig. 8

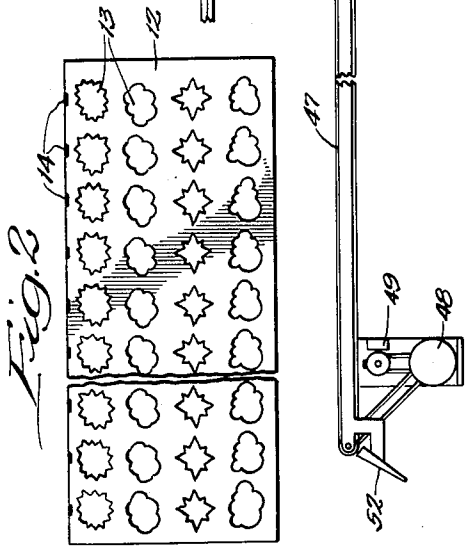


Fig. 2

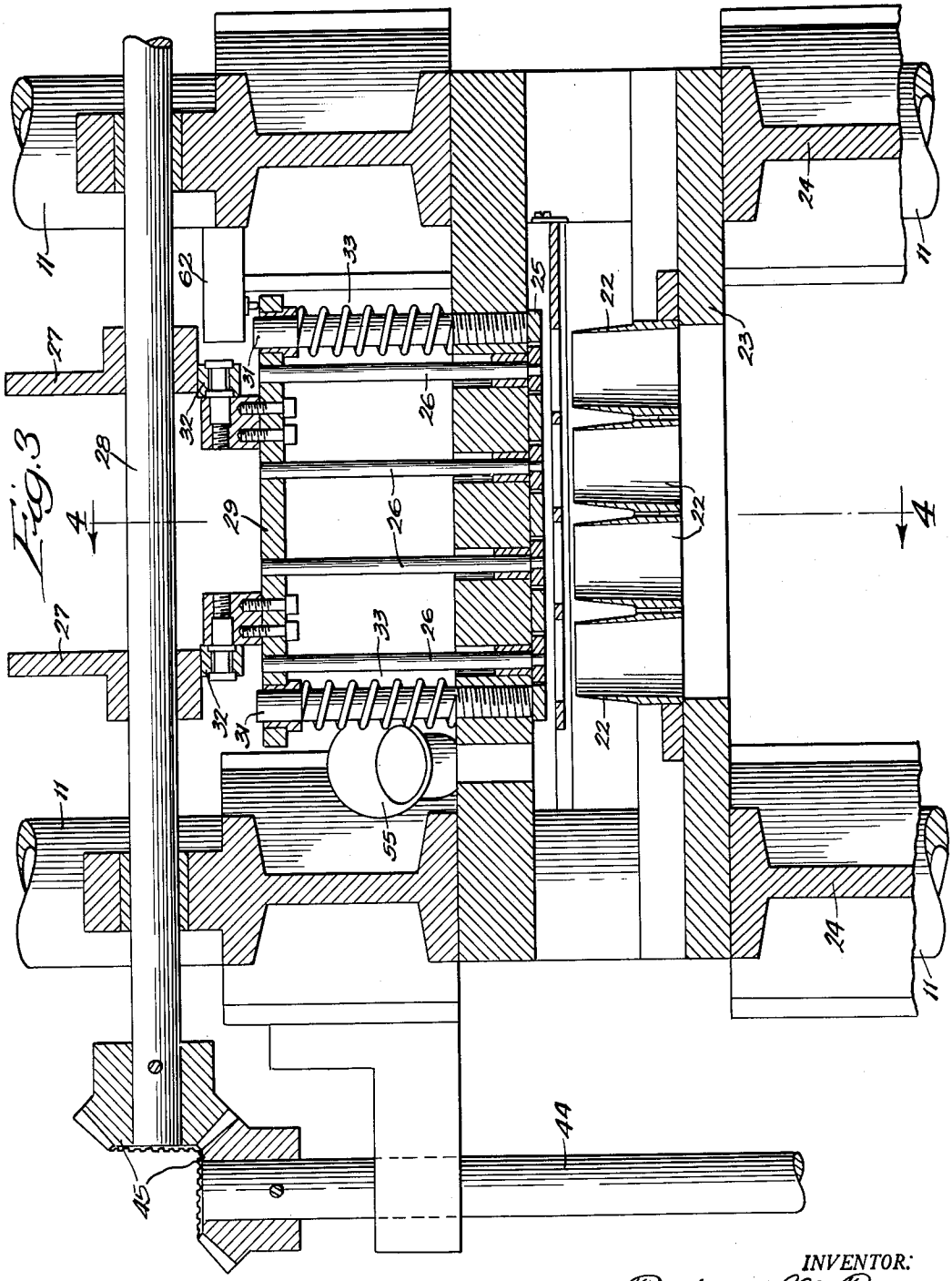
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Nov. 29, 1955 R. M. PAYNE 2,725,100

