May 25, 1971 L. A. MINTZ 3,580,794

STAMPING PRESS WITH LINEARLY APPLIED FORCE

Filed Oct. 7, 1968 4 Sheets-Sheet 1

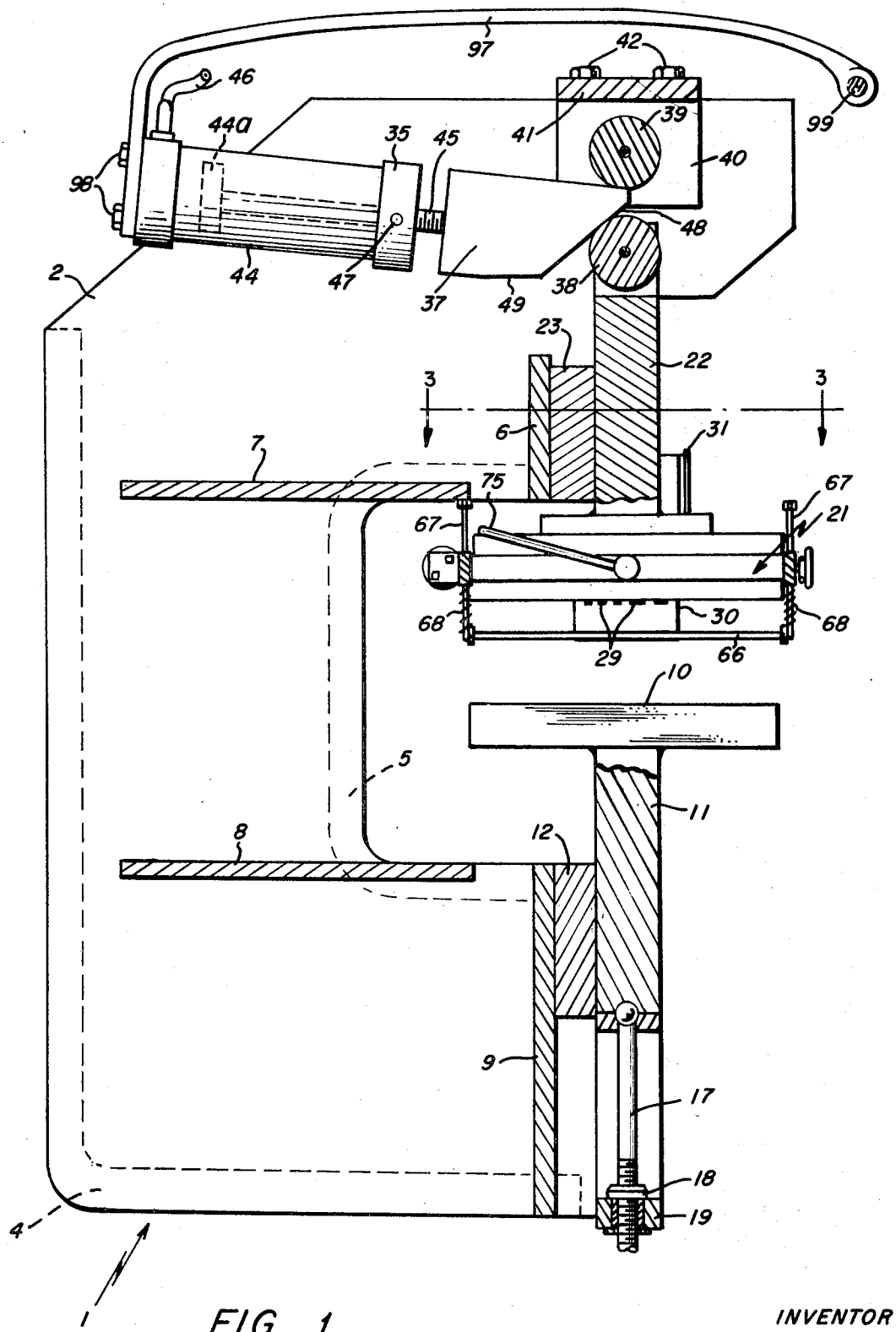

FIG. 1

