Oct. 8, 1968 W. L. DOLLENMAYER 3,404,594

VISIBLE PERFORATING APPARATUS WITH RECIPROCATING STRIPPING

Filed Oct. 30, 1964

FIG. 1

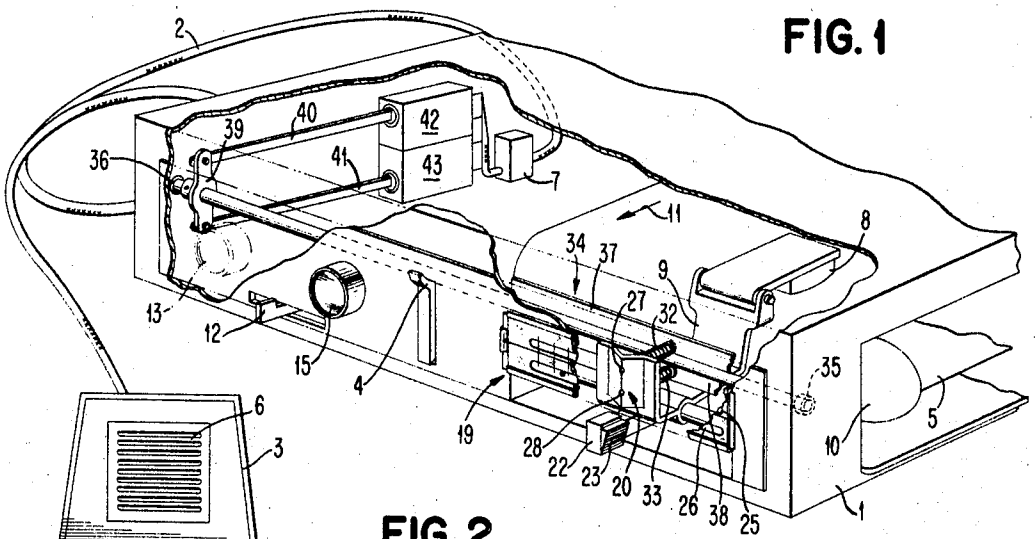


FIG. 2

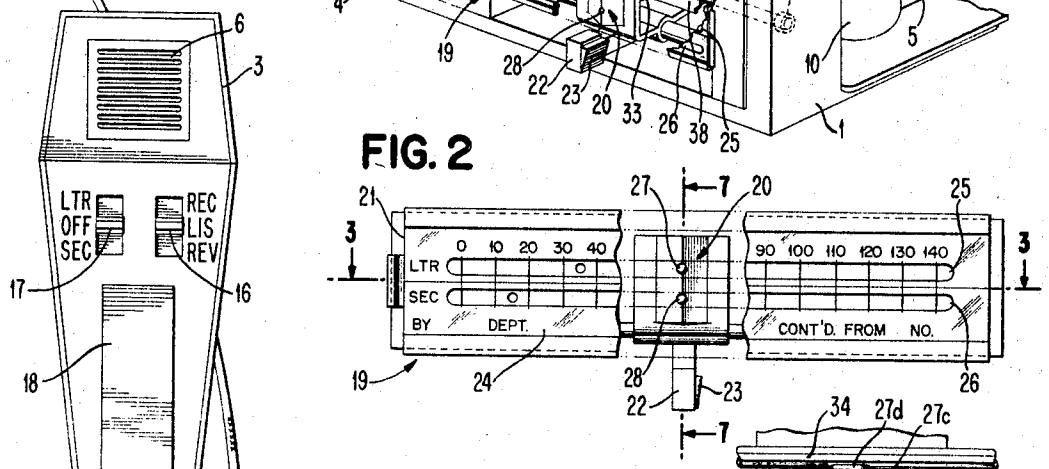


FIG. 3

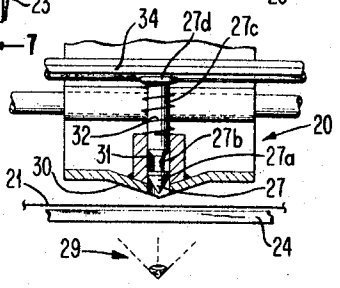


FIG. 4

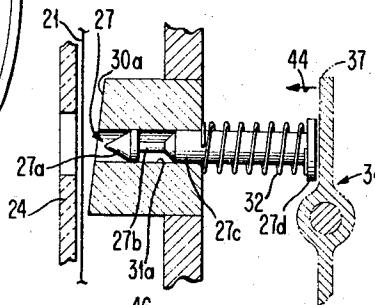


FIG. 5

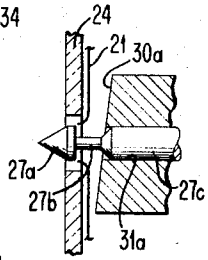


FIG. 6

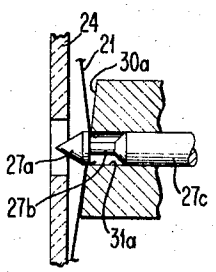


FIG. 8

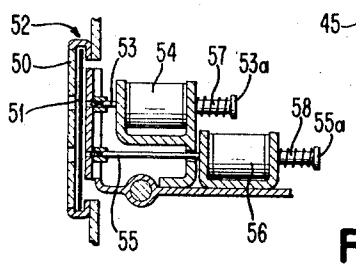
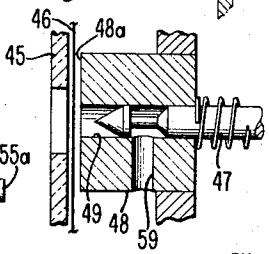


FIG. 7



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VISIBLE PERFORATING APPARATUS WITH RECIPROCATING STRIPPING

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4 Claims. (Cl. 83—587)

ABSTRACT OF THE DISCLOSURE

The invention relates to perforating apparatus in a dictating machine environment in which all of the primary working elements of the apparatus are positioned adjacent an index slip being perforated on a side opposite to that being observed so that entire index slip is visible.

The dictating machine is controlled by a microphone handset having an index control button. Movement of the button to the alternative Letter (LTR) or Secretary (SEC) positions operates mechanisms to punch corresponding perforations in an index slip **21**. The perforations are effected by a punch element that is mounted in a stripper for reciprocation from a home position toward the front of the machine and then back to the home position. A conical portion of the punch element tears the index slip during the outward movement from home position and severs a chad in the slip as it returns to the home position.

The perforating apparatus is disclosed herein in connection with dictating equipment but should find usefulness in a wide variety of equipment in which perforation of a media is required.

Dictating machines of many different types are in widespread use today. Their advantages, including rapid and efficient preparation of reports, letters, and similar documents using various types of recording media such as magnetic belts or sheets, are well known. Such machines are normally provided with a transducer, such as a