PUNCHING APPARATUS FOR STRIPS OF SEALS AND THE LIKE

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Fig. 3



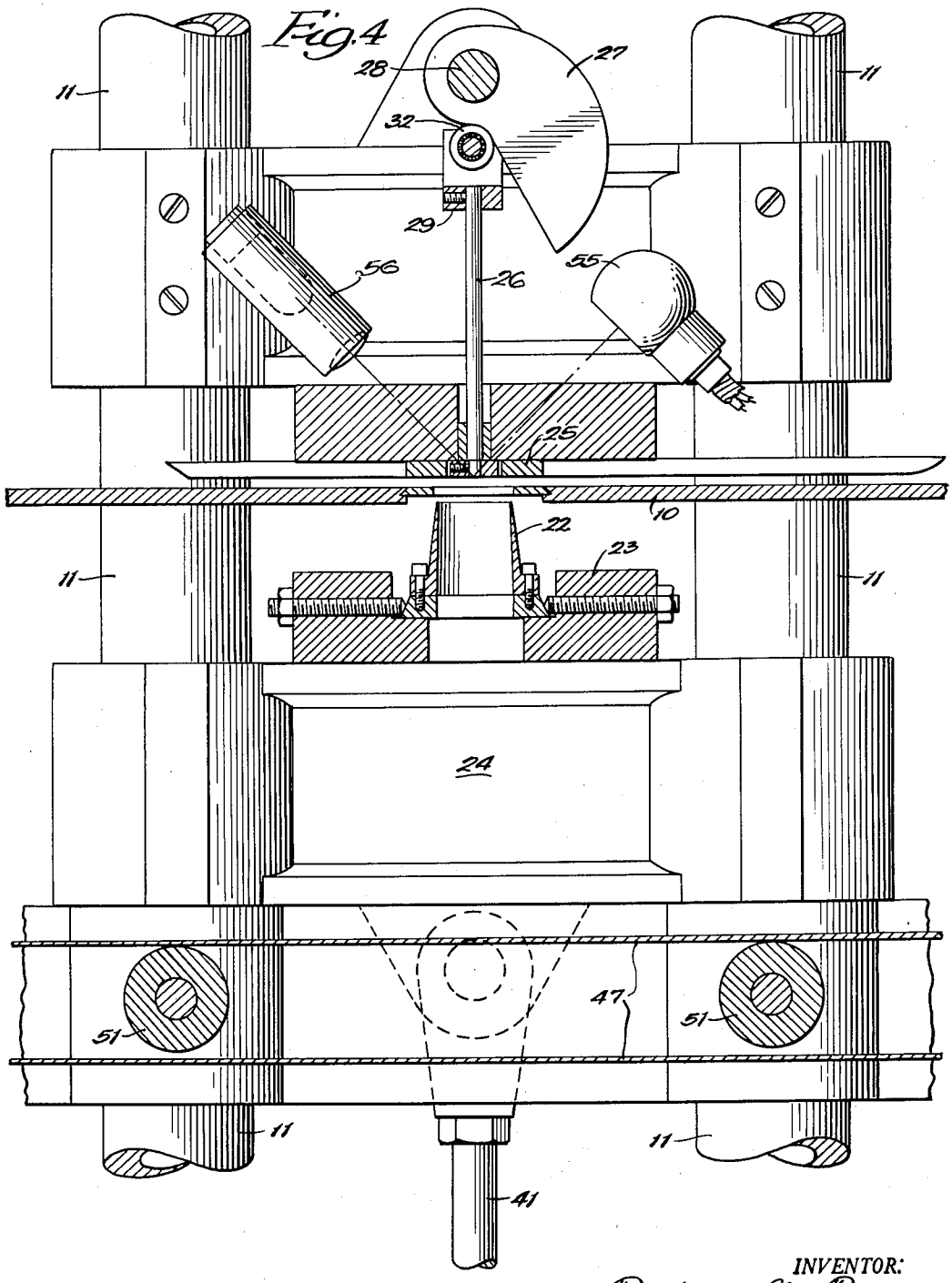
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PUNCHING APPARATUS FOR STRIPS OF SEALS AND THE LIKE

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Fig. 4



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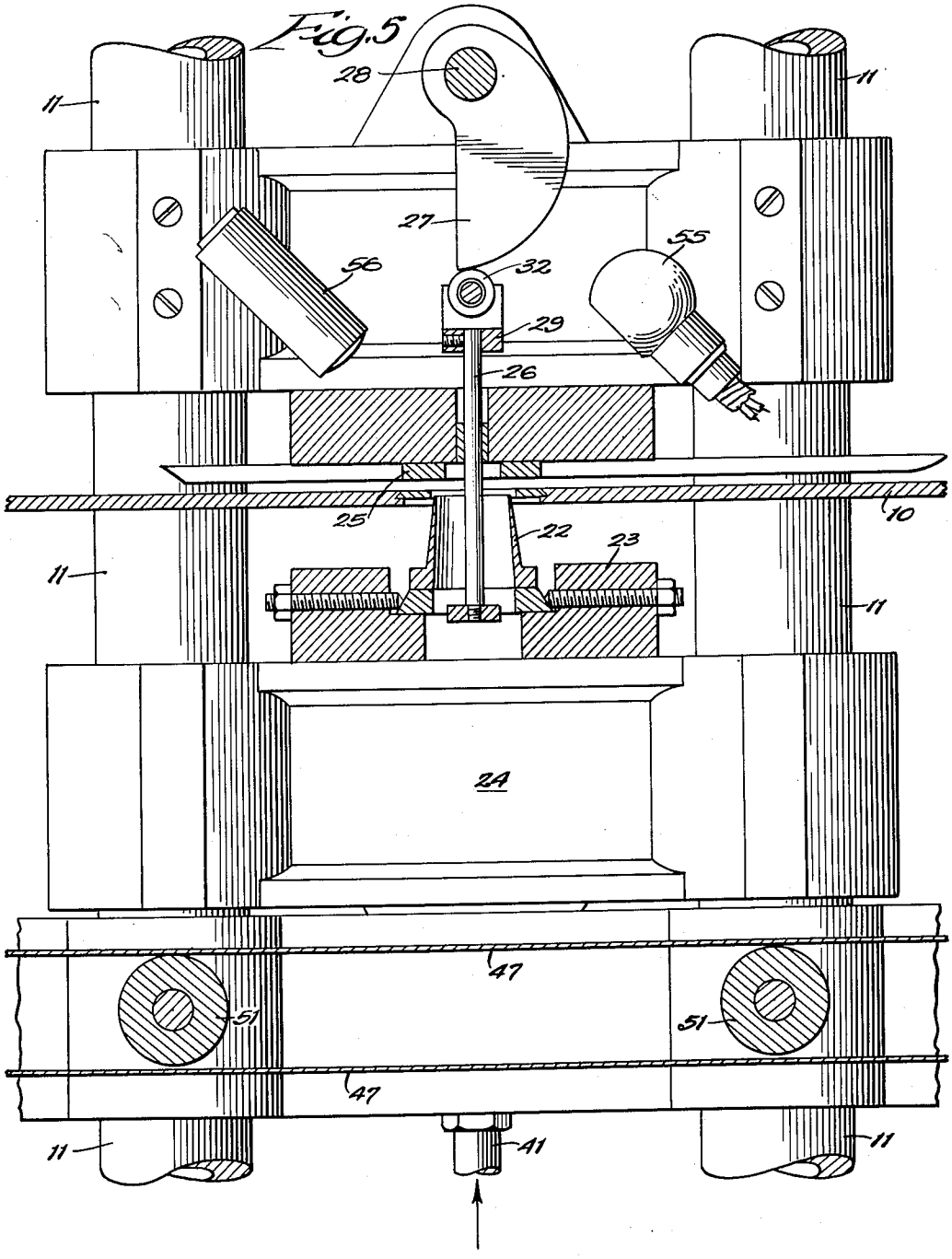
PUNCHING APPARATUS FOR STRIPS OF SEALS AND THE LIKE

