March 28, 1950 B. LEV 2,501,685

CAP PUNCHING MACHINE

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Fig. 1.

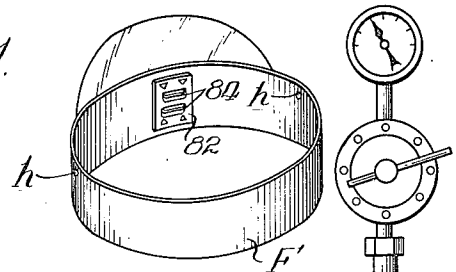
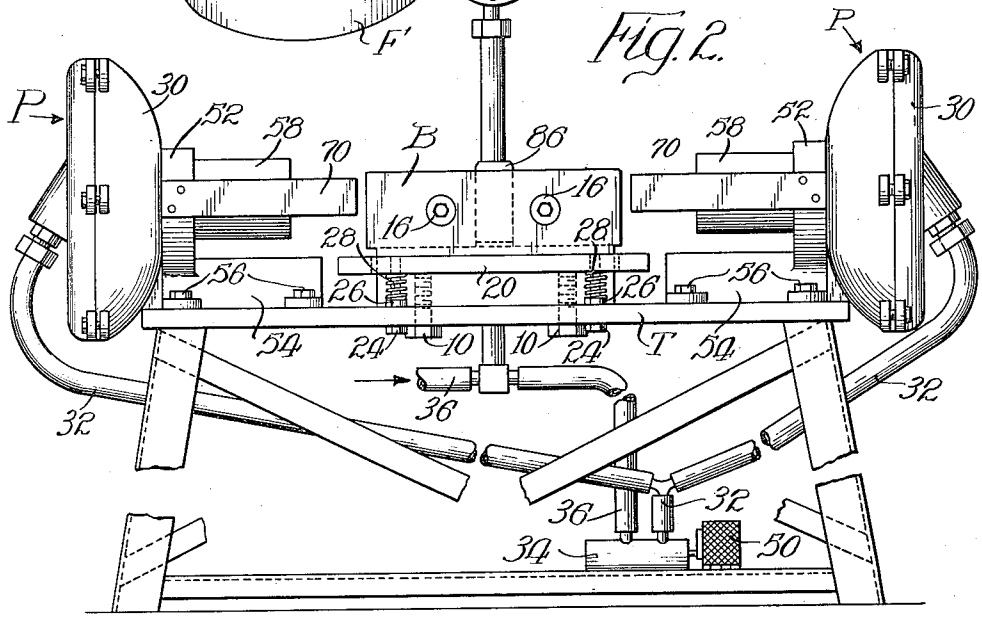


Fig. 2.



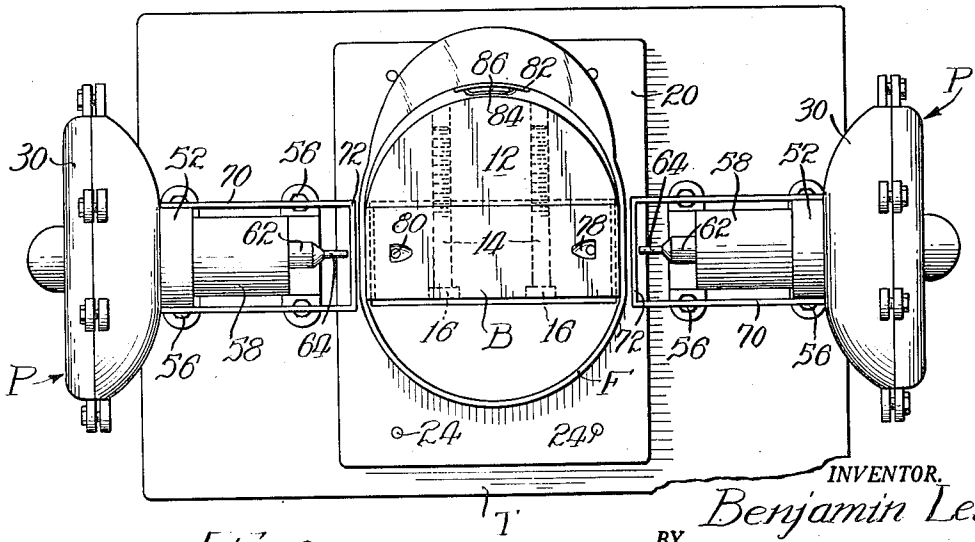


Fig. 3.