microphone having control buttons thereon for controlling various machine operations, and circuitry and mechanisms for translating the dictator's speech into signals that may then be recorded on the recording media employed. If a magnetic belt is used, for example, a typical dictating capacity for the belt is ten to fourteen minutes. During dictation, the drive mechanisms in the equipment serve to move the magnetic recording head from a zero position to the end of the belt. During this movement of the head the belt is rotated and the combined movements of the belt and head result in a helical path being recorded on the belt.

It has always been desirable in dictating equipment to have some means for informing the dictator of his position on the recording media. This means is commonly referred to as indexing means and serves not only to inform the dictator of his position, but also to inform the transcriber at a later time of the length of the various dictated materials on the media as well as special instructions that should be observed during the transcribing procedure.

Indexing mechanisms in the past have taken a number of forms but in practically every case they include some sort of index slip that is arranged adjacent the record media and having index markings on it that correspond to the increments of dictating intervals on the recording media. As an example, if the recording media has a capacity of ten minutes, then the index slip might have designations printed thereon from zero to ten at regular intervals corresponding to each minute on the recording media. Many methods have been proposed in the past for marking the index slip in order indicate the ends of letters or special instructions. Index slips have been provided with specially treated surfaces that can be scraped off to give

an indication. One of the most common ways of making indications on the index slip is to perforate the slip by means of an associated perforating mechanism that moves along with the head and which is always positioned adjacent the index slip in a position that corresponds to the relative position of the head with respect to the recording media.