2,725,100

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6 Sheets-Sheet 4

Fig. 5



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PUNCHING APPARATUS FOR STRIPS OF SEALS AND THE LIKE

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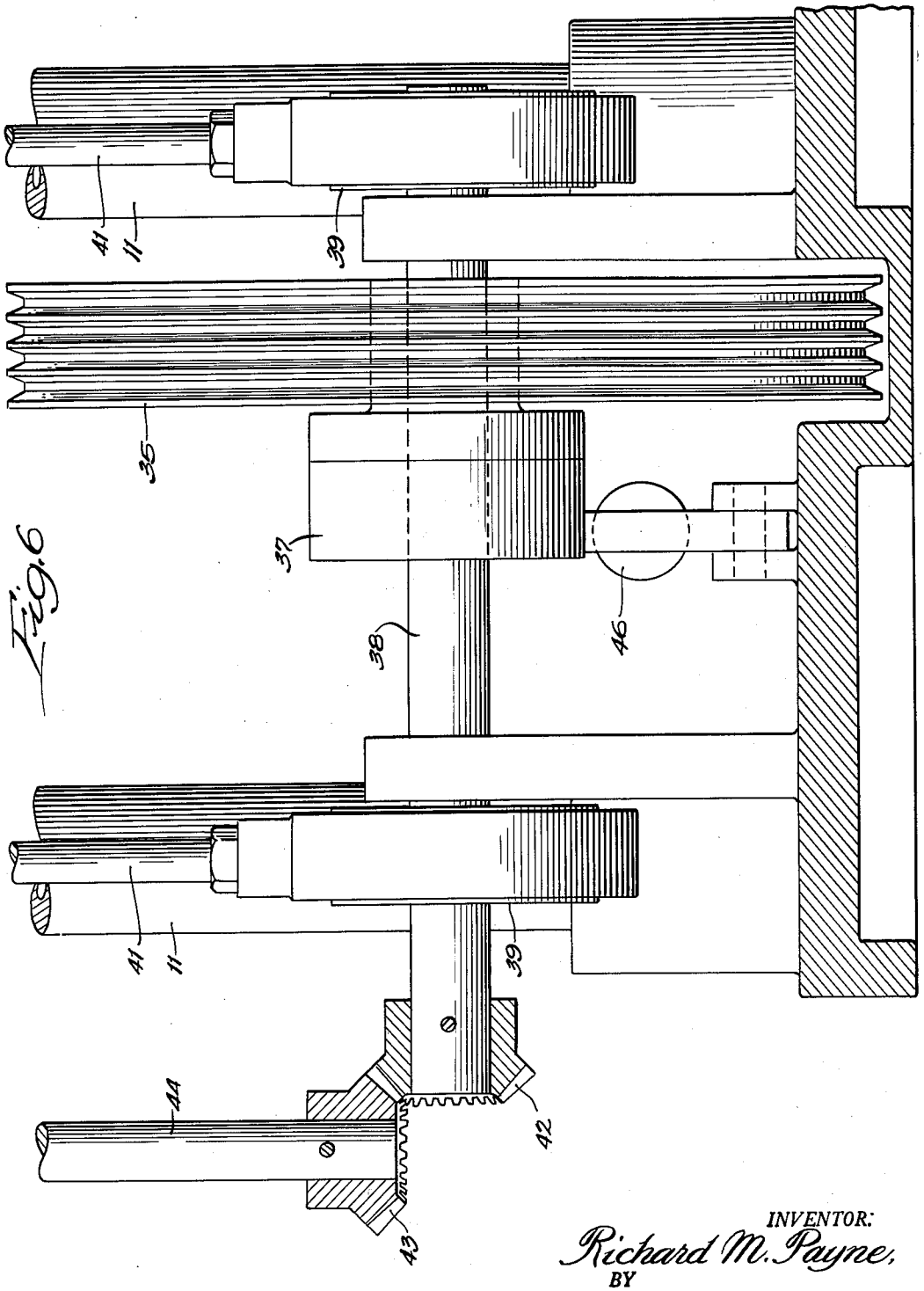


