C. F. STODDARD.

MACHINE FOR USE IN THE MANUFACTURE OF PERFORATED NOTE SHEETS.

APPLICATION FILED DEC. 8, 1914.

1,432,424. Patented Oct. 17, 1922.

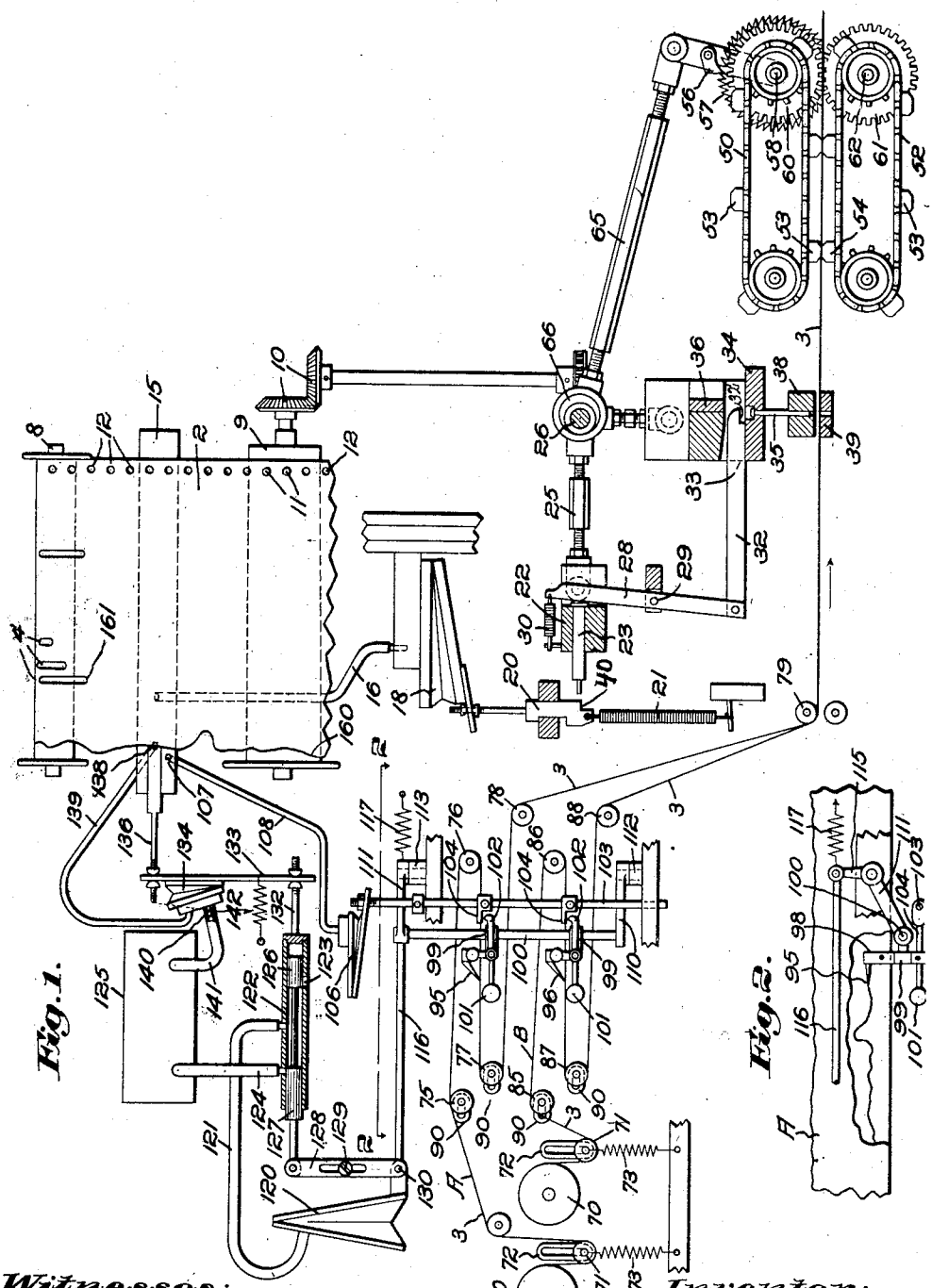


Fig. 1.

Fig. 2.

Witnesses:

Horace A. Crossman.

Carl L. Choate.

Inventor:

Charles F. Stoddard,

by Emery, Booth, Jamney & Varney, Attys

Patented Oct. 17, 1922. 1,432,424

UNITED STATES PATENT OFFICE.

CHARLES F. STODDARD, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN PIANO COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

MACHINE FOR USE IN THE MANUFACTURE OF PERFORATED NOTE SHEETS.

Application filed December 8, 1914. Serial No. 876,137.

To all whom it may concern:

Be it known that I, CHARLES F. STODDARD, a citizen of the United States, and a resident of New York city, county and State of New York, have invented an Improvement in Machines for Use in the Manufacture of Perforated Note Sheets, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to machines for use in the manufacture of perforated music sheets and the like for automatic or partly automatic musical instruments; and pertains more particularly to means, which may be employed if desired in conjunction with perforating mechanism, for making informative markings upon the note sheet, as for instance such markings as lines or other symbols or indicia indicating changes in playing intensities.

Among other objects the invention is intended to provide a practicable marking mechanism which may be used for making a so-called "dynamic line" or other indication, upon the perforated music sheet. A further object of the invention is to combine cooperatively a marking mechanism such as that described and a perforating mechanism.

The character of the invention may be readily understood by reference to the accompanying drawing which shows diagrammatically one practicable embodiment of the various features of the invention, which has been selected for illustration.

Fig. 1 shows diagrammatically the entire illustrative embodiment; and

Fig. 2 is a detached plan view of a detail on the line 2—2 of Fig. 1.

As shown in the drawings the illustrative mechanism comprises a pattern, means for feeding the note sheet material to be perforated, and associated therewith a marking mechanism and a perforating mechanism.

The perforating mechanism and the pattern means for selectively controlling the perforating, and also the feeding mechanism for the note sheet material to be perforated, may be of any suitable type. The illustrative embodiment comprises a pattern or stencil sheet 2 and note sheet material 3. The pattern sheet is shown as provided with perforations 4 corresponding to perforations intended to be punched in the note sheet material 3 which may comprise a stack of superposed sheets which may be punched collectively.

The pattern sheet 2 is mounted upon a spool 8 and may be fed in any practicable manner and wound, if desired, upon a take-up roll which is considered unnecessary to be shown in the drawing. For the purposes of the specific machine it is desired that the feed of the pattern sheet 2 be synchronized with the operation of the perforating mechanism and to illustrate diagrammatically one way in which this may be done, the pattern sheet 2 is shown as passing over a drum 9 which is geared with or otherwise synchronized with the perforating mechanism as through gears 10, 10. The drum 9 is provided with teeth 11, 11, to engage uniformly spaced perforations 12, 12, in the margin of the pattern sheet 2. The cooperation of these teeth 11 with the perforations 12 (or any equivalent or substituted expedient) may insure predetermined successive relationships between the moving pattern sheet and the perforating mechanism and also the moving note sheet material.

The pattern sheet 2 exemplifies a prime controller of a punch selecting mechanism which may be of any practicable type. One suitable form of punch selecting mechanism comprises a tracker bar 15 provided with vents to be opened by the perforations 4 of the pattern sheet. Each vent is connected by a duct—exemplified by the duct 16—with the controlling valves of a power pneumatic 18. As well understood in the art, when the corresponding vent in the tracker bar 15 is opened by a perforation in the pattern sheet, suction is admitted to the power pneumatic 18 causing the latter to collapse. When thus collapsed the pneumatic 18 lifts a selector slide 20; but when the tracker vent is again closed, permitting the pneumatic 18 to expand again, the slide 20 is

drawn downwardly to the position shown in the drawing by a spring 21.

It will be understood that there is a series of selector slides 20 corresponding each to one of the punches of the perforating mechanism. One complete set of selecting and punching devices is shown diagrammatically in the drawing; and it will be understood that these parts are re-duplicated as many times as may be necessary to provide for punching the desired number of rows of perforations.