One of the problems with prior art perforating mechanisms of this nature is that the mechanisms have been somewhat complicated and cumbersome and have usually obscured the area of the index slip that is currently subject to perforation. This has necessitated the dictator or transcriber moving the entire assembly to another location with respect ot the slip so that area under consideration can be observed. Prior art devices have usually had some large portion of the perforating or marking mechanism positioned in front of the slip between the observer and the slip. Moving the entire assembly out of the way in order to observe the slip requires additional time and also requires that the operator, the dictator or transcriber, listen again to the material in order to relocate the head assembly and indexing assembly in the same position that they previously occupied.

Therefore, an object of the invention is to provide a simplified perforating apparatus.

Another object of the invention is to provide a perforating apparatus that is arranged in such a fashion that any media being perforated is visible at all times to an observer.

Another object of the invention is to provide a perforating apparatus that may be operated electrically or manually as required by equipment parameters.

Another object of the invention is to provide an indexing mechanism for dictating equipment that performs the indexing operation with a high degree of reliability and which operates with complete visibility for the user of the equipment.

Another object of the invention is to provide a perforating apparatus which is designed in a manner to reduce noise of operation.

A further object of the invention is to provide apparatus for perforating closely spaced indicia with compactly arranged mechanisms.

Still another object of the invention is to provide apparatus for perforating a record media in a rapid and sharply defined fashion.

In order to accomplish these and other objects of the invention, a perforating apparatus is arranged in such a manner that all of the primary working elements of the apparatus are positioned adjacent the record media being perforated on a side opposite to that being observed.

In addition, the mechanisms of the present invention are designed in such a manner that rapid and smooth operation is insured with perforations that are cleanly severed.

The foregoing and other objects, features, and advantages of the invention will be apparent from the following more particular description of the various embodiments of the invention as illustrated in the accompanying drawings.

In the drawings:

FIG. 1 is a diagrammatic perspective view of a dictating equipment in which the invention is incorporated.

FIG. 2 is a front elevation of a portion of the indexing mechanism in the dictating equipment of FIG. 1.

FIG. 3 is a top elevation of certain perforating mechanisms used in the equipment of FIG. 1.

FIGS. 4, 5, and 6 represent a typical sequence of operation of the perforating mechanisms illustrated in FIG. 3, slightly modified.

FIG. 7 illustrates an alternative arrangment of the perforating mechanisms previously shown.

FIG. 8 illustrates another embodiment of the perforating mechanisms and associated actuating elements.

FIG. 1 illustrates a well known dictating machine configuration.

The dictating equipment is not shown in complete detail but generally is comparable to that dislosed in U.S. patent application Ser. No. 216,261, now U.S. Patent 3,222,460, entitled "Multiple Station Selection System," with N. J. Albanes and M. P. Langendorf as inventors, filed Aug. 10, 1962, and assigned to the same assignee as the present application. The dictating machine is designated **1** and is interconnected by a cable **2** to a handpiece microphone **3**. Machine **1** has various circuits and mechanisms for recording and reproducing dictated material and for giving an indication of the progress of dictation or transcription. A belt release lever **4** is pulled forward to permit the loading of a magnetic belt **5**, whereupon the belt release lever **4** is moved again to the position shown in FIG. 1. Signals derived from the microphone **3** through a transducer area **6** are directed by cable **2** to amplifier block **7** and from there to the recording head **8**. Recording head **8** is mounted for lateral movement on a carriage **9** from a home position at the extreme left of belt **5** to an advanced position at the extreme right of belt **5**. Belt **5** is rotated by mandrel **10** in a forward direction indicated by arrow **11** past recording head **8**. As mentioned before, the relative movements of head **8** and belt **5** result in the recording of a helical path about the periphery of belt **5**.

Machine **1** also has a speed control lever **12**, a volume control knob shown in phantom at **13** and a tuning or tracking knob that is designated **15**. Lever **12** permits the slowing down or speeding up of the belt to suit the listener's requirements. Knob **13** controls the volume level during playback. Knob **15** enables the user to position head **8** with a fine degree of control in order to establish proper tracking of a recorded path.

In addition to transducer **6** for picking up speech signals during recording and for serving as an output during reproduction, microphone **3** has a mode control button **16** with three positions: Record (REC), Listen (LIS) and Review (REV). Microphone **3** also has an instruction or indexing button **17** with three positions: Letter (LTR), off, and Secretary (SEC). Microphone **3** also has a dictate bar **18**.