Fig. 6

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PUNCHING APPARATUS FOR STRIPS OF SEALS AND THE LIKE

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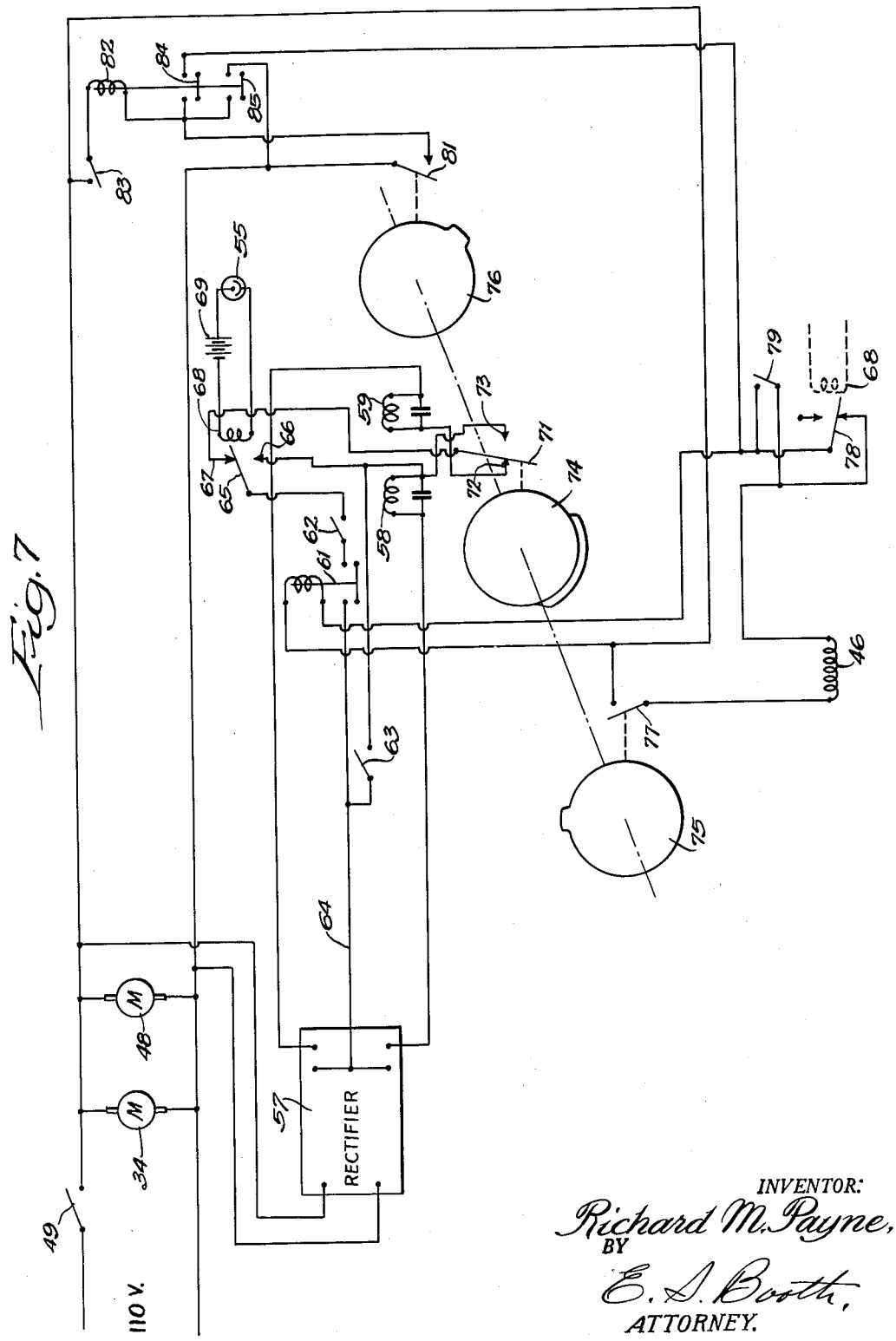


Fig. 7

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United States Patent Office 2,725,100 Patented Nov. 29, 1955

2,725,100

PUNCHING APPARATUS FOR STRIPS OF SEALS AND THE LIKE

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Application October 27, 1951, Serial No. 253,490

10 Claims. (Cl. 164—19)

This invention relates to punching apparatus for strips of seals and the like and more particularly to an apparatus for punching out gummed seals from stacks of strips on which the seals are printed.

Heretofore it has been the practice to print seals such as decorative Christmas seals on gummed strips and to cut individual imprints from a stack of such strips by a manually operated punch or press. This is a very slow and tedious operation involving difficulties in keeping the strips properly stacked, in manually handling the strips during the punching operation, in manually handling the punched seals to remove them from the punch and package them, and in handling the sheet after the seals are punched therefrom.

It is one of the objects of the present invention to provide a punching apparatus in which strips are fed to a punching station and are punched either fully or semi-automatically and in which the seals are removed and conveyed to a packaging station automatically and the punched sheets are fed from the machine automatically.

Another object is to provide a punching apparatus in which feeding of the strips to the punching station is controlled by a photo-electric cell to insure proper registry of the printed seals with the punch.

Still another object is to provide a punching apparatus in which the complete feeding and punching cycle is controlled automatically through electrical control devices to obtain a rapid and accurate operation.

According to one feature of the invention the punch is controlled jointly by a photo-electric cell and a cam operated cycling switch with the photo-electric cell stopping the feeding of the strip at the punching station and the cam operated switch starting the feeding after a punching operation.

A further object is to provide a punching apparatus in which the seals are punched out by a hollow punch moved upwardly against a fixed cutting plate and are removed from the hollow punch by a knock out plunger operated synchronously with the punch movement.

A further object is to provide a punching apparatus in which the punched out seals are dropped onto a horizontal conveyor and are carried thereby to a packaging station.

According to another feature of the invention, a discharge member is provided at the discharge end of the conveyor to receive the seals and deposit them in bags or packages and a current of air flows through the discharge member to hold the bags or packages open and to prevent sticking or clinging of the seals thereto.