The selecting mechanism comprises further a horizontally reciprocating cross head 22 carrying selector pins 23 which are so mounted as to slide lengthwise readily in the cross head 22. This cross head 22 is connected by a link 25 with an eccentric upon the shaft 26 which shaft is rotated continuously during the operation of the machine, thereby reciprocating the cross head 22 and its gang of selector pins toward and from the selector slides 20. A lever 28 fulcrumed at 29 bears at its upper end against the head of the selector pin 23 and is held in engagement with the selector pin head by a spring 30 which tends always to rock the lever 28 in a contra-clockwise direction. The lower end of the lever 28 is pivotally connected to a selector bar 32 the right hand end of which in the drawing rests in a guide way in a vertically reciprocating cross head comprising the two connected parts 33, 34. The part 34 carries a gang of punches 35 and the part 33 includes the punch driving bar 36.

The cross head 33, 34 is reciprocated vertically in appropriate guide ways by an eccentric upon the shaft 26, which is unnecessary to be shown. This suffices to illustrate that for each complete revolution of the shaft 26, the cross head 33, 34 is moved downwardly and then upwardly through one complete reciprocation. The punches 35 are carried sufficiently loosely in the cross head piece 34 to permit them to drop against the note sheet material 3 without perforating the same except when the selector bar 32 has been moved far enough toward the right in the drawing so that its full width will be interposed between the driving bar 36 and a punch head, otherwise the punch may rise into the notched end 32′ and does not perforate the sheet material.

The punches 35 are arranged to slide vertically in a stripper bar 38 which overlies the note sheet material 3 supported at the punching point upon a die 39.

With the described arrangement, when the cross head 22 is moved toward the left in the drawing, the lever 28 is permitted to rock slightly contra-clockwise and thereby to move the selector bar 32 toward the right. If the selector slide 20 remains in the position shown, the movement of the selector pin 23 is arrested in such a position that the selector bar 32 cannot move far enough to be interposed in driving position between the punch 35 and the driving bar 36; but if the selector slide 20 has been lifted (by the opening of the corresponding tracker vent) the cut-out portion 40 of the selector slide is thereby positioned opposite the selector pin 23, permitting a sufficient movement of the pin, the lever 28 and selector bar 32, to move the latter into driving position and cause its corresponding punch to be driven through the note sheet material 3. As will be understood by those skilled in the art, the horizontal reciprocation of the selector cross head 22, and the vertical reciprocation of the punch cross head 33, 34, are relatively so timed that the cross head 22 is moved toward the left to position the various selector bars 32 appropriately to the perforations to be punched, preparatory to the descent of the cross head 33, 34 to drive the selected punches through the note sheet material.

It is to be understood that the punch selecting and perforating mechanisms just described are merely illustrative and any suitable equivalent or substitute may be employed.

The note sheet material 3 may be fed relatively to the punching mechanism in any practicable manner. For instance, cooperating endless belts or chains 50, 52 may be provided having cross bars 53, 54 so disposed that a cross bar 53 and a cross bar 54 register with each other on opposite sides of the note sheet material 3 on the adjacent runs of the belts or chains, so as to grip the note sheet material between the cross bars with sufficient pressure to cause the note sheet material to accompany the belts or chains during their movement. As this feed mechanism is diagrammed in the drawings, the belts or chains are driven intermittently by a pawl 56 engaging a ratchet 57 upon a shaft 58 of one of the pulleys for the belt or chain 50. Also fixed upon the shaft 58 is a gear 60 meshing with a gear 61 upon a shaft 62 for the lower belt or chain. The pawl 56 drives its ratchet 57 in a contra-clockwise direction and thereby through the gears 60 and 61 drives the two belts or aprons in the proper direction to feed the note sheet material 3 toward the right in Fig. 1 as indicated by the arrow.

The pawl 56 is reciprocated by a pitman 65 connected to an eccentric 66 upon the shaft 26, that eccentric being so disposed upon the shaft that the belts or chains 50, 52 remain at rest during the downward movement of the cross head 33, 34 to drive the punches; and when said cross head is moved upwardly, the eccentric 66 causes the note sheet material 3 to be advanced through one feed step.

The foregoing description has pertained

to the mechanism for selecting the punches and causing them to perforate the note sheet material. Hereinafter will be described a marking mechanism adapted to cooperate with the above described apparatus but which may be employed separately if desired.

A marking mechanism embodying features of this invention may be employed in various ways and for making any of a number of different marks or indications upon a note sheet, but for purposes of explanation it will suffice to describe the use of the marking mechanism in placing a so-called "dynamic line" upon the note sheet material. This dynamic line is ordinarily a line or a succession of marks which meanders along the length of the sheet, the distance between any given point in the line and an edge of the sheet indicating a degree of loudness of playing.

In the illustrative apparatus, the marking is done by a pen arranged to rest upon each sheet of the note sheet material and to be moved transversely of the sheet during the feeding movement of the sheet, the composite of these two movements producing the meandering dynamic line. To best suit this sort of marking, wherein the pen preferably rests upon the sheet and remains in contact therewith—and as well to suit the general cooperative assembly of the parts—it is preferred to have the marking take place before the note sheet material is perforated; otherwise the perforations might interfere with the movement of the pen or other marking devices. While this is not indispensable, the illustrative apparatus is so arranged that the marking devices act upon the note sheet material at a point between the source of supply of the note sheet material and the punching point.

The illustrative dynamic line intended to be drawn by the marking apparatus is supposed to be made upon the face of the note sheet—i. e., that surface of the sheet which is exposed to the view of the operator when the finished note sheet is used in an automatic player-piano or the like. The punches, however, are preferred to be forced through the note sheet material from the reverse side of the sheet toward the face thereof. The punching operation, especially when the punches are slightly dulled, is likely to leave a slight burr or roughness at the edges of a perforation on that surface of the sheet opposite the punches and it is preferred to have this burr project from the face of the finished sheet so that the reverse side of the sheet which contacts with the tracker bar in the automatic instrument shall be entirely smooth. For these reasons, while it is desired to have the marking devices positioned to operate upon the face of the sheet, it is further desired to have the punches operate upon the opposite or reverse side of the sheet. The illustrative apparatus is organized to suit this purpose. Although, when the note sheet material 3 reaches the punching point, it may comprise a stack of as many as fifteen or twenty individual sheets, the present drawings, for the sake of clearness, show only two such sheets A and B. Each sheet A, B is mounted upon a spool 70, and each sheet passes from its spool 70 around a roller 71 which is mounted for vertical movement in bearings 72 shown diagrammatically. The shaft of each roller 71 has connected to it means, such as a spring 73 for exerting a yielding pressure upon the roller in opposition to the pull upon the roller exerted by the sheet as it is fed over the roller. The illustrative mechanism (the belts or chains 50, 52) for feeding the note sheet material has been described as feeding the sheets intermittently so that a more or less jerky movement is imparted to them. The shocks of the intermittent feed steps of the respective note sheets are desirably taken up or absorbed by the springs 73,73. Similar means performing the functions of these illustrative shock absorbers may be located at any desired point along the path of travel of the note sheets.

From its roller 71 the sheet A passes over an idle roller 75 adjustably mounted in its bearings for purposes presently described. Thence the sheet A passes over an idler 76 and a second idler 77 (also adjustable in its bearings). The run of the sheet between the idlers 76 and 77 is preferably substantially horizontal and the marking devices are preferably arranged to mark that portion of the sheet which lies between the idlers 76 and 77. From the idler 77 the sheet A passes over another idle roller 78 to an idler 79 at which point the sheet A meets the sheet B so that the two (together with others if desired) may be fed collectively to the punching point. The sheet B passes around idlers 85, 86, 87 and 88 corresponding to the described idlers for the sheet A. The idlers 85 and 87 are adjustable in their bearings.