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CAP PUNCHING MACHINE

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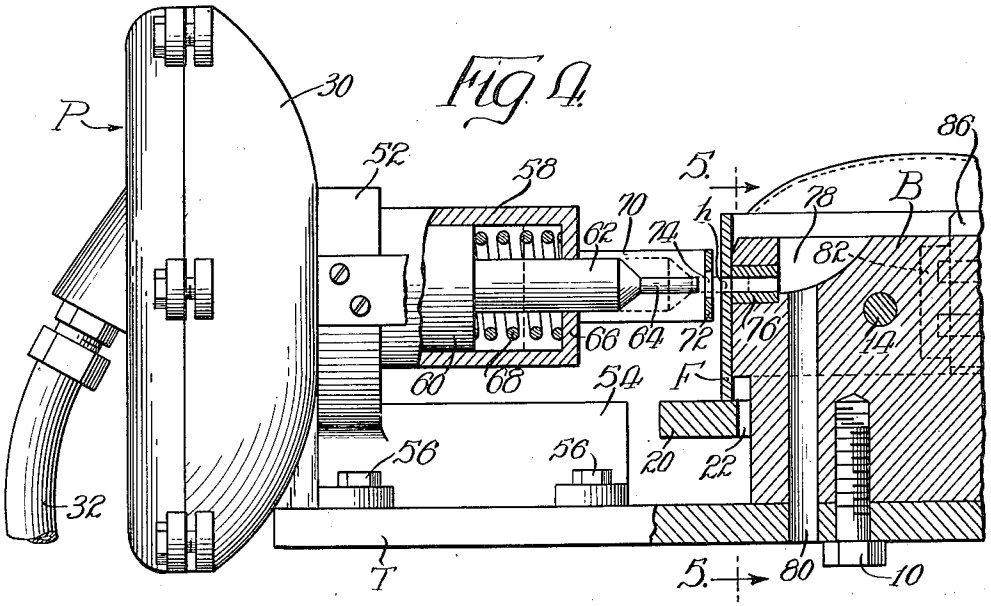

Fig. 4.

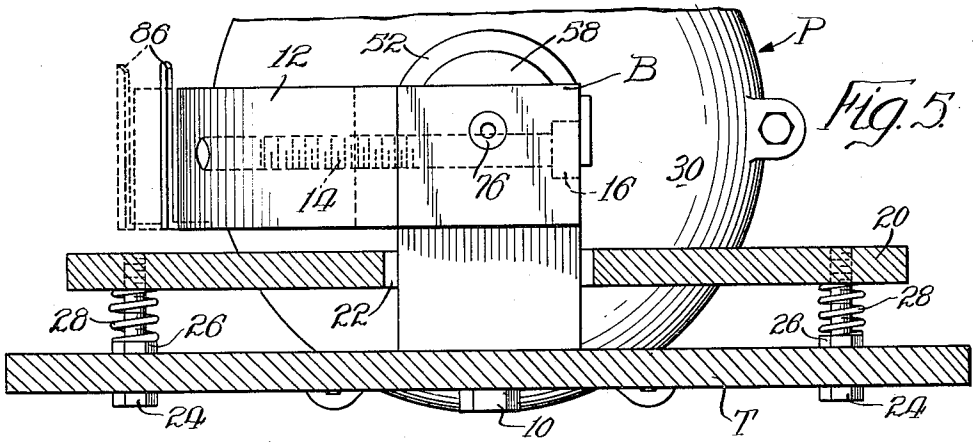

Fig. 5.

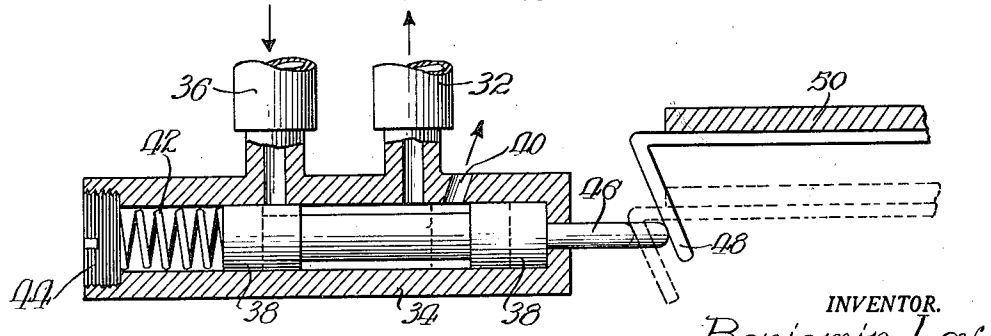

Fig. 6.