The above and other objects and features of the invention will be more readily apparent from the following description when read in connection with the accompanying drawings, in which:

Figure 1 is a side elevation of a punching apparatus embodying the invention;

Figure 2 is a plan view of an imprinted strip;

Figure 3 is a partial section on the line 3—3 of Figure 1;

Figure 4 is a section on the line 4—4 of Figure 3;

Figure 5 is a view similar to Figure 4 showing the parts in a different position;

Figure 6 is an elevation with parts in section of the punch driving mechanism;

Figure 7 is a diagram of the electrical control circuit; and

Figure 8 is a partial section of the discharge member.

The apparatus as illustrated comprises a supporting and guiding plate **10** which is carried at a convenient height above the floor by vertical frame members **11**. The supporting plate **10** is adapted to receive a stack of sheets on which the seals have been imprinted. Such a sheet is shown at **12** in Figure 2 with four rows of seals **13** imprinted thereon. Each sheet also has imprinted thereon in alignment with the rows of seals a series of indexing marks **14** for indexing the seals in proper registry with the punch as described hereinafter. The seals are imprinted on gummed sheets and after imprinting the sheets are stacked in the number it is desired to package the seals, so that a complete stack of punched seals may be placed in each envelope or package without requiring further counting. The sheets when so stacked are secured together as by gumming one end of the stack so that all of the sheets are in proper registry with each other during the complete operation.

The stacked sheets are fed across the guiding and supporting plate **10** by a feeding mechanism shown as comprising upper and lower pairs of rollers **15** and **16**. As shown, two pairs of rollers are provided, one at the entrance side of the punching station and the other at the exit side of the punching station, although more or less pairs of driving rollers could be used as desired. The upper rollers **15** are idling rollers mounted on fixed axes above the top of the guiding plate **10** spaced properly to engage the upper surface of a stack of imprinted sheets. The lower rollers **16** may be moved upwardly toward the rollers **15** through a lever **17** and cam **18** to provide the necessary driving pressure. The lower rollers are driven by a motor **19** through a belt **21** to feed the stacked sheets from right to left through the apparatus as seen in Figure 1. It will be understood that the sheets may be made of any convenient length and that stacks of sheets are fed through the apparatus in end to end relationship during the punching operation.

The imprinted seals are adapted to be punched from the stacked sheets by vertically movable hollow punches **22** as best seen in Figures 3 to 5. The punches may be shaped to produce any desired outline of a seal, such for example as the outlines indicated in Figure 2. As shown, there are four punches **22** ranged in alignment to correspond to the four rows of seals imprinted on the sheets **12** so that at each operation of the punch four stacks of seals will be punched from the sheets. The punches are mounted on a cross plate **23** which is open beneath the punches so that the punched seals can drop from the punches through the supporting plate. The supporting plate is carried by vertical shiftable head members **24** which can be moved upward for a punching operation and downward to release the strip at the end of a punching operation.

The punches when moved upward during a cutting operation strike against a cutting plate **25** which is fixedly supported above the guiding plate **10**. The cutting plate **25** is formed with openings therethrough in alignment with the punches through which knockout plungers **26** can move downwardly to eject punched out seals from the punches. Normally the knockout plungers lie in an elevated position as shown in Figures 3 and 4 and

are moved downwardly by cams 27 carried by a shaft 28 rotatable on a fixed axis above the cutting plate 25. As best seen in Figure 3 the knockout punches 26 are carried by a head plate 29 which is slidable vertically on guide pins 31. The head plate 29 carries rollers 32 which engage the cams 27 to move the head plate and the plungers downward, the head plate and plungers being returned to their elevated position by means of springs 33.

The punches are moved upward and the cam shaft 28 is driven synchronously therewith by means of a driving mechanism best shown in Figures 1 and 6. This mechanism as illustrated comprises an electric motor and reducer unit 34 which drives a flywheel 35 through a belt 36. The flywheel is connected through a single revolution clutch 37 to a main driving shaft 38. The shaft 38 carries a pair of eccentrics 39 which operate vertically extending pusher rods 41 which are connected to the heads 24 to move them and the punches vertically. The shaft 38 also carries a bevel pinion 42 meshing with a pinion 43 on a shaft 44 which is geared to the cam shaft 28 through bevel pinions 45 as best seen in Figure 3. Thus when the shaft 38 turns it turns the eccentrics 39 to move the punches vertically and at the same time drives the cam shaft 28 to move the knockout plungers. The clutch 37 is controlled by a trip solenoid 46 and when tripped will cause the shaft 38 to turn through one complete revolution after which the clutch is disengaged.

Punched out seals which drop from the hollow punches 22 are received on a horizontally traveling conveyor 47 which lies beneath the punch supporting plate 23 and extends horizontally beyond the punching apparatus as best seen in Figure 1. The conveyor may be driven by a motor 48 and is controlled through a switch mechanism 49 which switch mechanism may also control the driving motor 34. Although any desired type of conveyor may be employed, that illustrated comprises a flexible web which moves over guide members 51 with the upper run of the web moving from right to left as seen in Figure 1.

At the discharge or left end of the conveyor as best seen in Figures 1 and 8 a hollow tapered discharge member 52 is provided extending downward at an angle from the end of the conveyor to receive stacks of seals which fall from the end of the conveyor. The discharge member 52 is of a size and shape to be received in a bag or package 53 in which the seals are to be packaged in the manner best shown in Figure 8. As the seals leave the conveyor they may tend to cling to the conveyor and to the discharge member because of the adhesive thereon and further because of accumulated static charges. To insure that the seals will fall properly into the bags or packages and further to assist in holding the packages or bags open, the hollow discharge member is formed on its upper face with a series of perforations and a compressed air supply pipe 54 connected thereto to supply air under a relatively low pressure. I have found that the very slight air current produced by low pressure air will not only assist in holding the bags 53 open during the filling but will also prevent the seals from sticking to the discharge member to that they will drop properly to the bottoms of the bags. In this way the bags can be filled very rapidly with a complete stack of seals going into each bag.

