Jan. 4, 1927. 1,612,971

W. S. FREEBURG

SELECTIVE PUNCHING MACHINE

Filed August 19, 1921 3 Sheets-Sheet 1

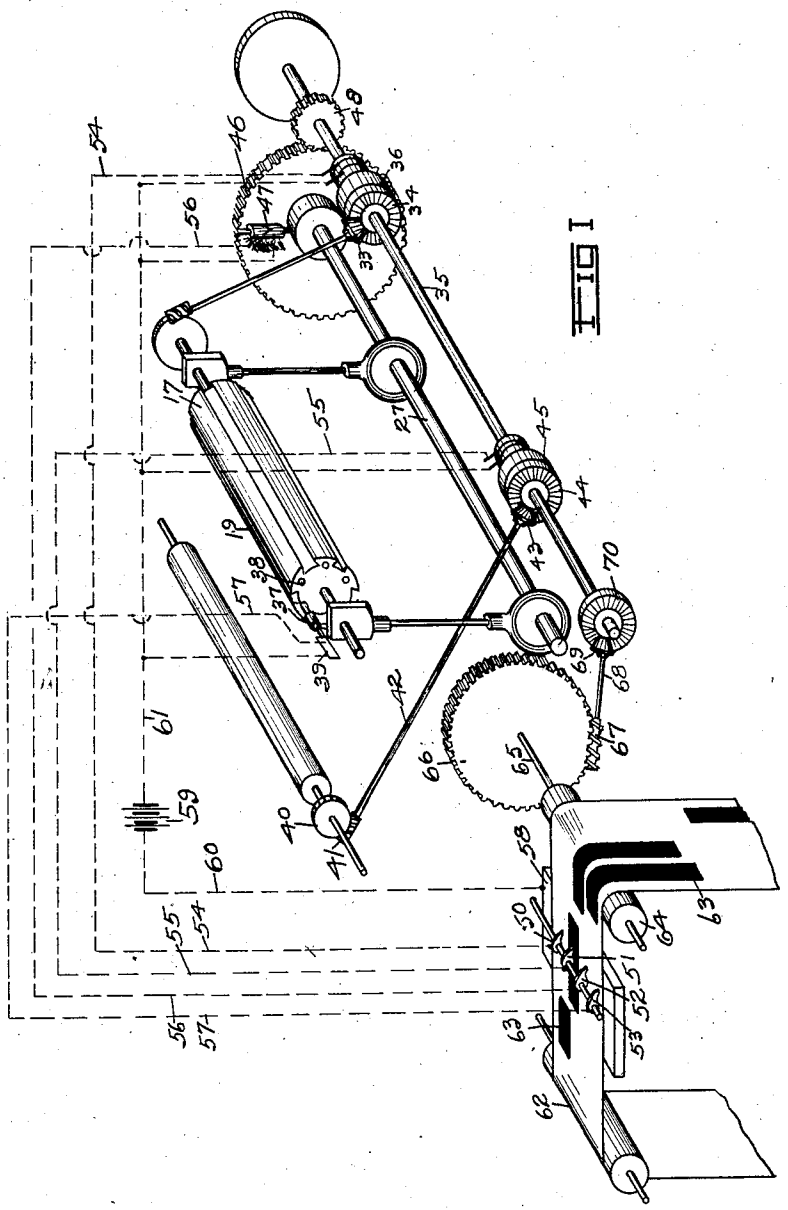


FIG I

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SELECTIVE PUNCHING MACHINE

Filed August 19, 1921 3 Sheets-Sheet 2

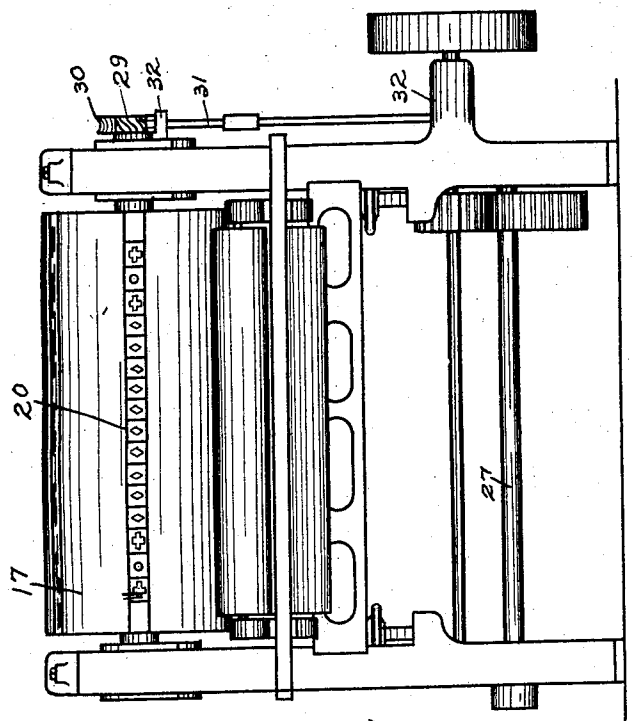


FIG. 2

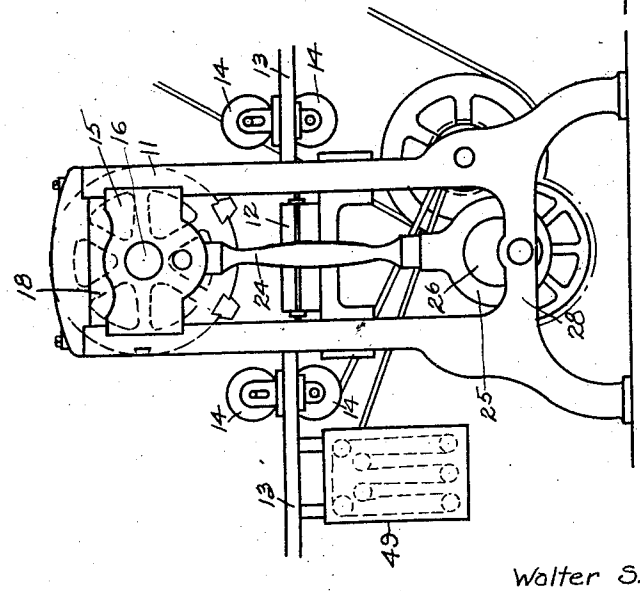


FIG. 3

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Jan. 4, 1927. 1,612,971

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SELECTIVE PUNCHING MACHINE

Filed August 19, 1921 3 Sheets-Sheet 3

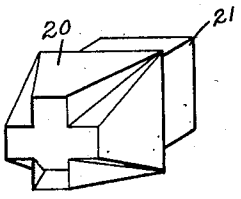


FIG 5

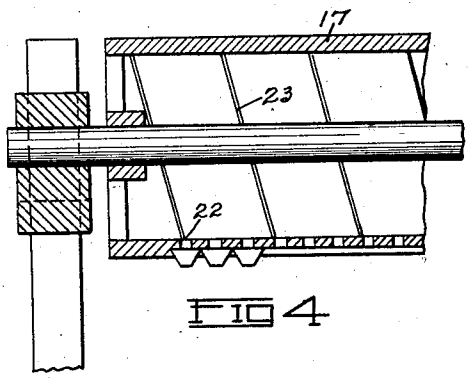


FIG 4

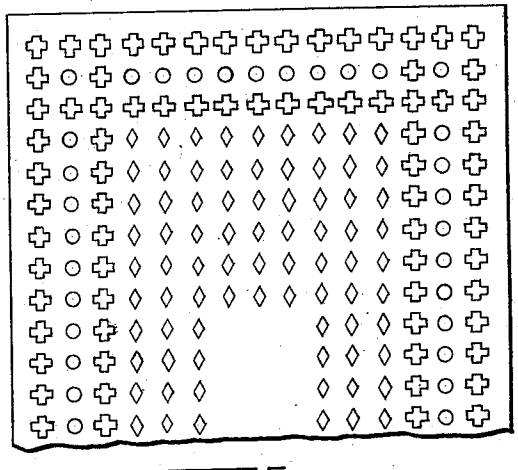


FIG 6

WALTER S. FREEBURG
INVENTOR

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Patented Jan. 4, 1927. 1,612,971

UNITED STATES PATENT OFFICE.

WALTER S. FREEBURG, OF MILWAUKEE, WISCONSIN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE FISK RUBBER COMPANY, OF CHICOPEE FALLS, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

SELECTIVE PUNCHING MACHINE.

Application filed August 19, 1921. Serial No. 493,730.

My invention relates to selective punching machines and the principal object of my invention is to provide a new and improved automatic machine. In the drawings accompanying this specification and forming a part thereof I have shown, for purposes of illustration, one form which my invention may assume. In these drawings—

Figure 1 represents a diagrammatic view of this illustrative embodiment of my invention,

Fig. 2 represents a front elevation of this illustrative embodiment,

Fig. 3 represents an end view of the machine shown in Fig. 2,

Fig. 4 represents a section of the form or cylinder,

Fig. 5 represents a general view of one of the tools, while

Fig. 6 represents a mat punched on the machine herein illustrated.

The machine herein shown comprises a frame 11 supporting a cutting table 12 and a pair of cooperating feed tables 13 over which stock may be fed across the cutting table by means of rollers 14 one of which carries on its shaft a worm wheel 40 actuated by a worm 41 carried by a shaft 42 which is driven by means of a bevel gear 44 and adapted to be connected with the main shaft 35 by means of a magnetic clutch 45.