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STAMPING PRESS WITH LINEARLY APPLIED FORCE

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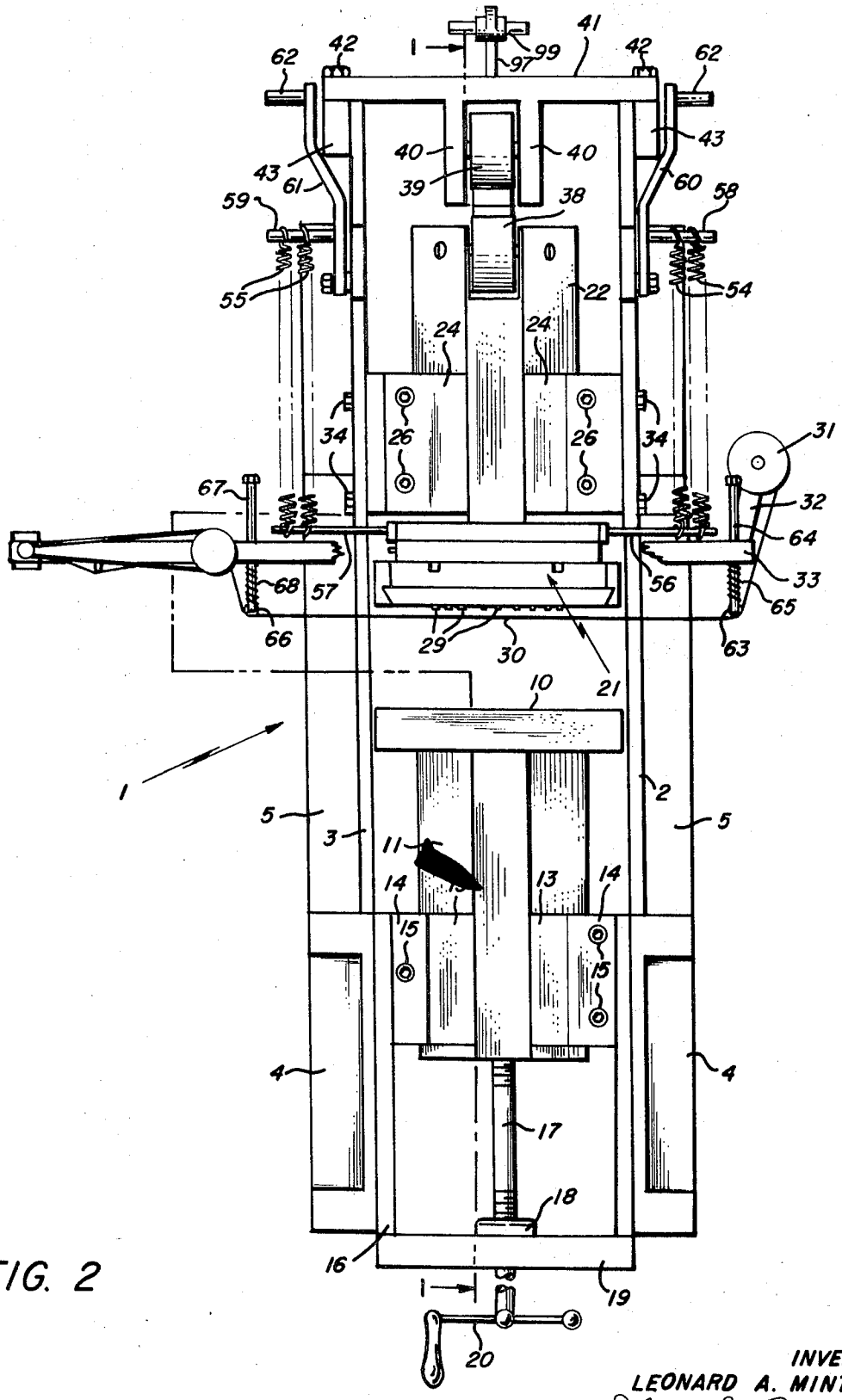