To insure proper registry of the seals with the punches 22 a photo-electric cell 55 is provided mounted above the guiding and supporting plate 10. A light source 56 including a suitable lens system is also mounted above the guiding and supporting plate to direct a beam of light onto the stacked sheets adjacent to the edge thereof so that the light will be reflected from the sheets to the photo-electric cell 55. The sheets are normally white except where they are imprinted with the indexing marks 14 so that maximum light will be reflected to the photo-electric cell when the sheets are in any position other than that at which the indexing marks 14 are viewed by the cell. The indexing marks are preferably black or a similar dark color so that when they register with the point which the cell is viewing the amount of light directed into the cell will be reduced. In this position the imprinted seals on the sheets are in proper registry with the punches and the photo-electric cell stops the sheet feeding means so that seals can be punched from the sheets.

The operating circuit of the mechanism is shown in Figure 7. As illustrated the main switch 49 connects the two motors 34 and 48 directly to a source of power which may be the usual 110 volt alternating current supply. When the switch 49 is closed both of the motors 34 and 48 will start and will continue to run as long as the switch 49 remains closed. Closing of this switch also supplies power to a rectifier 57 which is utilized to provide a D. C. supply for operating the feeding motor 19. This motor is preferably of the type including an electrically operated clutch energized by a winding 58 and an electrically operated brake controlled by a winding 59. When the clutch winding 58 is energized the motor will drive the belt 21 and through it will drive the feeding rollers 16 to feed the stacked sheets. When the winding 58 is deenergized and the brake 59 is energized the belt 21 and driving rollers 16 will be stopped quickly and accurately with the imprinted seals in registry with the punches.

The windings 58 and 59 are controlled by a solenoid operated switch 61 in the D. C. power supply and by a normally open switch 62 which is mounted as best seen in Figure 3 to be engaged and closed by the head plate 29 when the knockout plungers 26 are in their uppermost position. A manual switch 63 may also be provided in shunt with the switches 61 and 62 to energize the clutch winding 58 so that the sheets can be advanced manually when desired for adjustment of the machine.

The center lead 64 of the rectifier 57 in which the switches 61 and 62 are arranged in series is connected to a movable switch blade 65 which engages either of two contacts 66 or 67. The switch blade 65 is controlled by a winding 68 which is connected in circuit with a power source 69 and the photo-electric cell 55 so that the winding will be energized when the photo-electric cell is receiving a maximum quantity of light as when it views a portion of the strips other than the indexing marks thereon. The switch blade 65 normally engages the contact 67 as shown and is moved into engagement with contact 66 when the winding 68 is energized. The contact 66 is connected to the clutch winding 58 to control its energization and the contact 67 is connected to a second movable switch blade 71. The switch blade 71 normally engages a contact 72 and may be moved into engagement with a contact 73 by a cam 74. The contact 72 is connected to the brake winding 59 and the contact 73 is connected to the clutch winding 58. The cam 74 as shown has a single relatively long lobe thereon so that it will hold the switch blade 71 in engagement with the contact 73 throughout approximately 90 degrees of its revolution.

The cam 74 is mounted on a cam shaft which also carries a cam 75 having a single short lobe thereon and a cam 76 which has a single short lobe thereon. The cam 75 controls a normally open switch 77 which is connected in circuit with the trip solenoid 46. The solenoid 46 is connected to the supply circuit through the switch 77 and through a second switch 78 which normally occupies the position shown to energize the circuit but which is moved to an open circuit by the winding 68 when it is energized. A manually operable switch 79 may be provided to shunt the switch 78 for allowing the press to be tripped solely by the cam 75.

The supply circuit for the trip solenoid 46 and also for the solenoid operated switch 61 is controlled by a starting switch mechanism including a switch 81 which is normally open and which is closed periodically by the cam 76. The switch 81 is connected across the supply

circuit in series with a solenoid 82 and a manually operable starting switch 83. The solenoid 82 controls a pair of switch blades 84 and 85 which are normally open and which when closed complete a holding circuit through the solenoid 82 and energize the supply circuit to the press trip solenoid and also directly energize the solenoid switch 61.

In operation the toggle switch 49 is first closed to start the motors 34 and 48. One of these motors preferably drives the cam shaft on which the cams 74, 75 and 76 are mounted so that this shaft starts to turn as soon as the switch 49 is closed. At this time nothing further will happen because the switch 61 remains open and the solenoid 82 remains deenergized. Thereafter the starting switch 83 is closed and held closed until the cam 76 closes the switch 81. At this time the solenoid 82 is energized to close the switches 84 and 85 thereby to energize the remainder of the operating circuit. Provision of the cam 76 insures that the apparatus can never be started in mid-cycle which might result in an improper punching operation.

As soon as the switches 84 and 85 are closed the solenoid switch 61 will close and if the knockout plungers are in their normal elevated position the switch 62 will will be closed. If the strips on the supporting plate are at this time in such position that the photo-electric cell views the white portion of the strip the winding 68 will be energized to move the switch blade 65 downward into engagement with the contact 66 and to move the switch blade 78 upward to interrupt the trip solenoid circuit. At this time the clutch winding 58 will be energized and the brake winding 59 will be deenergized so that the feed rollers will move the stack of strips over the guiding and supporting plate 10 toward the punching station. As soon as the strips have moved to a position such that the photo-electric cell 55 views an indexing mark 14, the winding 68 will be deenergized and the switch blades 65 and 78 will move to the illustrated position. At this time the cam 74 will be approximately in the position shown so that the brake winding 59 will be energized through the contact 67, switch blade 71 and contact 72. Thus the feed mechanism will be stopped quickly and accurately with the photo-electric cell viewing an indexing mark and with the imprinted seals on the strips in proper registry with the punches. As the cam shaft continues to rotate the cam 75 will close the switch 77 to energize the trip solenoid 46 and engage the single revolution clutch 37. At this time the eccentrics 39 will raise the rods 41 to move the punches up and cut the imprinted seals from the stacked strips against the cutting plate 25. At the same time the cam shaft 28 will be driven in a counterclockwise direction as seen in Figures 4 and 5. The cam shaft 28 in the normal position of rest is as shown in Figure 4 with the rollers 32 engaging a low part of the cams 27 so that the plungers are elevated. The cams 27 are circular throughout approximately 180 degrees of their periphery so that during the first 180 degrees of travel the plungers will not be moved downward. During this same 180 degrees of travel the punches will have moved upward to their maximum elevated position to complete a punching operation so that the seals are fully cut out of the strips. During the second 180 degrees of travel the punches again move downward to their starting position and at the same time the cams 27 move the knockout plungers 26 downward so that they will travel through the punches as illustrated in Figure 5 to force the cut out seals therefrom so that they will drop by gravity onto the conveyor 47.