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UNITED STATES PATENT OFFICE

2,501,685

CAP PUNCHING MACHINE

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8 Claims. (Cl. 164—90)

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This invention relates to a machine for punching holes at opposite points in the frame of a uniform cap. Such a cap is commonly used in military service, by members of municipal organizations, such as police, and also by many uniformed persons in private employment. A conventional feature of most uniform caps is the strap which is extended across its front just above the visor. To secure the strap removably to the cap, it is convenient to pass fastening elements through the cap frame at points about opposite the ends of the strap. For this purpose two holes are preformed in the frame, and it is with the operation of punching these holes simultaneously that the machine of this invention is particularly concerned.

There is considerable variation in the design of uniform caps and this is often reflected in the length and width of the front straps thereon. As a consequence, the holes provided in the cap frame for the strap fastening elements must be positioned according to the length and width of the particular strap used. In some cases the holes should be located closer to or further from the cap front, and also closer to or further from the lower edge of the cap frame. In all cases, however, the holes are customarily located an equal distance from the front center of the cap.

It is a primary object of my invention that the machine for double punching the holes in the cap frame should include adjustable positioning means whereby the cap frame to be operated upon will be supported correctly to assure punching of the two holes at the exact point desired. It is also an object of this invention to provide a centering means for the cap frame when it is placed in the machine to be punched. The centering means for this purpose is conveniently located so that the cap may readily engage therewith and be removed therefrom without any additional effort in so doing. Other objects and purposes of this invention include the provision of a simple and rapid duplex mechanism whereby to operate two aligned punches simultaneously to produce holes at opposite points in the cap frame. The mechanism for this purpose is fully exposed and accessible, yet sufficiently guarded to prevent injury to the operator.

A suggestive form of duplex punching machine which is well suited to attain the purposes of this invention is set forth in the accompanying drawings in the following manner:

Figure 1 is a perspective view of a typical cap frame, inverted as it appears when operated upon by the present machine;

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Fig. 2 is a front elevational view of the machine, ready to receive the cap frame to be punched;

Fig. 3 which is a view thereof shows a cap frame in operative position thereon;

Fig. 4 is a fragmentary view in vertical section of one of the duplex punch mechanisms at the conclusion of its operation upon a cap frame which remains positioned in place;

Fig. 5 is a transverse section, taken on line 5—5 of Fig. 4; and

Fig. 6 is a sectional detail of the foot-operated control valve for the punch mechanisms.

The machine utilizes a framework supporting a table T which mounts at opposite ends a pair of like confronting, pneumatically-operated punch mechanisms P between which is an elongated positioning block B. This block which is fixedly connected to the table, as by bolts 10, carries at its rear side a form 12 which is adjustable toward and from the block by supporting bolts 14 having socketed heads 16 which are exposed for operation by a proper tool. I provide also a supporting plate 20 in which is a large central opening 22 for receiving the lower portion of the positioning block which is inset sufficiently so that the plate 20 substantially underlies the upper outset portion of the positioning block. This supporting plate is adjustably carried at varying elevations above the table T as by means of bolts 24 equipped with lock nuts 26 each of which is subjected to the thrust of one end of a coiled spring 28 whose opposite end is in thrust engagement with the plate 20. Because the positioning block is outset at its opposite ends above the supporting plate (see Fig. 4) a cap frame F, when fitted over the block and form 12 (see Fig. 3), will rest upon the supporting plate at a point outwardly of the opening 22 therein. The supporting plate is thus adapted to serve as a gauge for the cap frame by which to fix its vertical position relative to the positioning block B.

The features of adjustability for (1) the form 12 (horizontal) and (2) the supporting plate 20 (vertical) provide means whereby the cap frame F supported thereupon will be so located relative to the duplex punch mechanisms P that the holes *h* to be punched through the frame F at opposite sides of the cap will be predetermined as to position at a desired point relative to (*a*) the normally lower edge of the cap frame and (*b*) the front center thereof. These holes in the completed cap are prepared for occupancy by socket fittings to receive threaded screws by which to releasably secure the ends of a strap which extends across the cap at the front just

above its visor; and since the length and width of such a strap often varies with the different types and kinds of uniform caps now in common use, it is important that the holes *h* to be punched through the cap frame for receiving the strap-securing means be located according to the exact requirements in each case. For this reason adjustability of the supporting plate **20** and the form **12**, both relative to the duplex punching mechanism, is a primary consideration in the present invention.