It is assumed that the dynamic line is to be exactly the same on both of the sheets A and B and that upon each sheet the dynamic line is to be positioned in a precise predetermined relationship with the perforations in the sheet. To suit these purposes it is important to predetermine accurately a certain length of note sheet material between the exact marking point and the punching point. In other words, if the length of the sheet A between its marking device and the punches were greater than the length of the sheet B between its marking device and the punches, the dynamic line and perforations on the former when finished would have a different relationship from that of the dynamic line and perfora-

tions upon the sheet B when finished. Therefore means exemplified by the provision for adjusting the idlers 77 and 87, is supplied for adjusting the lengths of the sheets. For example, if the roller 77 is adjusted toward the left in the drawing, a greater length of note sheet is thereby caused to intervene between the roller 77 and the punching point, and vice versa if the roller is adjusted toward the right. The rollers 75, 77, 85 and 87 are shown as provided with horizontally slotted bearings 90 in which the rollers may be adjusted, any of the well known expedients being employed to hold the roller shafts in their adjusted positions.

To suit the organization of the punching mechanism, the note sheets are fed to the punches with their faces down in order to present their rear sides toward the punches. Hence the illustrative arrangement of the rollers 75, 76 and 77 serving to reverse the sheet to present its face upwardly exposed to receive a marking pen.

The sheet A is acted upon by a marking device 95 which may be of any suitable type as for instance a siphon pen. A similar marking device 96 is provided for the sheet B and these may be duplicated for as many other sheets as are desired to be marked concurrently. Each pen is mounted upon a holder 98 which may be in the form of a sleeve pinned to a shaft mounted upon a horizontal axis in an arm 99 fixed upon a vertically disposed shaft 100. Upon the same shaft is pinned an arm having at one end a weight 101 and at its other end a lug 102. The weight arm and the pen holder 98 being pinned to the same shaft, the weight tends to hold the pen down against the note sheet material and by depressing the lug 102 the pen may be lifted off of the sheet. The pen or other marking device is thus provided with means for moving it toward and from the sheet and this means may be appropriately operated automatically so as to make individual marks upon the sheet or to move the pen onto the sheet and permit it to rest there to make a continuous line or a line interrupted as desired.

For the purposes of the specific type of continuous dynamic line assumed to be desired in the present instance, the means for moving the marking device toward and from the sheet is automatically operated to move the pen into marking position against the sheet at the time the dynamic line is desired to begin, and to withdraw the pen from the sheet when the dynamic line has been finished.

The mechanism for this purpose comprises a vertically disposed slide rod 103 having fingers 104, 104 respectively to cooperate with the lugs 102 on the pen carrying shafts. The upper end of the slide rod 103 is secured to the movable board of a motor pneumatic 106 which through appropriate valves is arranged to be exhausted upon the opening of a tracker vent 107, a duct 108 connecting said vent 107 with the valve mechanism for the pneumatic 106. In the illustrative apparatus the vent 107 is arranged for cooperation with the same pattern sheet which constitutes an element of the punch selecting mechanism but this is not essential. In the specific apparatus the vent 107 is intended to be closed when the pattern sheet 2 is first introduced and preparatory to the beginning of the dynamic line, and to be opened at or just before the instant when the dynamic line is to be begun. The illustrative manner in which this is accomplished will be more fully described hereinafter.

The pen carrying rod 100 is mounted between two rocker arms 110, 111 mounted upon a common axis, the arm 110 being pivotally supported upon a bracket 112 and the arm 111 upon a bracket 113. As shown in Fig. 2, the arm 111 has a finger 115 connected to a link 116 and also to a spring 117. As shown in Fig. 1, the link 116 connects the finger 115 with the movable board of a pneumatic 120. By collapsing the pneumatic 120 more or less, the link 116 is moved toward the left in Figs. 1 and 2, thereby rocking the finger 115 and arm 111 in a contra-clockwise direction to move the pens transversely of the direction of feed of the note sheet material. When the pneumatic 120 is permitted to expand, the spring 117 rocks the finger 115 and arm 111 in a clockwise direction to move the pens in the opposite direction transversely to the direction of feed of the note sheet material. Thus by varying the degree of exhaust in the pneumatic 120 the pens may be controlled so that the result of their transverse movement on the note sheet and the feeding movement of the note sheet shall produce the meandering dynamic line. The degree of exhaust in the pneumatic 120 may be varied in any practicable manner.

For example, a duct 121 connects the pneumatic 120 with a cylinder 122. The cylinder has a port 123 to atmosphere and is also connected by a duct 124 to an exhaust chest 125. A duplex piston having the parts 126 and 127 has a snug but sliding fit in cylinder 122 and the stem of said piston is connected to a lever 128 fulcrumed at 129, the lower end of which is pivoted at 130 to the link 116. The cylinder 122 is connected by link 132 with an extension 133 of the movable board of a pneumatic 134 and a part of the same extension 133 on the opposite side of the hinge of the pneumatic 134, is connected to a slide 136 fitted in the tracker 15 and carrying a tracker vent 138 connected by a duct 139 with the interior of the interior of the pneumatic 134. The pneu-

matic 134 is arranged to be exhausted past a bleed 140 through a duct 141 communicating with the exhaust chest 125. A spring 142 tends to expand the pneumatic 134.

To control the operation of the described apparatus, the pattern sheet 2 or its equivalent or substitute is provided with means cooperating with the tracker vent 138 and therethrough to govern the degree of exhaust in the pneumatic 120 so as to move the pens as desired transversely of the direction of travel of the note sheet.

As one arrangement for operating on the tracker vent 138, the margin of the pattern sheet 2 is cut along a meandering line corresponding in shape to the meandering dynamic line desired to be marked upon the note sheet. In other words the edge of the punch selecting pattern sheet may be cut in the shape of a pattern to predetermine the undulations in the dynamic line.

The free end of the pattern sheet 2 is preferably left of full width so that when initially secured to the take-up roll, the advance end of the pattern sheet will close the tracker vent 107. Under these circumstances the pneumatic 106 is in expanded position, the slide rod 103 is held in its lowermost position by gravity and thereby the pens are held away from the note sheet material.

At this time also the introduction of the pattern sheet may have closed the tracker vent 138. The immediate effect of this is to cut off atmosphere from the pneumatic 134, which, being then exhausted past the bleed 140, is collapsed. But in this collapsing movement it draws the slide 136 toward the left in Fig. 1 and presently the vent 138 is partially uncovered so that an atmospheric bleed is established to the pneumatic 134. The collapse of the pneumatic 134 will continue until this pneumatic bleed suffices to balance the exhaust past the bleed 140 whereupon the pneumatic 134 will come to rest in a partly collapsed position.

Assuming that the foregoing has occurred upon initial introduction of the pattern sheet to the machine, the feed of the sheet presently carries to the tracker the advance end of the cut-away portion which constitutes the dynamic line pattern. When this occurs the cut-away portion leaves open the tracker vent 107 which produces a collapse of the pneumatic 106 thereby lifting the slide rod 103 and permitting the weights 101 to move the pens down upon the note sheets and to hold them there in marking position. At the same time the cut-away margin of the pattern sheet 2 opens the tracker vent 138 and disturbs the balance between the suction bleed and the atmospheric bleed to the pneumatic 134, by increasing the atmospheric bleed and thereby permitting the pneumatic 134 to expand until, in that movement of the slide 136 toward the right in Fig. 1, the vent 138 is again partially closed by the margin of the pattern sheet so as to restore the balance of the two bleeds. As the pattern edge of the sheet 2 meanders across the tracker bar, the described arrangement of bleeds so varies the degree of exhaust in the pneumatic 134 that its collapsing and expanding movements cause the tracker vent 138 to follow accurately the undulations of that pattern edge; and in this manner those undulations cause the corresponding movement to take place in the extension 133 of the movable board of the pneumatic 134. Thus the cylinder 122 is caused to reciprocate in an axial direction with a motion exactly corresponding to the degree of variation in what may be called the amplitude (measured transversely of the pattern sheet 2) of the undulations of the pattern edge. If it were desired to employ a pneumatic 134 of sufficient mechanical power directly to move the pens and the parts upon which they are mounted, there might be a direct mechanical connection between the extension 133 and the rocking support for the pens. It is preferred, however, to use a pneumatic 134 of low power which shall be more readily responsive to the described arrangement of bleeds, and to use in cooperation therewith a working pneumatic of higher power and for this purpose the pneumatic 120 is used.