To record material on belt **5**, mode control button **16** is moved to the upper Record position. When the user desires to dictate, he depresses the dictate bar **18** which results in the movement of belt **5** and head **8** in the manner previously noted, and through circuits not shown, signals are recorded on belt **5**. In order to listen to previously dictated material, the mode control button **16** is moved to the central Listen position, whereupon the drive mechanism in machine **1** is automatically activated to rotate belt **5** and move head **8**, and to thereby generate signals for reproduction by transducer **6**. If the dictator desires to hear material that he has previously recorded he moves the mode control button **16** down to the lower position for Review purposes. Button **16** is spring loaded from the lower position to the central position. Movement of button **16** in this manner results in a backspacing operation so that head **8** takes up a position approximately one track earlier on belt **5**. Each time button **16** is depressed to the lower position in this manner a backspacing operation will occur. The spring loaded movement of button **16** to the Listen position then enables the user to litsen to the previously recorded material from transducer **6**.

As with most dictating machines, machine **1** is provided with an indexing assembly **19** and associated perforating mechanisms indicated at **20**. Portions of these assemblies are illustrated with a front elevation in FIG. 2. The indexing assembly has provision for retaining an index slip or tab **21** having numerical designations thereon which correspond to the relative location of the head **8** in relation to belt **5**. In the example illustrated, index slip **21** has fourteen increments respectively designated **0**, **10**, etc. through **140**. These correspond to fourteen minutes of dictation capacity on belt **5**.

Associated with carrier **9** is an index lever **22** having a serrated element **23**. Sound head **8** can be positioned to any point with respect to belt **5** by squeezing element **23** and lever **22** together and thereafter sliding lever **22** to the right or left as desired. Certain portions of the indexing assembly **19** have been cut away in FIG. 1 to more clearly show the structural configuration of the perforating assembly **20**.

Assembly **19** has a transparent material **24** with slots **25** and **26**. Slots **25** and **26** are positioned in such a manner that when index slip **21** is properly inserted in the index assembly, two channels, a Letter instruction channel, and a Secretary instruction channel on the index slip will be completely exposed to view while the remainder of the index slip **21** can be seen through the transparent material **24**.

Button **17** on microphone **3** has upper and lower positions that correspond respectively with the upper and lower channels on the index slip **21**. When button **17** on microphone **3** is moved to the upper Letter position, a hole is perforated in the top channel of the index slip **21** by actuation of perforating mechanism **20**. When knob **17** on microphone **3** is moved to the lower Secretary instruction position, a hole is perforated in index slip **21** in the lower channel by the perforating mechanism **20**. Generally speaking, a perforation in the upper channel informs the transcriber that a letter has ended at the point of perforation.

According to a feature of the present invention, the perforations in the two channels of index slip **21** are formed by actuation of punch elements **27** and **28** that are respectively associated with channels **25** and **26**, and the operation is such that the index slip is completely visible at all times as head **8** scans belt **5** from beginning to end. In the embodiment illustrated in FIGS. 1–7, the punching operation takes place with the following mechanisms.

Referring to FIG. 3, an observer's position is indicated at **29** as being positioned on the front side of the index slip **21**. The perforating assembly **20** is positioned on the reverse side of index slip **21** which is in a direction toward the rear of machine **1**. FIG. 3 is a top cross-sectional elevation of the perforating assembly and only punch element **27** is shown. Punch element **27** is mounted in a stripper **30** for reciprocation from a home position toward the front of the machine and then back to the home position as shown in FIG. 3. Punch element **27** is arranged for reciprocation in an opening **31** of stripper **30**. Punch element **27** has three major portions. A conical portion **27*a*** is positioned toward the front of the machine. A cylindrical portion of lesser diameter **27*b*** is formed as an intermediate part of punch element **27**, and a shank portion **27*c*** is at the rear of punch element **27**. Punch element **27** also has a flanged surface **27*d*** at the rearmost extremity. Punch element **28** is formed like punch element **27**. Punch element **27** is normally maintained to the rear in its rest position by a compression spring **32** while punch element **28** is normally maintained in its home position to the rear by a compression spring **33**.

Referring to both FIG. 1 and FIG. 3, positioned adjacent the rearmost extremities of punch elements **27** and **28** is an actuator bail member **34** that is rotatably mounted in a bushing **35** at one end and in a bushing **36** at the other end. Actuator bail **34** has an upper flat extension **37** that lies adjacent the rear extremity of punch element **27** and a lower flat extension **38** that is positioned adjacent the rear extremity of punch element **28**.