Slidably mounted in the frame 11 are two cross heads 15 rotatably supporting a cross rod 16 to which is secured a form 17 in the shape of a hollow cylinder secured to the cross rods 16 by means of spokes 18. This form 17 is provided with a plurality of grooves 19 each adapted to receive a plurality of cutting dies 20 each of which is hollow to permit the cut out material to ravel into the die and is provided with a hollow stem 21 arranged to fit within the groove 19 and adapted to register with a cooperating aperture 22 in the form 17 and thereby permit the cut out material to pass on into the inside of the form 17. This material will constantly remain in the lowest part of the form 17 and accordingly upon rotation of the form the screw 23 will move the material toward the open end of the form and in this way constantly expel the material from the form. It will be understood that the dies 20 are readily removed from the groove 19 and that the various dies may carry various shapes so that the rows of dies may represent any desired row of a pattern.

The form 17 and the dies carried thereby are reciprocated by a suitable operating means which is herein shown as a pair of connecting rods 24 each secured to one of the crossheads 15 and each carrying at its lower end an eccentric strap 25 cooperating with an eccentric 26 carried by an operating shaft 27 mounted to the crosspiece 28 of the frame 11 and adapted to be connected by a one-revolution clutch 47 to a gear 46 rotating freely upon the shaft 27 and meshing with a cooperating pinion 48 carried by the main-shaft 35.

Rotation of the form 17 is accomplished by means of a worm 29 acting upon the worm-wheel 30 secured to the cross rod 16 and carried by the extensible shaft 31 which is mounted in suitable brackets 32 and carries at its lower end a bevel gear 33 meshing with a cooperating bevel gear 34 mounted loosely on the main-shaft 35 and connected thereto at will by means of a magnetic clutch 36. Form 17 is caught and held in exact register by means of a pin 37 spring pressed into locking engagement with apertures 38 in the drum 17 and retractable by means of a solenoid 39.

The solenoid 39, one revolution clutch 47, and the magnetic clutches 36 and 45, are all controlled by a control 49. This control comprises four fingers 50, 51, 52, and 53 connected by wires 54, 55, 56, and 57 to the clutch 36, the clutch 45, the clutch 47, and the solenoid 39 respectively. Mounted below these fingers is a metallic plate 58 adapted to be engaged by the fingers and connected through the wire 60 to a source of power 59 and thence through a wire 61 to the remaining terminal of each of the four controlling devices. These fingers 50, 51, 52, and 53 are normally separated from the plate 58 by means of a tape 62 passing there-between, provided with apertures 63 to permit the fingers to selectively contact with the plate 58, and fed by means of a roller 64 which in turn is driven by a shaft 65 connected to a worm gear 66 which meshes with a worm 67 mounted on a shaft 68 which carries a bevel gear 69 meshing

with a bevel gear 70 fixed to the main shaft 35.

In operation the pattern to be punched will be analyzed and the number of different rows of characters determined. These rows will be set up in the grooves 19 and a control tape 62 will then be prepared for that pattern. The stock will then be started into the machine and simultaneously the control tape will be started under the fingers 50, 51, 52, and 53. As the main-shaft 35 revolves it will feed the control tape forward and various apertures 63 will come under fingers 50, 51, 52, and 53 to permit these fingers to selectively contact with the plate 58 and to thereby selectively energize the four controlling devices 36, 45, 47, and 39. Ordinarily the clutch 45 will first be energized to feed the stock into the machine the desired distance, whereupon this clutch will be de-energized to stop the forward movement of the stock. Simultaneously the solenoid 39 will have been energized to permit rotation of the form 17 and the clutch 36 to cause such rotation and near the end of the desired rotation the solenoid 39 will have been de-energized so that the pin 37 will snap into an aperture 38 when the form has assumed the proper position irrespective of whether the clutch 36 is disengaging at exactly the right instant or a trifle later. With the stock and form both in position the one-revolution clutch 47 will be energized to cause reciprocation of the form 17 and consequent punching of the stock. After this reciprocation the stock will again be fed forward, the form 17 rotated if desired, and the next punching effected. This process will be repeated until the entire pattern has been punched whereupon the same tape may be re-fed and the same pattern re-punched or a new tape may be inserted and a different pattern punched.

The disclosure herein is illustrative only and subject to many variations both in structure and operation and also in use and my invention is, of course, not limited to the illustrative description herein contained.

I claim:

1. A device of the character described comprising a cylindrical form provided with circumferentially spaced design cutting tools, means for rotating the form to selectively present the tools in cutting position, means for periodically reciprocating the form to operate the tools, means to periodically advance a sheet of material beneath the form and means to automatically control the extent of rotation of the form, the periodicity of the reciprocation of the form and the periodicity of the advance of the material to punch a predetermined composite design in the sheet of material.

2. A device of the character described comprising a cylindrical form provided with circumferentially spaced design cutting tools, electrically controlled, means for rotating the form to selectively present the tools in cutting position, electrically controlled means for periodically reciprocating the form to operate the tools, electrically controlled means to operate the tools, electrically controlled means to periodically advance a sheet of material beneath the form, a group of electrical contacts to individually operate each of the electrically controlled means and means to make and break the individual contacts in a predetermined sequence.

In testimony whereof I have signed my name to the above specification.

WALTER S. FREEBURG.