FIG. 2

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STAMPING PRESS WITH LINEARLY APPLIED FORCE

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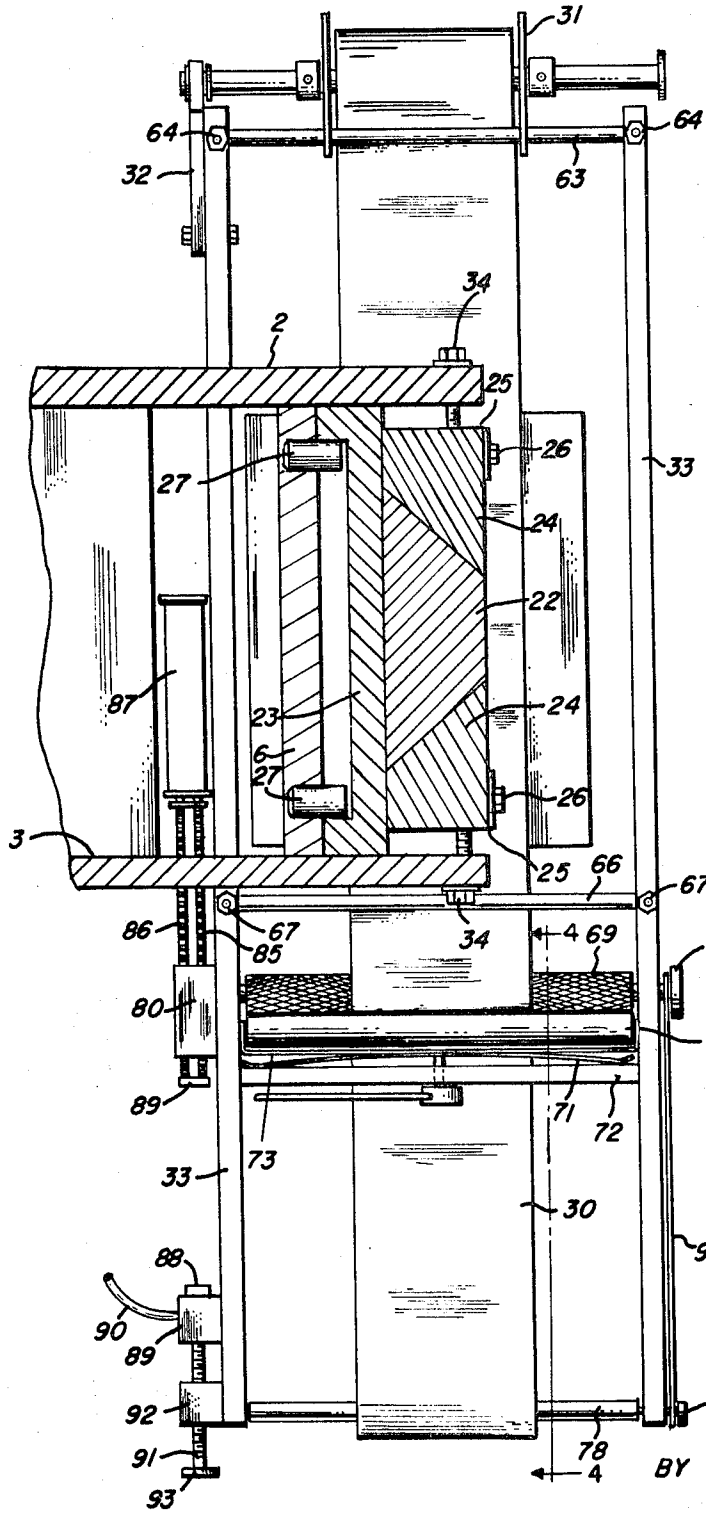

FIG. 3

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STAMPING PRESS WITH LINEARLY APPLIED FORCE

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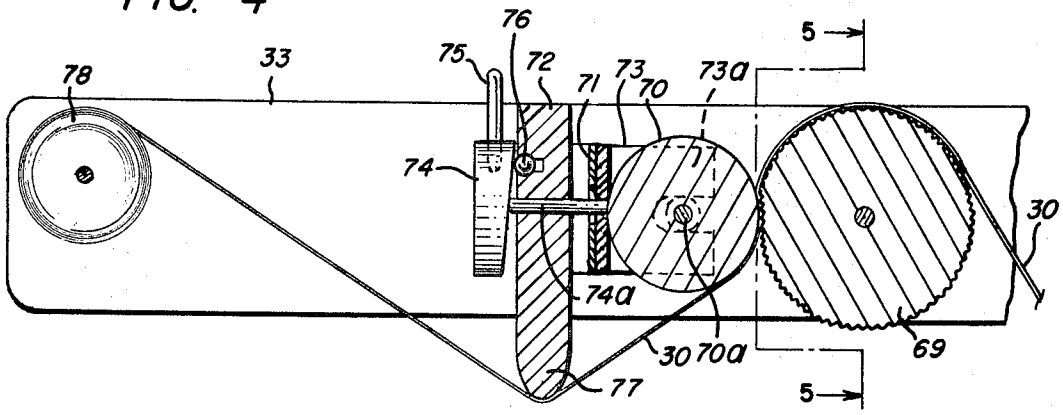
FIG. 4