Actuator bail **34** is mounted for movement under control of a punch plate **39** that in turn is controlled by plungers **40** and **41**. Plungers **40** and **41** are moved by upper and lower solenoids **42** and **43**. Bail **34** is also shown in a phantom cross-section in FIG. 4.

A typical perforating operation occurs as follows. As-

suming that it is desired to perforate a Letter instruction hole in index slip **21**, button **17** is moved to the upper Letter (LTR) position. Movement of the button **17** in this direction results in the energization of solenoid **43**. Plunger **41** is thereupon pulled to the rear which rocks plate **39** in a counterclockwise direction as viewed in FIG. 1. Rocking of plate **39** results in the associated actuator bail **34** also rocking with top flange **37** being moved toward punch element **27**. This causes punch element **27** to move forward in the opening **31** with continued movement causing conical portion **27*a*** of punch element **27** to pierce the index slip **21**.

The sequence of operation is shown in FIGS. 4–6. Referring to FIG. 4, punch element **27** and bail **34** are in the home position. When operated, bail **34** moves in a direction toward the front of the machine as indicated by arrow **44**, FIG. 4. The piercing of index slip **21** by punch element **27** is illustrated in FIG. 5. The movement of punch element **27** is quite rapid and a perforation occurs when conical portion **27*a*** passes through slip **21** due to the inertia of slip **21** and the relative positioning of slip **21** adjacent the transparent material **24**.

FIG. 6 illustrates conditions as punch element **27** is restored to its home position. For convenience, the stripper is shown with a slanted front face that is slightly modified from FIGS. 1–3, and is redesignated **30*a***. Conical portion **27*a*** has a relatively flat rear surface that cooperates with the slanted face of stripper **30*a***. As punch element **27** passes through slip **21** and prior to its complete return to the home position, the severed portions of slip **21** drop into the area of portion **27*b*** of punch element **27**. These portions are carried by the conical portion **27*a*** to the rear as the punch element restores. A shearing action takes place due to the fact that the flat surface of portion **27*a*** is fitted with rather close tolerance inside the opening **31*a*** and also due to some extent to the slanted face of stripper **30*a***. This action results in the complete severing of the edges of the perforation to insure that a clean well defined perforation is made in the index slip. Continued movement of punch element **27** to its home position returns punch element **27** to the rear of index slip **21** and permits slip **21** to return to its normal vertical position in the index assembly **19**.

The front face of stripper **30** can also be changed so that it is more or less vertical in relation to the index slip. This is illustrated in FIG. 7 where a transparent plate **45** is positioned in front of an index slip **46**. A punch element **47** is positioned inside a stripper element **48** which has a substantially vertical front surface **48*a***. Operation of the perforating mechanism of FIG. 7 would occur in approximately the same fashion as with the mechanisms previously discussed except that the shearing action on the return movement of the punch element **47** will take place about the same time around the entire edge of the opening **49** in stripper **48** rather than in a scissors-like manner as occurs with the slanted surface of the stripper **30*a***.

Normally, the chad resulting from one perforation will fall out the front of the stripper on the forward stroke of the punch element during the succeeding operations. If desired, however, a chad drop, such as opening **59** in FIG. 7, can be provided to allow chad to drop out of the mechanism immediately following each perforation.

Considering FIG. 4 again, the perforating mechanism of the present invention could be actuated manually rather than electrically as previously described. The dashed bail **34** would then not be provided at all. A manual depression of the punch element **27** by pressing on flange **27*d*** in the same direction as indicated by arrow **44** would result in a comparable perforating action. Additional linkages could be added to the mechanism to provide manual levers that would be more accessible to the front of the device. A manually actuated perforating element of this type could be advantageous in a small portable dictating machine, for example.

The perforation of index slip **21** in channel **26** for indicating a special Instruction to the secretary occurs in a comparable manner by depression of button **17** to the lower Secretary (SEC) position. In this case solenoid, **42** is energized, pulling plunger **40** to the rear, rocking plate **39** and bail **34** in such a manner that the lower flange **38** of bail **34** acts against the rear flange of punch element **28** to operate it in a manner comparable to the actuation of punch element **27** previously described.

