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PAPER FOLDING AND CREASING MACHINE

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FIG. 1

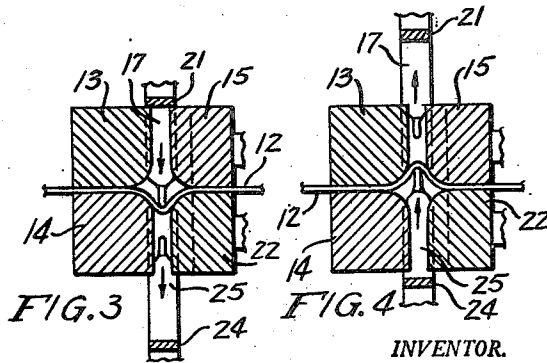
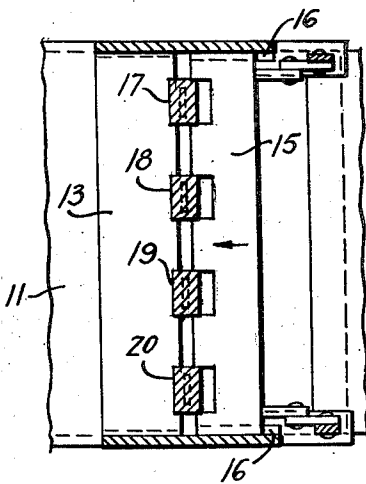
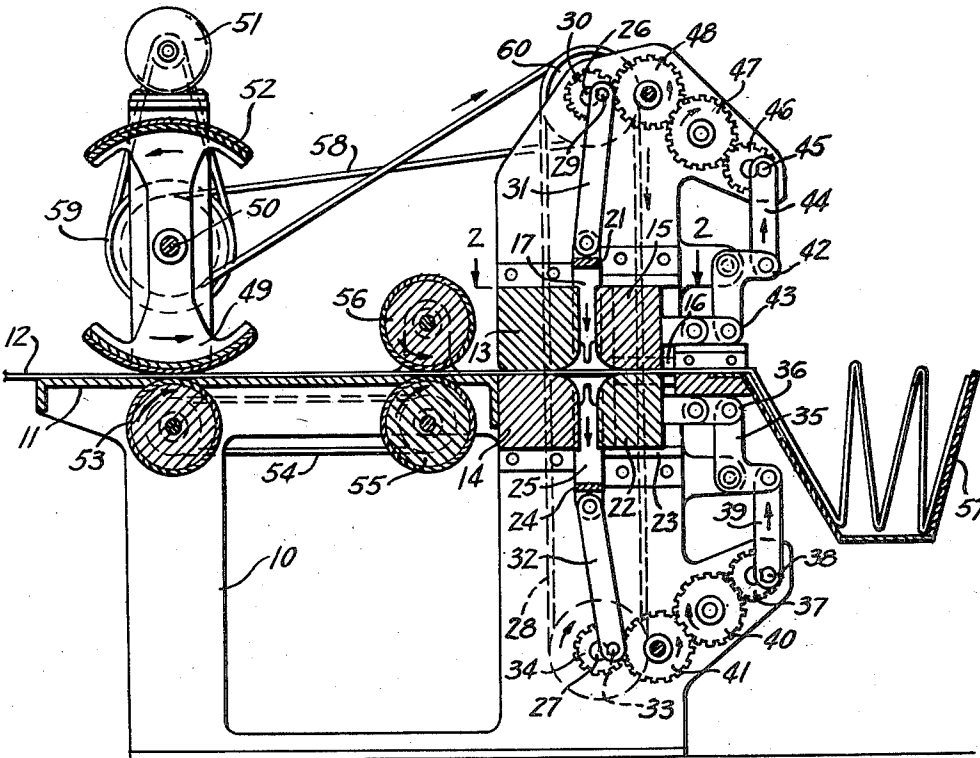


FIG. 2

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**PAPER FOLDING AND CREASING MACHINE**

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**3 Claims. (Cl. 270—79)**

The present invention relates to a machine for folding and creasing a web of paper.

An object of the present invention is to provide a machine for folding and creasing a web of paper and one which lends itself readily to putting multiple folds and creases in large sheets of blueprint paper in accordance with standards required by industrial and military engineering establishments.

Another object of the present invention is to provide a machine for folding and creasing a web of paper which is simple in structure, one sturdy in construction, easily adjusted for folding paper into various lengths and widths, one which may be economically manufactured and maintained, and one which is highly effective in action.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in connection with the annexed drawings, in which:

Figure 1 is a sectional view of a machine of the present invention, showing a continuous web of paper being folded therein;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a fragmentary sectional view showing the folding plungers at the end of the downwardly folding movement; and

Figure 4 is a sectional view showing the folding plungers at the end of the upwardly paper folding movement.

Referring in greater detail to the drawings, in which like numerals indicate like parts throughout the several views, the paper folding and creasing machine of the present invention comprises an upstanding frame 10 on one end of which is a table 11 for supporting the intermediate portion of a web of paper, the latter being indicated by the reference numeral 12 in Figure 1.