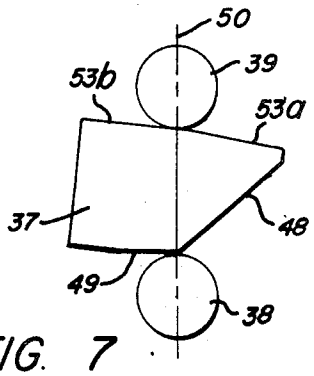


FIG. 7

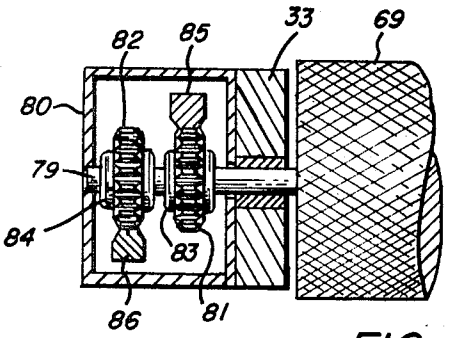


FIG. 5

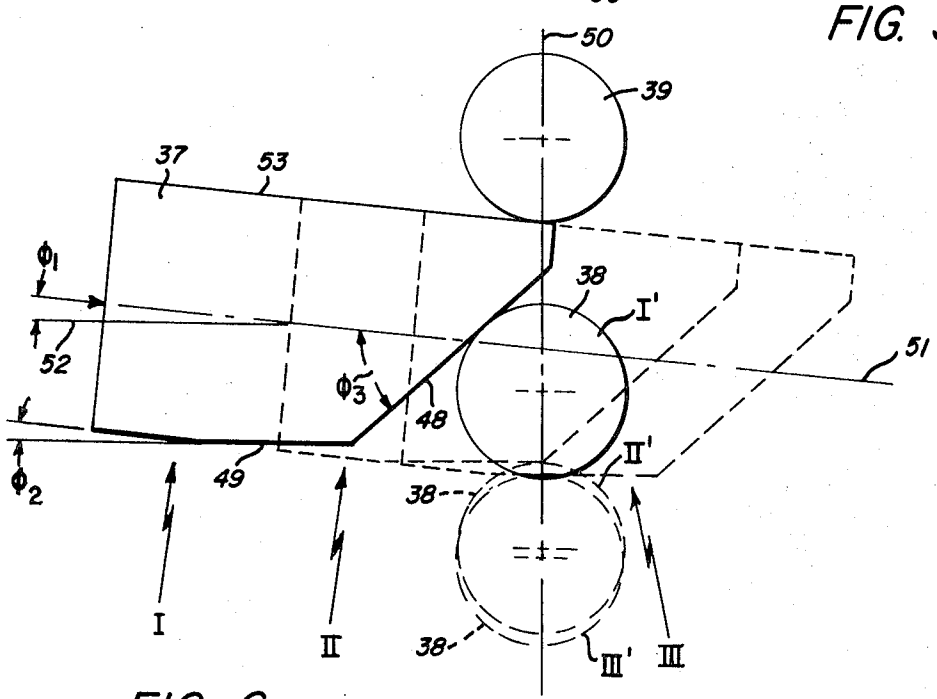


FIG. 6

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United States Patent Office 3,580,794 Patented May 25, 1971

3,580,794

STAMPING PRESS WITH LINEARLY APPLIED FORCE

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Filed Oct. 7, 1968, Ser. No. 765,557
Int. Cl. B30b 1/40, 15/20; B32b 31/20
U.S. Cl. 156—581 6 Claims

ABSTRACT OF THE DISCLOSURE

A stamping press having an air cylinder which transfers its force to a stamping head by means of a wedge forced by the air cylinder between a reaction roller and a ram driving the stamping head. During the approach stroke, one planar face of the wedge is at a substantial angle to the axis of the piston of said air cylinder, but during the pressure stroke another planar face of the wedge is disposed at a very small angle to the piston and it exerts its pressure substantially solely along the axis of travel of the stamping ram. The press also has a hand lever to rotate the air cylinder and wedge about an axis to permit hand operation of the ram. When used for roll leaf stamping a linear thrust drive is coupled to the roll leaf to advance it in the same direction upon both directions of motion of said thrust drive.