FIG. 8 illustrates a compact arrangement for actuating the punch elements directly with solenoids that are mounted concentrically with the elements and in a staggered fashion to permit the use of solenoids having sufficient size to perform satisfactorily. In FIG. 8, a transparent material **50** is positioned in front of an index slip **51** that is maintained by an index assembly **52**. Punch element **53** has an associated solenoid **54** while punch element **55** has an associated solenoid **56** that is positioned to the rear and below solenoid **54**. Punch element **53** extends through solenoid **54** in a coaxial fashion to terminate with a flange portion **53*a*** while punch element **55** extends through solenoid **56** and terminates with a flange portion **55*a***. Punch elements **53** and **55** are maintained in a normal rearward home position by respectively associated spring elements **57** and **58**. The shapes of the punch elements adjacent index slip **51** in FIG. 8 would be comparable to the shapes for those punch elements previously discussed such as elements **27** and **28**.

Operation of the device in FIG. 8 is as follows. Assuming that microphone **3** is interconnected with the device of FIG. 8, depression of the button **17** on microphone **3**, results in the energization of either solenoid **54** or solenoid **56**. If solenoid **54** is energized, punch element **53** is drawn to the front and thereafter restored to perforate index slip **51** in essentially the same fashion as previously described in connection with FIGS. 1–7. The movement of button **17** in the opposite direction results in the energization of solenoid **56** and the perforation of the lower channel of index slip **51** by punch element **55**.

It is appropriate to point out certain advantages of the inventive apparatus. The structural characteristics are such that the apparatus lends itself to simplified manufacturing and installation procedures. In addition, since no die element is required in the front of the mechanism, no alignment problems exist as with prior art devices that use a cooperating die and stripper combination. From the foregoing discussion, it is evident that the inventive concepts could be applied in many different types of equipment all using similar basic principles.

An outstanding and obvious advantage provided by the apparatus is that the index record media, such as slip **21**, is visible to the operator of the equipment at all times, and therefore the necessity for moving the carrier assembly and the index assembly in order to determine what perforations exist in the slip and the requirement to then relocate the entire assemblies to their former positions, is eliminated.

The device functions in an accurate and rapid manner to supply perforations having good visibility.

While the invention has been particularly shown and described with reference to several embodiments, it will be understood by those skilled in the art that various changes in form and detail may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. Marking apparatus for visibly perforating a record media to form individual apertures of substantial size and predetermined configuration comprising:

an observation station;

means for supporting said media in a plane with a first one of its surfaces facing toward said observation station;

reciprocating perforating means mounted solely adjacent an opposite surface of said media for movement from a home position toward said media, said perforating means having a portion shaped for easy

penetration of said media during movement from said home position and further having a shoulder formed in accordance with said predetermined configuration for engagement with a substantial portion of said media upon penerating said media;

means for reciprocating said perforating means from said home position a sufficient distance for said perforating means to penetrate said media;

and stripper means coextensively mounted with said reciprocating perforating means, said stripper means also being formed in accordance with said predetermined configuration and cooperatively engaged wi.h said perforating means so that during the return movement of said perforating means the portion of said media engaged by the shoulder of said perforating means is completely severed as a chad from said media to form an aperture according to said predetermined configuration.

2. The apparatus of claim **1**, which further comprises:

transparent means mounted adjacent the first one of the said surfaces of said media for providing backup support for said media during the forward perforating movement of said element, said transparent means being positioned substantially coextensively with said media and enabling viewing of the entire surface of said media.

3. The apparatus of claim **1**, wherein:

said stripper means has an opening extending therethrough and is generally perpendicular to the plane of said media; and wherein

said perforating means is mounted within said opening for reciprocation from home position toward said media, has a penetrating portion positioned toward said media and a cutting shoulder surface formed for engagement with said media and severing action with said opening, and further has an axial portion of lesser dimension to accommodate media engaged therewith following penetration.

4. The apparatus of claim **3**, wherein:

said perforating means has a conically shaped portion positioned for penetration of said media and an edged surface on said conically shaped portion formed for severing action with said stripper means to form round apertures in said media.

References Cited

UNITED STATES PATENTS

1,941,316	12/1933	Patzer	83—578
3,091,668	5/1963	Trost	179—100.1 X
3,222,460	12/1965	Albanes et al.	179—100.1

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