The duplex punch mechanisms P are mutually aligned, and since they are alike in all respects a description of but one will suffice. There is comprised in each of these mechanisms P a pneumatic diaphram chamber **30** to which is connected a conduit **32** leading from a valve casing **34** to which air is supplied through a conduit **36** leading from a pressure source (not shown). Within the casing is a plunger unit comprising a pair of interconnected plungers **38** in spaced relation, and so arranged with respect to the inlet conduit **36** and a lateral exhaust port **40** as to close either one of them while the other remains open. An expansion spring **42** which exerts an end thrust against the plunger unit is confined in place within the casing by a plug **44** at one end thereof. Pressure from this spring urges the plunger unit normally to a position in which the inlet conduit **36** is closed; the outlet conduit **32** remains open continuously. Extending from the plunger unit axially through the casing end opposite the plug is a stem **46** whose exposed end lies in the path of a cam **48** which is carried by a treadle **50** mounted near the base of the machine framework for movement in response to foot pressure. With each operation of the treadle the plunger unit is axially shifted to (1) close the exhaust port **40** and (2) open the inlet conduit **36** whereby to complete a closed circuit for air pressure to pass through the conduits **32** to both pneumatic diaphragm chambers **30**; with release of pressure upon the treadle, the parts will be automatically restored to their normal positions as indicated by the full lines in Fig. 6.

The diaphragm chamber is supported upon a bracket arm **52** upstanding from a base block **54** which is fixedly mounted upon the table T with the aid of bolts **56**. The bracket arm is also united to one end of a horizontal cylinder **58** wherein is a piston **60** from which is axially extended a shank **62** carrying a punch **64**. This shank is slidable through an axial opening in an end wall **66** of the cylinder wherein is an expansive spring **68** exerting opposed thrusts upon the said end wall and upon the piston **60**, the effect being to normally press the piston toward an innermost position, such as is shown in Fig. 4. A guard frame **70** may be secured to the bracket arm **52** to extend horizontally therefrom alongside opposite sides of the cylinder **58** and transversely at **72** across in front of the punch **64** where it is provided with a hole **74** through which the punch may freely pass, when operated.

The guard frame end **72** is positioned close to one side of the positioning block B but remains spaced therefrom a distance which is requisite to accommodate the cap frame F when fitted in position around the block and supported upon the plate **20**. At a point opposite the punch **64** and coaxial therewith the positioning block mounts a cylindrical punching die **76** into which the punch **64** may enter during each operation. The punchings dislodged from the cap frame

are advanced through the die **76** to emerge through its inner end into a pocket **78** from which a discharge passageway **80** leads downwardly through the positioning block and the table whereon it is supported. By the means described there will be a continuous and automatic gravity disposal of the punchings as fast as they accumulate.

In Fig. 1 the cap frame F is shown as equipped with a holder plate **82** which is affixed interiorly thereof at its front center. This plate is provided with a pair of bars **84** which outstand from the plate inwardly thereof, and in the completed cap a stay (not shown) is received between the bars **84** and the body of the plate **82**, the stay being removably fitted therein for support of a grommet whereon is sustained the cover of the completed cap. In the condition shown in Fig. 1 the cap frame is subjected to the punching operation performed by the present machine. To center the cap frame in operative position, there is provided a tongue **86** (see Fig. 5) which is carried by the form **12** to upstand from its base at the front in slightly spaced relation thereto. This tongue is adapted to enter between the bars **84** and the body of the holder plate **82** when the cap frame is placed down thereupon to rest upon the supporting plate **20**. The two punches **64** which are in mutual alignment are then positioned an equal distance rearwardly of the front center of the cap, so that the holes *h* resulting from simultaneous operation of the punch mechanisms will be equidistant from the cap front.