As the cam shaft continues to turn the cam 74 will move the switch blade 71 into engagement with the contact 73 to energize the clutch winding 58 through the contact 67, switch blade 71 and contact 73. At this time the feeding mechanism will be started despite the fact that the photo-electric cell is still viewing an indexing mark. The lobe on the cam 74 is made sufficiently long to insure that the photo-electric cell will be viewing a white portion of the strip before the switch blade 71 is released but is made sufficiently short also to insure that the strip will not be moved far enough to bring another indexing mark into the viewing field of the photo-electric cell before the switch blade 71 is released. As soon as the photo-electric cell views a white portion of the strip the winding 68 will be energized and the switch blades 65 and 78 will be moved. The switch blade 65 will engage the contact 66 to maintain the clutch winding 58 energized until the photo-electric cell again views an indexing mark and opening of the switch blade 78 will insure that the trip solenoid 46 cannot be energized until the photo-electric cell has again stopped the feeding mechanism. As long as strips imprinted with seals and indexing marks are fed into the apparatus the seals will be automatically and accurately punched from the strips and will be dropped onto the conveyor 47 in spaced stacks to be carried away thereby.

The punched strips are fed from the punching apparatus by the left hand set of feed rollers 15 and 16 and may be removed from the left hand end of the supporting and guiding plate 10 in any desired manner. The punched out seals are carried by the conveyor to its discharge end and are placed in bags or packages which are inserted over the discharge member 52 in the manner described above.

It will be seen that by the present apparatus seals can be punched out rapidly and accurately with a minimum of labor and with no possibility of improper punching.

While the invention has been described in connection with one specific purpose, it will be apparent that variations might be made therein. For example, the apparatus may be used in conjunction with any desired type of automatic packaging machinery and may be controlled to operate in timed relation therewith by driving the shaft upon which cams 74, 75 and 76 are mounted from the automatic packaging machine. It is therefore not intended that the scope of the invention shall be limited to the exact apparatus shown nor otherwise than by the terms of the appended claims.

What is claimed is:

1. Punching apparatus for a strip of seals and the like having indexing marks thereon comprising feeding means to advance a strip to a punching station, a photo-electric cell positioned to view said indexing marks when the strip is positioned with the seals thereon at the punching station, means controlled by the photo-electric cell to stop the feeding means when the cell views an indexing mark, a movable punch, a control circuit for the punch, a switch in the control circuit, means controlled by the photo-electric cell when it views an indexing mark to close the switch, a cam shaft having a plurality of cams thereon, a second switch in the control circuit closed by one of the cams to initiate a punching operation, and means controlled by another of the cams to start the feeding means with the photo-electric cell still viewing an indexing mark.

2. Punching apparatus for a strip of seals and the like having indexing marks thereon comprising feeding means to advance a strip to a punching station, a photo-electric cell positioned to view said indexing marks when the strip is positioned with the seals thereon at the punching station, means controlled by the photo-electric cell to stop the feeding means when the cell views an indexing mark, a movable punch, a control circuit for the punch, a switch in the control circuit, means controlled by the photo-electric cell when it views an indexing mark to close the switch, a cam shaft having a plurality of cams thereon, a second switch in the control circuit closed by one of the cams to initiate a punching operation, and a switch temporarily moved by another of the cams to start the feeding means with the photo-electric cell still viewing an indexing mark.

3. Punching apparatus for a strip of seals and the like having indexing marks thereon comprising feeding means to feed a strip to a punching station, a motor to drive

the feeding means, an electrically operated clutch to connect the feeding means to the motor, an electrically operated brake to stop the feeding means, a photo-electric cell positioned to view said indexing marks when the strip is positioned with the seals thereon at the punching station, circuits controlled by the photo-electric cell to de-energize the clutch and energize the brake when the cell views an indexing mark and to de-energize the brake and energize the clutch when the cell does not view an indexing mark, a movable punch, a control circuit for the punch including a pair of switches, means controlled by the photo-electric cell to close one of the switches when the cell views an indexing mark, a cam shaft having a plurality of cams thereon, one of which closes the other of the switches, and a switch operated by another of the cams to energize the clutch and de-energize the brake with the photo-electric cell still viewing an indexing mark.

4. Punching apparatus for a strip of seals and the like having indexing marks thereon comprising feeding means to feed a strip to a punching station, a motor to drive the feeding means, an electrically operated clutch to connect the feeding means to the motor, an electrically operated brake to stop the feeding means, a photo-electric cell positioned to view said indexing marks when the strip is positioned with the seals thereon at the punching station, circuits controlled by the photo-electric cell to de-energize the clutch and energize the brake when the cell views an indexing mark and to de-energize the brake and energize the clutch when the cell does not view an indexing mark, a movable punch, a control circuit for the punch including a pair of switches, means controlled by the photo-electric cell to close one of the switches when the cell views an indexing mark, a cam shaft having a plurality of cams thereon, one of which closes the other of the switches, a switch operated by another of the cams to energize the clutch and de-energize the brake with the photo-electric cell still viewing an indexing mark, a power supply circuit for the motor, the circuits and the punch control circuit, a main switch for the power supply circuit, a solenoid to close the main switch, a pair of switches in series with the solenoid one of which is manually operable and the other of which is closed by a third one of the cams and connections from the main switch to the solenoid to maintain the solenoid energized when the main switch is closed.