A pair of anvils 13 and 14 are arranged in superimposed spaced relation and are fixedly supported in the frame 10 with adjacent anvil faces facing away from the table 11. The presser block 15 is positioned in tandem spaced relation with respect to the anvil 13 and is mounted on a slideway 16 for movement toward and away from the anvil 13.

The pressing bars or folding plungers 17, 18, 19 and 20, are dependently carried on a horizontally disposed bar 21 and are positioned between the anvil 13 and the presser block 15. The folding plungers 17 to 20, inclusive, are identical and will be described with reference to plunger 17.

A second presser block 22 is positioned in tandem spaced relation with respect to the anvil 14 and is mounted in a slideway 23 for movement toward and away from the anvil 14. A horizontally disposed bar 24 supports a plurality of other folding plungers, arranged in opposed relation with respect to the plungers 17 to 20, inclusive, although a single one of them is shown in Figures 1, 3, and 4, and indicated by the single reference numeral 25. The last-named plungers, represented by the plunger 25, are positioned between the anvil 14 and the presser block 22.

A driven shaft 26 is mounted transversely of the frame 10 adjacent the upper end of the latter and is positioned above and spaced from the plungers 17 to 20, inclusive, and another shaft 27 is similarly positioned below and spaced from the plunger 25 and associated plungers.

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Means is provided connecting the shafts 26 and 27 together and comprises a chain or belt 28 shown in dotted lines in Figure 1.

Means is provided connecting the plungers 17 to 20, inclusive, to the driven shaft 26 for upward and downward movement in response to the rotation of the shaft 26. Specifically, this means embodies a crank pin 29 carried upon a gear 30 which is fixedly secured to the shaft 26 for rotation therewith, and a link bar 31 having its upper end mounted upon the crank pin 29 and having its lower end pivotally connected to the bar 21 which supports the plungers. A similar link bar 32 has one end connected to the bar 24 for pivotal movement and its other end mounted upon a crank pin 33 carried by a gear 34 fixedly secured on the driven shaft 27.

Means is provided connecting the presser block 22 to the driven shaft 27 for movement toward the anvil 14 upon completion of upward movement of the plungers 17 to 20, inclusive. Specifically, this means consists in a bell crank 35 mounted intermediate its ends for rocking movement about a horizontal axis on the frame 10 and having one end connected to a link 36 which is connected to the block 22. The other end of the bell crank 35 is connected to the end gear 37 of a gear train by means of a crank pin 38 carried by the gear 37 and another link 39 has one end mounted upon the crank pin 38 and the other end connected to the other end of the bell crank 35. Gears 40 and 41 complete the gear train and are in mesh with each other and are in mesh with the gears 37 and 34, respectively.

Similar means is provided for connecting the presser block 15 to the driven shaft 26 for movement toward the anvil 13 upon completion of movement of the plunger 25 and associated plungers downwardly upon rotation of the shaft 27. Specifically, this means includes a similar bell crank 42 connected at one end to the block 15 by means of a link 43 and connected at its other end to a link 44 which, in turn, is connected to a crank pin 45 carried on one face of a gear 46, the latter being the end gear in a gear train including gears 47 and 48, and the previously mentioned gear 30. The relative movements of the upper and lower set of plungers and of the gears and links are indicated by the arrows in Figure 1, an upward fold in the paper web 12 having been completed and the plungers 17 to 20, inclusive, being in position to initiate downward movement to form a new fold in the paper web 12.

Means is provided for intermittently feeding lengths of a paper web into the passage between the anvils and the presser blocks and specifically this means consists in a broken wheel 49 mounted upon a drive shaft 50 which is journaled in the frame 10 transversely of the latter and driven by a motor 51.

The segments of the broken wheel 49 are provided with a resilient pad 52 for engagement with the paper web 12 and an idler roller 53 is rotatably supported in the frame 10 below the broken wheel 49 in rolling engagement with the under side of the paper web 12. A belt 54 connects the roller 53 with the lower one of a pair of auxiliary drive rollers 55 and 56, the latter rollers assuring positive feed of the paper web 12 into the passage between the anvils.

Means is provided for temporarily receiving the folded paper web on the side of the anvils 13 and 14 remote from the broken wheel 49 and consists in a trough 57 conveniently located and of a size to receive the folded paper web as it is received from the machine of the present invention.

It is to be understood that the position of the broken wheel 49 and the length of its segments may be adjusted to control the lengths of the paper web between folds. A belt 58 connects suitable pulleys 59 on the shaft 50

with a suitable pulley 60 on the shaft 26 for driving rotation of the latter.

In operation, the paper folding and creasing machine of the present invention is useful in folding lengths of paper such as blueprint paper and the like to the rigid standards prescribed by engineering departments of commercial and military establishments. The presser blocks 15 and 22 are so connected to the driven shafts 26 and 27, respectively, that upon completion of the downward movement and subsequent upward movement of the plungers adjacent to the anvil 13 and received within slots in the presser block 15, as shown in Figure 2, the block 22 moves toward the anvil 14 to crease the portion of the paper web which has been pushed downwardly into the space between the anvil 14 and the block 22. The subsequent upward and downward movement of the plunger 25 and the associated plungers leaves the paper web portion between the anvil 13 and the block 15, the movement of the latter into pressing engagement with the anvil 13 providing another crease in the paper web. The action is continuous and the paper web 12 is folded rapidly to a compact bundle of the required size.