To permit freedom of movement of the cylinder 122, the ducts 121 and 124 are made freely flexible.

In the position shown in Fig. 1 the duplex piston 126, 127 is so positioned in the cylinder 122 that both the atmosphere port 123 and the exhaust port 124 are closed. If under these conditions, the pneumatic 134 collapse slightly, the cylinder 123 will be moved toward the right and thereby, while the atmosphere port 123 is still held closed, the exhaust port 124 will be open at least to a slight extent. Thereby the pneumatic 120 will be exhausted to some extent and will collapse. This collapsing movement rocks the lever 128 clockwise and moves the piston 126, 127 toward the right causing it to follow the movement of the cylinder. This movement of the piston tends to close the exhaust port 124 and does in fact close it if the described collapse of the pneumatic 134 ceases. In fact, the piston 126, 127 follows the movement of the cylinder 122 until finally the piston resumes the position shown in the drawing closing both the atmosphere and the exhaust ports of the cylinder. Thereupon the degree of exhaust in the pneumatic 120 is held constant temporarily until some further movement of the cylinder 122 takes place. If then the pneumatic 134 expands somewhat, moving the cylinder 122 toward the left, the atmosphere port 123 is opened, the pneumatic 120 is permitted to expand, and the

lever 128 again rocked, this time contra-clockwise, to cause the piston to follow the cylinder movement toward the left until the atmosphere port is again closed.

It will be obvious to those skilled in the art that the described construction and arrangement of the cylinder 122 and piston 126, 127 provides a sort of relay by which the movements of the preferably low powered pneumatic 134 may be reproduced in a preferably high powered pneumatic 120, so that the latter may be caused to rock the pen supports in a manner exactly corresponding to the movement of the tracker vent slide 136.

The dynamic line pattern edge, or its equivalent or substitute, is of course laid out to represent a resultant movement comprising as its components the feed movement of the pattern sheet. and the transverse movement of the tracker vent slide 136. This component in a direction transverse to the pattern sheet is transmitted by the described apparatus to the pens themselves and their movement transverse the note sheet combines with the feeding movement of the note sheets to produce the resultant dynamic line.

With the illustrative arrangement shown in Fig. 1, the amplitude of undulations of the pattern edge of the sheet 2 produces on the note sheet a somewhat greater amplitude of undulations in the dynamic line measured transversely of the note sheet. The slide 136 and the link 132 are connected to the lever provided upon the movable board of the pneumatic 134, at substantially equal distances from the hinge of the pneumatic constituting the lever's fulcrum—therefore the extent of movement of the slide 136 (which exactly follows the amplitude of the pattern undulations), produces an equal extent of movement of the link 132 and cylinder 122. The effective movement of the piston 126, 127 is the same as that of the cylinder 122; and the extent of this movement of the piston produces an equal extent of movement of the link 116, because, as shown, the fulcrum of the lever 128 is located midway between the respective points of attachment of the piston and the link 116. Therefore the extent of movement of the link 116 is to all intents and purposes equal to the amplitude of the undulations in the pattern margin. Thus the oscillations of the finger 115 (see Fig. 2) are equal in extent to the amplitude of undulations of the pattern edge; but, as shown, the distance of the pen point from the fulcrum 100 upon which it rocks in its transverse movement, is greater than the distance from that fulcrum 100 to the point of attachment of the link 116, and therefore the extent of movement of the pen is greater than the extent of movement of the tracker vent slide 136. In other words the amplitude of undulations of the dynamic line on the note sheet is greater than that of the pattern edge.

Thus the variations in amplitude of the dynamic line are made to correspond exactly with the variations in the pattern edge, but the amplitudes themselves are greater in the first case than in the last. In other words, the meandering of the dynamic line on the note sheet covers a wider area than the meanderings of the pattern edge on the pattern sheet. If desired, however, the relation between the amplitudes of pattern edge undulations and dynamic line undulations may be adjusted by moving the fulcrum 129 of the lever 128. For instance, if the fulcrum 129 is moved downwardly (in the slot of the lever 128 provided to permit that adjustment) the amplitude of undulations of the dynamic line is diminished and may be made equal to those of the pattern edge, or otherwise varied as desired.

As will appear to those skilled in the art, the pattern edge on the sheet 2 is merely one illustrative form of prime controller for marking devices, and it may or may not be used in conjunction with a prime controller, such as the pattern sheet 2, for punch selecting mechanism or the like. The specific pattern sheet 2 however, serves as a unitary prime controller for both the punch selecting mechanism and the marking mechanism; and is particularly adapted to provide for marking the note sheet material before it is perforated.

In the usual finished note sheet it is important that each point in the dynamic line be positioned lengthwise the sheet in a definite relation to the note playing perforations. For instance, it is ordinarily desired that any given group of note perforations shall reach the tracker at approximately the same time that those parts of the dynamic line pertaining to those note perforations occupy the field of vision of the operator.

For convenience in description it may. be assumed that the advance end of a dynamic line to be marked by the apparatus of the drawing is desired to be placed in the same line transverse the note sheet, with the advance end of the initial note perforation therein. But as already described, after the advance end of the dynamic line has been marked on the note sheet material, the latter is obliged to travel from the pens 95, 96 through a substantial distance to the punches 35, before the note sheets are presented in position to receive note perforations aligned with the advance end of the dynamic line. To suit this situation, the illustrative apparatus is so organized that the marking of the dynamic line is begun and continues for a considerable period, and

until the advance end of the dynamic line reaches the punching point, before any note perforations are punched. This is provided for by locating the advance end 160 of the pattern edge of the sheet 2 a certain distance in front of the advance edge 161 of the initial note perforation, said distance corresponding to the distance which the note sheet material is obliged to travel from the marking point (at the pens 95, 96) to the punching point. Of course, the distance between the advance end 160 of the pattern edge and the advance end 161 of the first note perforation will depend largely upon the relative speeds of feeding movement of the pattern sheet 2 and the note sheet material—the desiratum being merely that during the time the pattern sheet 2 is fed through the distance between the points 160 and 161, the note sheet material will have been fed through the distance between the marking point and the punching point.

Thus in one embodiment of all the features of the invention, a marking mechanism and a perforating mechanism are so co-ordinated as to produce note sheets having note perforations and informative markings located thereon in predetermined relationship; and this co-ordination of the two mechanisms may be governed by a single prime controller such as the pattern sheet 2, although this is not indispensable.

It is to be understood that this invention is not limited to the specific construction, organization and mode of operation shown in the drawings and hereinbefore described for illustration. On the contrary, the invention may be variously embodied and the specific construction and organization may be variously modified. Furthermore it is not necessary that all the features of the invention be used conjointly since they may be used to advantage separately.

Claims:

1. A machine for making perforated note sheets comprising, in combination, perforating means; perforator selecting mechanism; marking mechanism; means to present note sheet material to the marking mechanism and perforating mechanism; and means providing cooperatively related patterns for the marking mechanism and perforator-selecting mechanism respectively for making correlated marks and perforations on the note sheet.

2. A machine for making perforated note sheets comprising, in combination, note sheet perforating mechanism; dynamic indication marking mechanism; means operatively connecting the two to govern their relative operation; and means to present a note sheet to both the marking and perforating mechanisms.

3. A machine for making perforated note sheets comprising, in combination, note sheet perforating mechanism; dynamic indication marking mechanism; and means to feed a note sheet in relation to both the marking and perforating mechanisms.

4. A machine for making perforated note sheets comprising, in combination, note sheet perforating mechanism; dynamic indication marking mechanism; and means to present a note sheet first to the marking mechanism and then to the perforating mechanism.