5. Punching apparatus for a strip of seals and the like having indexing marks thereon, comprising a guide plate to support a strip of seals and having an opening therein at a punching station, a cutting plate spaced above the guide plate in registry with the opening, feeding means to feed a strip of seals between the guide plate and the cutting plate, a photo-electric cell positioned to view an indexing mark on the strip when the strip is positioned with seals thereon at the punching station, a circuit controlled by the photo-electric cell to stop the feeding means when the cell views an indexing mark, a hollow punch movable upward through the opening in the guide plate, drive means for the punch, a control circuit for the drive means, a pair of switches in series in the control circuit, means controlled by the photo-electric cell to close one of the switches when the cell views an indexing mark, a rotating cam shaft having a plurality of cams thereon, one of which controls the other of the pair of switches, and means operated by another of the cams to start the feeding means.

6. Punching apparatus for a strip of seals and the like having indexing marks thereon, comprising a guide plate to support a strip of seals and having an opening therein at a punching station, a cutting plate spaced above the guide plate in registry with the opening, feeding means to feed a strip of seals between the guide plate and the cutting plate, a photo-electric cell positioned to view an indexing mark on the strip when the strip is positioned with seals thereon at the punching station, a circuit controlled by the photo-electric cell to stop the feeding means when the cell views an indexing mark, a hollow punch movable upward through the opening in the guide plate, drive means for a punch, a knockout plunger movable downward through the cutting plate and the punch to knockout cut seals from the punch, a connection from the knockout plunger to the drive means to operate the plunger in timed relation with the punch, a control circuit for the drive means, a pair of switches in series in the control circuit, means controlled by the photo-electric cell to close one of the switches when the cell views an indexing mark, a rotating cam shaft having a plurality of cams thereon, one of which controls another of the switches, and means operated by another of the cams to start the feeding means.

7. Punching apparatus for a strip of seals and the like having indexing marks thereon, comprising a guide plate to support a strip of seals and having an opening therein at a punching station, a cutting plate spaced above the guide plate in registry with the opening, feeding means to feed a strip of seals between the guide plate and the cutting plate, a photo-electric cell positioned to view an indexing mark on the strip when the strip is positioned with seals thereon at the punching station, a circuit controlled by the photo-electric cell to stop the feeding means when the cell views an indexing mark, a hollow punch movable upward through the opening in the guide plate, drive means for the punch, a knockout plunger movable downward through the cutting plate and the punch to knock out cut seals from the punch, a connection from the knockout plunger to the drive means to operate the plunger in timed relation with the punch, a control circuit for the drive means, a pair of switches in series in the control circuit, means controlled by the photo-electric cell to close one of the switches when the cell views an indexing mark, a rotating cam shaft having a plurality of cams thereon, one of which controls another of the switches, means operated by another of the cams to start the feeding means, and means operated by the knockout plunger to prevent starting of the feeding means by the last named means until the plunger reaches its raised position.

8. Punching apparatus for a strip of seals and the like having indexing marks thereon, comprising a guide plate to support a strip of seals and having an opening therein at a punching station, a cutting plate spaced above the guide plate in registry with the opening, feeding means to feed a strip of seals between the guide plate and the cutting plate, a photo-electric cell positioned to view an indexing mark on the strip when the strip is positioned with seals thereon at the punching station, a circuit controlled by the photo-electric cell to stop the feeding means when the cell views an indexing mark, a hollow punch movable upward through the opening in the guide plate, drive means for the punch, a knockout plunger movable downward through the cutting plate and the punch to knock out cut seals from the punch, a connection from the knockout plunger to the drive means to operate the plunger in timed relation with the punch, a control circuit for the drive means, a switch in the control circuit operated by the photo-electric cell, means operating in timed relation with the plunger to start the feeding means, and means operated by the plunger to prevent starting of the feeding means by the last named means unless the plunger is in a raised position.

9. Apparatus for treating a strip having indexing marks thereon comprising feeding means to advance a strip to a treating station, treating means adjacent to the path of movement of the strip to treat the strip in predetermined relationship to the indexing marks, control means responsive to the indexing marks to stop the feeding means when the strip is in the desired predetermined relationship to the treating means, a control circuit to control operation of the treating means, a pair of switches in the control circuit, means operated by the control means when it responds to an indexing mark to close one of the switches, a cam shaft having a plurality of cams thereon, the other of the switches being closed by one of the

cams to initiate operation of the treating means, and means controlled by another of the cams to start the feeding means with the control means still responding to an indexing mark.

10. Apparatus for treating a strip having indexing marks thereon comprising feeding means to advance a strip to a treating station, treating means adjacent to the path of movement of the strip to treat the strip in predetermined relationship to the indexing marks, control means responsive to the indexing marks to stop the feeding means when the strip is in the desired predetermined relationship to the treating means, a control circuit to control operation of the treating means, a pair of switches in the control circuit, means operated by the control means when it responds to an indexing mark to close one of the switches, a cam shaft having a plurality of cams thereon, the other of the switches being closed by one of the cams to initiate operation of the treating means, means controlled by another of the cams to start the feeding means with the control means still responding to an indexing mark, a power supply circuit for the feeding means, the control circuit and the treating means, a

main switch for the power supply circuit, a solenoid to close the main switch, a pair of switches in the solenoid circuit one of which is manually operable and the other of which is closed by a third one of the cams, and connections from the main switch to the solenoid to maintain the solenoid energized when the main switch is closed.

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