What is claimed is:

1. In a paper folding and creasing machine, a frame, a pair of anvils arranged in superimposed spaced relation and fixedly supported in said frame, a first presser block positioned in tandem spaced relation with respect to the upper one of said anvils and connected to said frame for movement toward and away from said upper anvil, a first plunger means positioned between said upper anvil and said first block, a second presser block positioned in tandem spaced relation with respect to the lower one of said anvils and connected to said frame for movement toward and away from said lower anvil, a second plunger means positioned between said lower anvil and said second block, there being a space between said first and second blocks and forming with the space between said anvils a passage for the ejection therethrough of a web of paper to be folded and creased, a first driven shaft positioned above and spaced from said first plunger means, a second driven shaft positioned below and spaced from said second plunger means, means connecting said first and second driven shafts together, means connecting said first plunger means to said first driven shaft for up and down movement responsive to rotational movement of said first driven shaft, means connecting said second plunger means to said second driven shaft for up and down movement responsive to rotational movement of said second driven shaft, means connecting said second block to said second driven shaft for movement toward said second anvil upon completion of the upward movement of said first plunger means and connecting said first block to said first driven shaft for movement toward said first anvil upon completion of the downward movement of said second plunger means.

2. In a paper folding and creasing machine, a frame, a pair of anvils arranged in superimposed spaced relation and fixedly supported in said frame, a first presser block positioned in tandem spaced relation with respect to the upper one of said anvils and connected to said frame for movement toward and away from said upper anvil, a first plunger means positioned between said upper anvil and said first block, a second presser block positioned in tandem spaced relation with respect to the lower one of said anvils and connected to said frame for movement toward and away from said lower anvil, a second plunger means positioned between said lower anvil and said second block, there being a space between said first and second blocks and forming with the space between said anvils a passage for the ejection therethrough of a web of paper to be folded and creased, a first driven shaft positioned above and spaced from said first plunger means, a second driven shaft positioned below and spaced

from said second plunger means, means connecting said first and second driven shafts together, means connecting said first plunger means to said first driven shaft for up and down movement responsive to rotational movement of said first driven shaft, means connecting said second plunger means to said second driven shaft for up and down movement responsive to rotational movement of said second driven shaft, means connecting said second block to said second driven shaft for movement toward said second anvil upon completion of the upward movement of said first plunger means, means connecting said first block to said first driven shaft for movement toward said first anvil upon completion of the downward movement of said second plunger means, means on the side of said anvils remote from said blocks for intermittently feeding lengths of a paper web into said passage.

3. In a paper folding and creasing machine, a frame, a pair of anvils arranged in superimposed spaced relation and fixedly supported in said frame, a first presser block positioned in tandem spaced relation with respect to the upper one of said anvils and connected to said frame for movement toward and away from said upper anvil, a first plunger means positioned between said upper anvil and said first block, a second presser block positioned in tandem spaced relation with respect to the lower one of said anvils and connected to said frame for movement toward and away from said lower anvil, a second plunger means positioned between said lower anvil and said second block, there being a space between said first and second blocks and forming with the space between said anvils a passage for the ejection therethrough of a web of paper to be folded and creased, a first driven shaft positioned above and spaced from said first plunger means, a second driven shaft positioned below and spaced from said second plunger means, means connecting said first and second driven shafts together, means connecting said first plunger means to said first driven shaft for up and down movement responsive to rotational movement of said first driven shaft, means connecting said second plunger means to said second driven shaft for up and down movement responsive to rotational movement of said second driven shaft, means connecting said second block to said second driven shaft for movement toward said second anvil upon completion of the upward movement of said first plunger means, said last-named means embodying a bell crank mounted intermediate its ends on said frame for rocking movement about a horizontal axis, a link operatively connecting one end of said bell crank to said second block, a gear carrying a crank pin rotatably mounted on said frame adjacent said bell crank, another link connecting the other end of said bell crank to said crank pin, and a rotatable gear train mounted on said frame operatively connecting said gear to said second driven shaft, and means connecting said first block to said first driven shaft for movement toward said first anvil upon completion of the downward movement of said second plunger means, said last-named means comprising another bell crank mounted intermediate its ends on said frame for rocking movement about a horizontal axis, a link operatively connecting one end of said another bell crank to said first block, another gear carrying a crank pin rotatably mounted on said frame adjacent said another bell crank, another link connecting the other end of said another bell crank to said last-named crank pin, and another rotatable gear chain mounted on said frame operatively connecting said last-named gear to said first driven shaft.

References Cited in the file of this patent

UNITED STATES PATENTS

1,440,133	Christman	Dec. 26, 1922
1,625,566	Rosenthal	Apr. 19, 1927
1,637,550	Christman	Aug. 2, 1927

FOREIGN PATENTS

587,061	Great Britain	Apr. 11, 1947
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