5. A machine for making perforated note sheets comprising, in combination, perforating mechanism to form note sounding perforations; a source of supply of note sheet material; and marking mechanism to mark dynamic indications to act upon the note sheet material between said source of supply and the perforating point.

6. A machine for making perforated note sheets comprising, in combination, note sheet perforating mechanism; dynamic indication marking mechanism; means operatively connecting the two to predetermine a desired relative operation thereof; and means to present a note sheet to said mechanisms.

7. A machine for making perforated note sheets comprising, in combination, perforating mechanism; marking mechanism; means to present a plurality of sheets separately to the marking mechanism; and means to collect the sheets and present them collectively to the punching mechanism.

8. A machine for making perforated note sheets comprising, in combination, a source of supply for a plurality of note sheets; means to hold said note sheets apart to be individually marked; marking mechanism to act upon the note sheets so held; means to bring the marked note sheets together in a stack; and perforating mechanism co-operating with the last-named means for perforating the stack of sheets collectively.

9. A machine for making perforated note sheets comprising, in combination, note sheet perforating mechanism; marking mechanism located to mark a note sheet before it is perforated; means to control the marking mechanism to cause a marking operation; and means cooperatively connected therewith to control the perforating mechanism subsequently to cause a correlated perforating operation on said sheet.

10. A machine for making perforated note sheets comprising, in combination, perforating mechanism to form note sounding perforations, marking mechanism arranged to mark a note sheet before it is perforated; means to feed a note sheet from the marking point; governing means to cause a marking operation; and means to cause a perforating operation correlated with said marking operation when that part of the note sheet so marked reaches a predetermined relationship with the perforating point.

11. A machine for making perforated note sheets comprising, in combination, note sheet perforating mechanism and dynamic indication marking mechanism constructed and arranged to act at different points longitudinally of the same sheet; and means operatively connecting the perforating and marking mechanisms to govern the relative positions of correlated marks and perforations on the sheet.

12. A machine for making perforated note sheets comprising, in combination, note sheet perforating mechanism; dynamic indication marking mechanism; and governing means for said mechanisms respectively to predetermine relative positions of correlated perforations and marks on the sheet.

13. A machine for making perforated note sheets comprising, in combination, note sheet perforating mechanism; dynamic indication marking mechanism; selector mechanism to predetermine the location of perforations in a sheet; governing mechanism to predetermine the location of marks upon the sheet; and means operatively connecting said selector mechanism and said governing means.

14. A machine for making perforated note sheets comprising in combination, perforating means; perforator-selecting means; means for presenting a note sheet to the perforating mechanism; a marking device cooperating with said sheet, and positioned for marking the sheet before it is perforated; means to feed the sheet to the marking and the perforating means; marker-operating means to cause the marking device to mark the sheet; and cooperating governing means for the marker-operating and perforator selecting means respectively, for governing relative positions of marks and perforations on the sheet.

15. A machine for making perforated note sheets comprising, in combination, perforating means; perforator-selecting means; means for presenting a note sheet to the perforating mechanism; a marking device cooperating with said sheet, and positioned for marking the sheet before it is perforated; means to feed the sheet past the marking device and the perforating means; marker-operating means to cause the marking device to mark the sheet; governing means for the marker-operating means and perforator-selecting means respectively; and means operatively connecting said respective governing means, to cause a marking operation to precede a corresponding perforating operation by a sufficient interval of time for feeding the note sheet material from the marking devices to the perforating means.

16. A machine for making perforated note sheets comprising, in combination, perforating means; perforator-selecting means; means for presenting a plurality of note sheets to the perforating mechanism to be perforated collectively; a plurality of marking devices cooperating respectively with said sheets, and positioned for marking the sheets before they are perforated; means to feed the sheets past the marking devices and the perforating means; marker-operating means to cause the marking devices to mark the sheets; governing means for said marker-operating means and perforator-selecting means respectively; and means operatively connecting said respective governing means to cause a marking operation to precede a corresponding punching operation by a sufficient interval of time for feeding the note sheet material from the marking devices to the perforating means.

17. A machine for making perforated note sheets comprising, in combination, perforating means; perforator-selecting means: means for presenting a plurality of note sheets to the perforating mechanism to be perforated collectively; a plurality of marking devices cooperating respectively with said sheets, and positioned for marking the sheets before they are perforated; means to feed the sheets past the marking devices and the perforating means; marker-operating means to cause the marking devices to mark the sheets; a tracker having connection to said marker-operating means and also to said perforator-selecting means; pattern means cooperating with said tracker to govern said marker-operating means and said punch-selecting means respectively: and means relatively governing said two pattern means to cause a marking operation to precede a corresponding punching operation by a sufficient interval of time for feeding the note sheet material from the marking devices to the perforating means.

18. A machine for making perforated note sheets comprising, in combination, perforating means; perforator-selecting means; means for presenting a plurality of note sheets to the perforating mechanism to be perforated collectively; a plurality of marking devices cooperating respectively with said sheets, and positioned for marking the sheets before they are perforated; means to feed the sheets past the marking devices and the perforating means; marker-operating means to cause the marking devices to mark the sheets; a tracker having connection to said marker-operating means and also to said punch-selecting means; a pattern sheet cooperating with said tracker and having pattern means to govern said marker-operating means and perforator-selecting means, respectively; said two pattern means being relatively located on said pattern sheet to cause a marking operation to precede a corresponding punching operation by a sufficient interval of time for feeding

the note sheet material from the marking devices to the perforating means.

19. A machine for making perforated note sheets comprising, in combination, perforating means; perforator-selecting means; means for presenting a plurality of note sheets together to the perforating mechanism to be perforated collectively; a plurality of marking devices cooperating respectively with said sheets, and positioned for marking the sheets before they are perforated; means to feed the sheets past the marking devices and the perforating means; means to move the marking devices toward and from the sheets; a tracker having connection to said means for moving the marking devices, and also to said punch-selecting means; a pattern sheet cooperating with said tracker and having means to govern said marker-moving means and said perforator-selecting means respectively, said two pattern means being relatively located on said pattern sheet to move the marking devices to marking position preceding a corresponding punching operation by a sufficient interval of time for feeding the note sheet material from the marking devices to the perforating means.

20. A machine for making perforated note sheets comprising, in combination, perforating means; perforator-selecting means; means for presenting a plurality of note sheets together to the perforating means to be perforated collectively; means intermediate the source of supply of said sheets and the perforating point, to separate said plurality of sheets to permit them to be marked individually; a plurality of marking devices for said sheets respectively, and positioned for marking the sheets before they are perforated; a common support for the marking devices arranged to move the latter transversely to the direction of feed of the sheets; means to feed the sheets past the marking devices and the perforating means; means to move the marking devices toward and from the sheets; automatic means for moving the marking device support; a tracker having connection to said automatic means and also to said punch-selecting means; a pattern sheet cooperating with said tracker and having pattern means to govern said automatic marker-moving means and said selector-selecting means, respectively, said two pattern means being relatively located on said pattern sheet to cause a marking operation to precede a corresponding punching operation by a sufficient interval of time for feeding the note sheet material from the marking devices to the perforating means.

21. A machine for making perforated note sheets comprising, in combination, sheet feeding means; and marking and perforating means cooperating with said sheet feeding means to act upon opposite sides of the sheet.

22. A machine for making perforated note sheets comprising, in combination, perforating means; a plurality of marking means at different distances from the perforating means; and means to predetermine equal lengths of note sheet material between the respective marking means and the perforating point.

23. A machine for making perforated note sheets comprising, in combination, perforating means, marking means; and means for adjusting the length of note sheet material between the marking means and perforating means.

24. A machine for making perforated note sheets comprising, in combination, perforating means; a plurality of marking means; and means to equalize the lengths of note sheet material between the respective marking means and the perforating means.