In operation a cap frame is fitted in place over the tongue **86** and down upon the supporting plate **20**. Previously both the form **12** and supporting plate **20** have been adjusted to the desired positions for locating the holes to be punched at the requisite distances from the front center and lower edge of the cap frame. It will be found convenient to have the cap frame inverted when placed in the machine so that the lower edge of the cap, when completed, will be standing uppermost during the operation of punching. Pressure on the treadle **50** will release pneumatic pressure simultaneously into the cylinder **34** whereby to open up circuits through the two conduits **32** to produce concurrent operation of the two punches **64**. The cap frame is thereupon pierced at the two places previously selected for the purpose. Immediately upon release of the pneumatic pressure the punches are spring-retracted so that the cap frame may freely be lifted off the positioning block and a new cap frame substituted. These operations will follow one upon another with rapidity when performed by an operator who has once acquired familiarity with this work.

I claim:

1. Means for double punching a cap frame having a stay-holder affixed thereto at its front center comprising a positioning block, means extended outwardly from the block below its top providing a substantially horizontal support for one edge of the cap frame when fitted around the block, a pair of punches adjacent the positioning block at opposite faces thereof, a pair of cylindrical dies carried by the positioning block to the inside of the cap frame when fitted thereon and coaxial with the two punches for coaction therewith, centering means carried by the block adjacent one face thereof at a point between the two punches for engagement with the stay-holder of the cap frame whereby to fix its rotative position

relative to the block, and means for advancing and retracting the two punches simultaneously to pierce and then release the cap frame in each cycle of operation.

2. Means for double punching a cap frame according to claim 1 in which the horizontal support for the cap frame is independent of and disconnected from the positioning block, and in which means is provided for sustaining the said horizontal support at a selected position of vertical adjustment whereby to vary the height at which the cap frame is supported when fitted around the positioning block.

3. Means for double punching a cap frame according to claim 1 in which means is provided for sustaining the said horizontal support at a selected position of vertical adjustment whereby to vary the height at which the cap frame is supported when fitted around the positioning block.

4. Means for double punching a cap frame comprising a horizontal positioning block with an inset in the lower portion of its vertical walls, a horizontal support for one edge of the cap frame when fitted around the positioning block, the horizontal support comprising a plate apertured to receive the lower inset portion of the positioning block and to underlie its upper outset portion, a pair of punches adjacent the positioning block at opposite outset faces thereof, a pair of cylindrical dies carried by the positioning block to the inside of the cap frame, when fitted thereon, and coaxial with the two punches for coaction therewith, and means for advancing and retracting the two punches simultaneously to pierce and then release the cap frame in each cycle of operation.

5. Means for double punching a cap frame according to claim 8 in which means is provided to sustain the horizontal support in a selected position of vertical adjustment within the range of the inset lower portion of the positioning block, thereby to vary the vertical position of the cap frame, when rested thereupon, relative to the positioning block.

6. Means for double punching a cap frame comprising a positioning block, means extended outwardly from the block below its top providing a substantially horizontal support for one edge of the cap frame when fitted around the block, a pair of punches adjacent the positioning block at opposite faces thereof, a pair of cylindrical dies carried by the positioning block to the inside of the cap frame, when fitted thereon, and coaxial with the two punches for coaction therewith, a form arranged adjacent a vertical face of the positioning block between the two punches, means

for adjusting the position of the form toward or from the said vertical face of the positioning block, and means for advancing and retracting the two punches simultaneously to pierce and then release the cap frame in each cycle of operation.

7. Means for double punching a cap frame comprising a positioning block, means extended outwardly from the block below its top providing a substantially horizontal support from one edge of the cap frame when fitted around the block, means for sustaining the horizontal support at a selected position of vertical adjustment whereby to vary the height at which the cap frame is supported when fitted around the positioning block, a pair of punches adjacent the positioning block at opposite faces thereof, a pair of cylindrical dies carried by the positioning block to the inside of the cap frame, when fitted thereon, and coaxial with the two punches for coaction therewith, and means for advancing and retracting the two punches simultaneously to pierce and then release the cap frame in each cycle of operation.

8. Means for double punching a cap frame comprising a positioning block, means independent of and disconnected from the positioning block, extended outwardly therefrom below its top providing a substantially horizontal support for one edge of the cap frame when fitted around the block, means for sustaining the horizontal support at a selected position of vertical adjustment whereby to vary the height at which the cap frame is supported when fitted around the positioning block, a pair of punches adjacent the positioning block at opposite faces thereof, a pair of cylindrical dies carried by the positioning block to the inside of the cap frame, when fitted thereon, and coaxial with the two punches for coaction therewith, and means for advancing and retracting the two punches simultaneously to pierce and then release the cap frame in each cycle of operation.

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