25. A machine for making perforated note sheets comprising, in combination, perforating means; a plurality of marking means; means to present a plurality of note sheets separately to the respective marking devices; means to present said note sheets collectively to the perforating means; and means to equalize the lengths of note sheets from the respective marking means to the perforating point.

26. A machine for making perforated note sheets comprising, in combination, perforating means; a plurality of marking means; means to present a plurality of note sheets to the marking means respectively; sheet guiding means for guiding the sheets from the several marking devices into a stack arrangement for presenting them collectively to the perforating means; and means for adjusting relative lengths of sheets from the respective marking devices to the perforating point.

27. A machine for making perforated note sheets comprising, in combination, perforating means; a plurality of marking means; means to present to the marking means and perforating means respectively the opposite faces of each of a plurality of sheets; and means for equalizing the lengths of sheets between the respective marking devices and the perforating point.

28. A machine for making perforated note sheets comprising, in combination, perforating means; a plurality of marking means; means for presenting the faces of a plurality of sheets separately to the respective marking means; means for presenting the reverse sides of said plurality of sheets collectively to the perforating means; and means for equalizing the lengths of sheets between the marking means and perforating means.

29. A machine for making perforated note sheets comprising, in combination, perforat-

ing mechanism and marking mechanism for perforating and marking each of the said sheets; means providing operatively connected pattern elements for said mechanism respectively to govern the relative operation of the two mechanisms; and means operatively connecting said governing patterns and said mechanisms.

30. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; a single prime controller sheet for governing said mechanisms; and means operatively connecting said controller sheet to said marking and perforating mechanisms.

31. A machine for making perforated note sheets comprising, in combination, marking means and perforating means constructed and arranged to operate in succession upon the same note sheet material; means providing controlling elements for said mechanisms respectively; and means operatively connecting said controlling elements to said marking and perforating means.

32. A machine for making perforated note sheets comprising, in combination, marking mechanism and perforating mechanism constructed and arranged to operate in succession upon the same note sheet material; means providing prime controllers for said mechanisms respectively constructed and arranged to determine conjointly the relationship of marks and perforations on the said sheet material; and means connecting said prime controllers to said marking and perforating mechanisms.

33. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; a pattern sheet for governing the perforating mechanism and having governing means for the marking mechanism; and means operatively connecting said pattern with said marking and perforating mechanisms.

34. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; a pattern sheet to govern the perforating mechanism and having on its margin means for governing the marking mechanism; and means operatively connecting said pattern with said marking and perforating mechanisms.

35. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; pattern means for governing the perforating mechanism and having means for operating the marking means; and means operatively connecting said pattern with said marking and perforating mechanisms.

36. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; a substantially rectangular pattern sheet for governing the perforating mechanism and having longitudinally extending controlling means for the marking mechanism; and means operatively connecting said pattern with said marking and perforating mechanisms.

37. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; a substantially rectangular pattern sheet for governing the perforating mechanism and having longitudinally extending governing means for the marking mechanism, said governing means beginning on said sheet in advance of the pattern devices for governing the perforating mechanism; and means operatively connecting said pattern with said marking and perforating mechanisms.

38. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; a substantially rectangular pattern sheet for governing the perforating mechanism and having along its length an undulating governing means for the marking mechanism; and means operatively connecting said pattern with said marking and perforating mechanisms.

39. A machine for making perforated note sheets comprising, in combination, marking mechanism and perforating mechanism constructed and arranged to act in succession upon note sheet material; a pattern sheet having thereon marker governing and perforating governing means relatively positioned to correspond to the successive operation of said mechanisms; and means operatively connecting said pattern with said marking and perforating mechanisms.

40. A machine for making perforated note sheets comprising, in combination, perforating mechanism; marking mechanism constructed and arranged with reference to the perforating mechanism to mark note sheet material before it is perforated; means to present note sheet material to the marking and perforating mechanisms; a pattern sheet having marker-governing and perforator-governing means relatively located to cause marking operations to precede corresponding perforating operations; and means operatively connecting said pattern with said marking and perforating mechanisms.

41. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; means to present note sheet material first to the marking mechanism then to the perforating mechanism; governing means for said mechanisms respectively cooperating to position corresponding marks and perforations in desired relation on the sheet; and means operatively connecting said governing means to said marking and perforating mechanisms.

42. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; a pattern sheet for governing the perforating mechanism and having marginal indentations to govern the marking mechanism; and means operatively connecting said pattern with said marking and perforating mechanisms.

43. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; a pattern sheet for governing the perforating mechanism and having an irregular margin for governing the marking mechanism; and means operatively connecting said pattern with said marking and perforating mechanisms.

44. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; a pattern sheet for governing the perforating mechanism and having an irregular margin; means operatively connecting the pattern sheet and the perforating mechanism, and means operatively connecting said irregular margin and the marking devices for producing on the note sheets, marks corresponding to the irregularities in said margin.

45. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; a pattern sheet for the perforating mechanism and having an undulating margin; means operatively connecting the pattern sheet and the perforating mechanism and means operatively connecting said undulating margin and the marking devices for producing correspondingly undulating marks on the note sheet.

46. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; a pattern sheet having pattern means corresponding to perforations to be made in the note sheet material and having an undulating margin, portions of said undulating margin being located on said sheet in advance of corresponding perforating pattern devices, means operatively connecting the pattern and the perforating mechanism and means operatively connecting said undulating margin and the marking devices.

47. A machine for making perforated note sheets comprising, in combination, marking mechanism; perforating mechanism; pattern means for the perforating mechanism and having means for causing the marking devices to mark and for determining the character of markings on the sheet; and means operatively connecting the pattern and the perforating mechanism.

48. A note sheet marking machine comprising, in combination, a dynamic line marking device; a tracker; controlling means co-operating with said tracker; means operatively connecting the tracker and marking device for automatically governing the latter; and means to present note sheet material to the marking device.

49. A note sheet marking machine comprising, in combination, a dynamic line marking device; a tracker; controlling means co-operating with said tracker; means operatively connecting the tracker and marking device for moving the latter to and from marking position; and means to present note sheet material to the marking device.

50. A note sheet marking machine comprising, in combination, a dynamic line marking device; a tracker; controlling means co-operating with said tracker, means to position note sheet material in operative relation with the marking device; and means operatively connected to the tracker for relatively moving the marking device and sheet into marking relation.

51. A note sheet marking machine comprising, in combination, a dynamic line marking device; a tracker; controlling means co-operating with said tracker; means to present note sheet material in operative relation with the marking device; and means operatively connected with the tracker for determining the place upon the sheet at which the marker is to operate.

52. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material in operative relation with the marking device; a tracker; controlling means co-operating with said tracker; and means operatively connected with the tracker for relatively moving the marking device and sheet to mark the latter at a predetermined point.

53. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material in operative relation with the marking device; a tracker; controlling means co-operating with said tracker; and means operatively connected with the tracker for moving the marking device transversely of the sheet.

54. A note sheet marking machine comprising, in combination; a dynamic line marking device; means to present note sheet material in operative relation to the marking device; a tracker; controlling means co-operating with said tracker; and mechanism operatively connected with the tracker for moving the marking device toward and from the sheet and transversely of the sheet.

55. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material to the marking device; and

pattern means having operative connection to the marking device for automatically governing the latter.

56. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material to the marking device; and pattern means having operative connection to the marking device for relatively moving the marking device and note sheet material into marking relationship.

57. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material to the marking device; and pattern means having operative connection with the marking device for automatically governing the position of marks upon the note sheet material.

58. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material in operative relation to the marking device; and automatic mechanism for relatively moving the marking device and sheet to mark the latter at a predetermined point.

59. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material in operative relation to the marking device; and automatic mechanism for relatively moving the marking device and sheet into marking relation.

60. A note sheet marking machine comprising, in combination, a dynamic line marking device; and mechanism for relatively moving the marking device and note sheet material for causing the marker to draw an unbroken line along the note sheet material.

61. A note sheet marking machine comprising, in combination, a dynamic line marking device; mechanism for relatively moving the marking device and note sheet material for causing the marker to draw a line progressively on the note sheet material; and pattern controlled automatic means for relatively moving the marker and note sheet material for causing variations in said line.

62. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to feed note sheet material relatively to the marking device; and automatic means for causing the marking device to make a series of demarkations lengthwise the note sheet material.

63. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to feed note sheet material relatively to the marking device; automatic means for causing the marking device to make a series of demarkations lengthwise the note sheet material; and pattern controlled automatic means for relatively moving the marking device and note sheet material to vary the distances of said demarkations from an edge of the note sheet material.

64. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material to the marking device pattern means having a succession of mechanical instrumentalities corresponding to marks desired to be made upon the note sheet material; and means operatively connecting said pattern means and the marking device for causing the latter to mark the note sheet material.

65. A note sheet marking machine comprising, in combination, a dynamic line marking device; mechanism relatively to move a note sheet and marking device to produce an undulating series of demarkations on the note sheet; a pattern and pattern controlled means to govern the character of said undulations.

66. A note sheet marking machine comprising, in combination, a dynamic line marking device; mechanism relatively to move the marking device and note sheet material to produce an undulating series of demarkations upon the note sheet material; a tracker connected to said mechanism for governing the same; and a pattern sheet to cooperate with said tracker.

67. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material to the marking device; and governing means for the marking device including a pattern means having a succession of mechanical instrumentalities corresponding to different operations of the marker; and transmitting means intermediate said pattern means and the marker arranged to cooperate with said succession of instrumentalities.

68. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material to the marking device; and marker-governing means including a pattern sheet having an irregular edge and transmitting means, cooperating with said irregular edge and operatively connected with the marking device.

69. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material to the marking device; a pattern sheet having an irregular edge; and means providing a tracker vent movable in accordance with said irregularities and operatively connected with the marking device.

70. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet

material to the marking device; and marker-governing means including a pattern sheet having an undulating series of devices for controlling a tracker vent; and means providing said tracker vent to cooperate with said undulating series and operatively connected with the marking device.

71. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material to the marking device; and marker-governing means including a tracker having a sliding vent, pattern means having an undulating series of devices to cooperate with said vent; and means operatively connected with the marking device for causing said tracker vent to move in accordance with the undulations of said series of devices.

72. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material to the marking device; a pattern means; relatively low-powered means controlled by the pattern to produce a movement to be transmitted to the marking device and higher-powered means for transmitting said movement to the marking device.

73. A note sheet marking machine comprising, in combination, a dynamic line marking device; means to present note sheet material to the marking device; pattern means for governing the character of marking; a relatively low-powered means controlled by the pattern means for producing a motion to be transmitted to the marking means; and a higher-powered means for transmitting said movement to the marking device; and means for adjustably supporting said transmitting means to vary the motion transmitted to the marking device.

74. A note sheet marking machine comprising, in combination, a marking device; means to present note sheet material to the marking device; power-operated means for relatively moving the marking device and note sheet material for positioning the two in different marking relations; a prime controller for governing said power-operated means; and relay means operatively connecting the prime controller and said power-operated means.

75. A note sheet marking machine comprising, in combination, a marking device; means to present note sheet material to the marking device; a power pneumatic for relatively moving the marking device and note sheet material for positioning the same in different marking relations; a prime controller; a second power pneumatic operatively connected to the prime controller; and means governed by said second pneumatic for controlling the first power pneumatic.

76. A note sheet marking machine comprising, in combination, a marking device; means to present note sheet material to the marking device; a power pneumatic for relatively moving the marking device and note sheet material to position the same in different marking relations; a prime controller having operative connection with said power pneumatic; and means operatively connected with the power pneumatic whereby the extent of movement communicated by the power pneumatic for relatively moving the marking device and note sheet material may be adjusted.

77. A note sheet marking machine comprising, in combination, a prime controller in the form of a strip having marker-governing instrumentalities; means providing a pneumatic vent controlled by said marker-governing instrumentalities; a power-operated means governed by said vent; marking means operatively connected with said power-operated device to be moved thereby; and means to present note sheet material to the marking device.

78. A note sheet marking machine comprising, in combination; marking means; means to present note sheet material to the marking means; power means for relatively moving the marking means and note sheet material to position the same in different marking relations; a pneumatic controller operatively connected to said power means to govern the same, and having ports to atmosphere and to exhaust respectively; and a prime controller for governing the relative capacities of said ports.

79. A note sheet marking machine comprising, in combination; marking means; means to present note sheet material to the marking means; and governing mechanism for relatively moving the marking means and note sheet material including a pneumatic having atmomsphere and exhaust ports, a prime controller for governing the relative capacities of said ports, and means operatively connecting said pneumatic to said governing mechanism whereby it may relatively move the marking means and note sheet material.

80. A note sheet marking machine comprising, in combination, marking means; means to present note sheet material to the marking means; and governing means for relatively moving the marking means and note sheet material including a pneumatic having atmosphere and exhaust ports, a prime controller for governing the relative capacities of said ports, and adjustable means for communicating the movement of said pneumatic to the marking means.

81. A note sheet marking machine comprising, in combination, marking means; means to present note sheet material to the marking means; a pneumatic having atmosphere and exhaust bleeds; a prime controller for varying the relative capacities of said

bleeds; a second pneumatic having connections for relatively moving the marking means and note sheet material; and means connecting the first and second pneumatics for governing the pneumatic condition in the latter.

82. A note sheet marking machine comprising, in combination, marking means; means for presenting note sheet material to the marking means; a pneumatic having atmosphere and exhaust ports; a prime controller for varying the relative capacities of said ports; a second pneumatic having atmosphere and exhaust ports and having connections for relatively moving the marking means and note sheet material; and means connected with the first pneumatic for governing the relative capacities of the ports to the second pneumatic.

83. A note sheet marking machine comprising, in combination, marking means; means to present note sheet material to the marking means; a pneumatic having atmosphere and exhaust ports, a prime controller for varying the capacities of one of said ports; and means operatively connected with said pneumatic for relatively moving the marking means and note sheet material.

84. A note sheet marking machine comprising, in combination, marking means; means to present note sheet material to the marking means; a pneumatic having atmosphere and exhaust ports, one of said ports being operatively connected to move concurrently with the movable board of said pneumatic; a prime controller for varying the capacity of said movable port; and means operatively connected with said pneumatic for relatively moving the marking means and note sheet material.

85. A note sheet marking machine comprising, in combination, marking means; means to present note sheet material to the marking means; a pneumatic having atmosphere and exhaust ports, one of said ports being operatively connected to move concurrently with the movable board of said pneumatic; a prime controller having a series of instrumentalities to vary the capacity of said movable port; and means operatively connected with said pneumatic for relatively moving the marking means and note sheet material.

86. A note sheet marking machine comprising, in combination, marking means; means to present note sheet material to the marking means; a tracker; having a sliding portion a pneumatic having atmosphere and exhaust ports, the atmosphere port being located in said sliding portion and which has operative connection to slide responsively to movement of the movable board of said pneumatic; a prime controller for varying the capacity of said atmosphere port; and means operatively connected with said pneumatic for relatively moving the marking means and note sheet material.

87. A note sheet marking machine comprising, in combination, marking means; means to present note sheet material to the marking means; a pattern sheet having an undulating series of controlling means for a tracker vent; means having a tracker vent, movable substantially to follow the undulations of said series; a pneumatic having exhaust and atmosphere ports; means connecting the atmosphere port with said tracker vent; and means having operative connection with said pneumatic for relatively moving the marking means and note sheet material.

88. A note sheet marking machine comprising, in combination, marking means; means for presenting note sheet material to the marking means; a prime controller having an undulating series of successively operating mechanical instrumentalities corresponding to desired marking operations; controlled means movable transversely of said series to cooperate with said mechanical instrumentalities; means to move said controlled means substantially in accordance with the undulations in said series; and means having operative connection with said controlled means for relatively moving the marking means and note sheet material.

89. A note sheet marking machine comprising, in combination, marking means; means for presenting note sheet material to the marking means; a pattern sheet having an undulating series of pattern devices corresponding to desired marking operations; pattern controlled means movable by said pattern transversely of said pattern sheet to cooperate with said series of pattern devices; and means having operative connection with said pattern controlled means for relatively moving the marking means and note sheet material.

90. A note sheet marking machine comprising, in combination, marking means; means to present note sheet material to the marking means; a pattern sheet having an irregular edge, the irregularities thereof corresponding to desired marking operations; means movable transversely of the edge of the pattern sheet and having a tracker vent to cooperate with the irregularities in said edge; and means connected to said tracker vent and governed thereby for relatively moving the marking means and note sheet material.

91. A note sheet marking machine comprising, in combination, marking means; means to present note sheet material to the marking means; a pattern sheet having an undulating edge; pattern governed means providing a tracker vent relatively movable transversely to said edge; and means connected with said tracker vent and governed

thereby for relatively moving the marking means and note sheet material.

92. A note sheet marking machine comprising, in combination, a marking device; means to present note sheet material to the marking device; a pattern sheet having an undulating series of indications thereon; means controlled by said pattern sheet and movable thereby transversely of said series to be variably positioned in accordance with the undulations of said series; and means operatively connected with said last named means for relatively moving the marking means and note sheet material.

93. A note sheet marking machine comprising, in combination, marking means; means to present note sheet material to the marking means; a tracker having a plurality of vents for governing the relative operation of the marking means and note sheet material; means operatively connected with one of said vents for causing the marking device to mark the note sheet material; and means operatively connected with another of said vents for relatively positioning the marking means and note sheet material.

94. The combination of means providing a movable tracker vent; a pattern sheet having an undulating series of vent-controlling means to cooperate with said movable vent; an operating device, and means operatively connected with said vent for governing said operating device.

95. The combination of means providing a movable tracker vent; a sheet having an undulating series of vent-controlling means to cooperate with said vent; a pneumatic having connection to said vent and having an exhaust port; and an operating device operatively connected to said pneumatic.

96. The combination of means providing a movable tracker vent; a sheet having an undulating series of vent-controlling means to cooperate with said movable vent; a pneumatic having connections for moving said movable vent; an operating device; and means operatively connected with said vent for governing the operating device.

97. The combination of a tracker having a slide containing a vent; a sheet having an undulating vent-controlling means to cooperate with said vent; a pneumatic connected to said slide and having connection with said vent; and an operating device having operative connection with said pneumatic.

98. The combination of a tracker having a slide containing a vent; a sheet having an irregular edge to cooperate with said vent; a pneumatic having connection to said slide and to said vent; and an operating device having operative connection to said pneumatic.

99. The combination of a tracker having a slide containing a vent; a sheet having an edge to cooperate with said vent; a pneumatic mechanically connected to said slide and pneumatically connected to said vent; and an operating device having operative connection to said pneumatic.

100. The combination of a tracker having a slide containing a vent; a sheet having an edge to cooperate with said vent; a pneumatic having an exhaust port, and an atmosphere port connected to said vent; means connecting the movable board of said pneumatic with said slide; and an operating device operatively connected with the movable board of said pneumatic.

101. The combination of a tracker; a member having a vent and mounted adjacent to and movable longitudinally of said tracker; a sheet having an edge to cooperate with said vent and means operatively connected with said vent for automatically maintaining said vent in predetermined relation with said edge.

102. The combination of a pneumatic; means for causing expanding and collapsing movement thereof; a valve mechanism connected to the movable board of said pneumatic comprising a piston and cylinder, the cylinder having ports governed by the piston to vary pneumatic condition in the cylinder; a second pneumatic connected with the cylinder; and an operating device having operative connection with said second pneumatic.

103. The combination of a piston and cylinder, the cylinder having ports governed by the piston for varying the pneumatic condition in the cylinder; means relatively to move the piston and cylinder; a pneumatic connected with the cylinder; and an operating device for operative connection with said pneumatic.

104. The combination of a cylinder and piston, the cylinder having atmosphere and exhaust ports governed by the piston; means relatively to move the piston and cylinder to vary the relative capacities of said ports; a pneumatic connected with the cylinder and an operating device operably connected with said pneumatic.

105. The combination of a relatively low-powered pneumatic; means for causing expanding and collapsing movement thereof; a higher-powered pneumatic; an operating device having operative connection with said higher-powered pneumatic; and transmission means intermediate the lower-powered and the higher-powered pneumatics including a piston and cylinder, the cylinder having ports governed by the piston for varying pneumatic condition in the cylinder, means connecting the cylinder with the higher-powered pneumatic, and means connecting the lower-powered pneumatic for relatively moving the piston and cylinder.

106. The combination of a relatively low-powered pneumatic having atmosphere and

exhaust ports; means for varying the relative capacities of said ports; a second higher-powered pneumatic having atmosphere and exhaust ports; and means connected to said lower-powered pneumatic for varying the relative capacities of said ports of the second higher-powered pneumatics.

107. A note sheet marking machine comprising, in combination, a marking device; means to present note sheet material to the marking device; and marker governing means including means providing a sliding tracker vent; pattern means having a series of devices to cooperate successively with said vent; and means operatively connected with the marking device for causing said tracker vent to maintain operative relation with said devices in succession.

108. A note sheet marking machine comprising, in combination, a marking device; means to present note sheet material to the marking device; means for moving the marking device transversely in relation to the note sheet material; means for moving the note sheet material longitudinally past the marking device; a pattern having its edge shaped to govern said transverse movement of the marking device; means for moving the pattern in synchronism with the movement of the note sheet material; and means operatively connected with the edge of the pattern to control said transverse movement of the marking device.

109. A note sheet marking machine comprising, in combination, a marking device; means to present note sheet material to the marking device; means for moving the marking device transversely in relation to the note sheet material; means for moving the note sheet material longitudinally past the marking device; a pattern having its elge shaped to govern said transverse movement of the marking device; and means automatically cooperating with said pattern edge to control said transverse movement of the marking device.

110. A note sheet marking machine comprising, in combination, a dynamic line marking device; means for moving the marking device into and out of operative relation with the note sheet; and a pattern for controlling such movement of the marking device.

111. A machine for making perforated note sheets comprising, in combination, perforating mechanism; marking mechanism; and a single pattern means for governing the operations of both of said mechanisms.

112. A machine for making perforated note sheets comprising, in combination, perforating mechanism; marking mechanism; means providing co-operatively connected pattern elements for governing said mechanisms; and means operatively connecting said pattern elements to said marking and perforating mechanisms.

113. A note sheet marking machine comprising, in combination, a marking device; means to present note sheet material to the marking device; and marker-governing means including a tracker having a sliding vent; pattern means having an undulating series of devices to cooperate with said vent, and means operatively connected with the marking device for causing said tracker vent to cooperate with said series of devices in succession.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

CHARLES F. STODDARD.

Witnesses:

GUS G. FOSTER,

LAURENCE A. JANNEY.

Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,432,424, granted October 17, 1922, upon the application of Charles F. Stoddard, of New York, N. Y., for an improvement in "Machines for Use in the Manufacture of Perforated Note Sheets," errors appear in the printed specification requiring correction as follows: Page 12, lines 112, 121, and 129, claims 68, 69, and 70, and page 13, lines 9, 20, and 30, claims 71, 72, and 73, strike out the words "dynamic line"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 12th day of December, A. D., 1922.

[SEAL.] KARL FENNING,

Acting Commissioner of Patents.

Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,432,424, granted October 17, 1922, upon the application of Charles F. Stoddard, of New York, N. Y., for an improvement in "Machines for Use in the Manufacture of Perforated Note Sheets," errors appear in the printed specification requiring correction as follows: Page 12, lines 112, 121, and 129, claims 68, 69, and 70, and page 13, lines 9, 20, and 30, claims 71, 72, and 73, strike out the words "dynamic line"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 12th day of December, A. D., 1922.

[SEAL.] KARL FENNING,

Acting Commissioner of Patents.