BACKGROUND OF THE INVENTION

High-powered stamping presses are used for various types of stamping processes. Particularly in those which are used in hot leaf stamping for marking and decorating, it is necessary to have a very close control of the force exerted by the stamping head at the surface of the article to be marked. Slight variations in such pressure have a markedly deleterious effect on the quality of the work. In machines of this kind where the pressure force required is of the order of tons, this force may be obtained from an air operated pressure cylinder. However, it would be inordinately expensive to employ a long stroke slow acting air cylinder to generate and impress its force directly onto the stamping head. Since the maximum pressure is required only within a very small distance at the end of the stamping stroke, the large amount of air used to actuate the cylinder during the major part of the stroke is wasted. The result is the use of inordinately large and expensive air compressors. As a result, most compressed air operated stamping presses use some kind of force multiplying linkage between the piston of the air cylinder and the ram driving the stamping head. Typical of such linkages have been knuckles or toggles. One difficulty with such linkages is that the amount of force exerted by the stamping head varies continually along its stroke. This is particularly deleterious at the point where the stamping surface contacts the surface of the work piece. Slight variations in the thickness of the work pieces, which are normally encountered, produce substantial variations in the stamping pressure. This in turn causes variations in the quality of the stamping produced, resulting in a substantial percentage of unacceptable work pieces. Attempts at meticulous adjustments in the air pressure controls and in the control of the sizes and supports of the work pieces are at best expensive and only partially effective. An additional difficulty in such prior

machines is that the force multiplying linkage exerts its force on the ram so that there is a substantial component of force exerted transverse to the direction of travel of the ram, in addition to the desired force exerted along such direction of travel. As a result, excessive wear is produced between the ram and the ways or gibs in which it travels. Such wear requires very frequent readjustments of the alignment of the machine in order to produce acceptable uniformity in the work product and also frequent and expensive replacements of worn rams and ways.

The present invention eliminates both of the above difficulties as well as creating additional advantages. It does so by a novel arrangement of a force multiplying transformation interposed between the piston of the air cylinder and the pressure ram providing two constant pressure ranges throughout the entire length of the stroke. During the final, or working portion of the stroke, the working pressure is exerted upon one end of the pressure ram solely in a direction along the path of travel of said ram, with no transverse component of force. During this working portion, the force multiplication factor between the force within the air cylinder and the force exerted on the work piece remains constant thus eliminating the problems in variations in work due to slight variations in the exact point in the travel of the ram at which stamping actually occurs.

SUMMARY OF THE INVENTION

This invention accomplishes the desired results described above by disposing the air cylinder so that its piston moves along a line which deviates from a right angle relationship with the direction of travel of the pressure ram by a very small angle, which may be of the order of 5°. That piston has mounted firmly at its outer end a wedge whch is forced, by the piston, between a stationary reaction roller and a roller mounted on one end of the pressure ram. The outer end of the wedge is provided with a planar wedge surface disposed at a substantial angle with respect to the direction of travel of the piston, so that such surface moves the ram carrying its stamping head rapidly towards the work with a constant pressure exerted on the ram. As the stamping head moves into the region of its pressing operation, a second planar surface on the wedge enters the space between the reaction roller and the ram roller. That second surface is disposed at the same angle with respect to the direction of travel of the piston as that existing between the direction of travel of the piston and perpendicular to the line of travel of said ram, which angle, as has been indicated above, may be of the order of 5°. The smallness of such angle produces a very large amplification of the force exerted by the air cylinder, but at the same time, the equality between the angles described above causes that amplified force to be exerted solely along the direction of the pressing stroke, and with substantially no lateral component. As indicated above, this arrangement results in an extraordinarily effective operation which eliminates the previous difficulties of undesirable variation in working pressures and excessive wear. This arrangement also permits the ram to be hand-operated by manually rotating the air cylinder together with the wedge about an axis transverse to the normal direction of motion of the piston.

In addition, when the invention is used in a roll leaf

stamping machine, it may be provided with a special pneumatic cylinder drive for a roll which advances the roll leaf through the machine. Such drive operates through a pair of gears coupled respectively to said roll through one-way clutches. These gears are driven by a pair of racks moved back and forth by its pneumatic cylinder and related to the gears so that the roll advances the roll leaf in the same direction for both parts of the stroke thus greatly reducing the necessary length of such stroke.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention may be best understood by referring to the annexed drawings in which:

FIG. 1 is a vertical cross-section of an embodiment of any novel machine, taken along line **1—1** of FIG. 2;

FIG. 2 is a front view of the machine shown in FIG. 1;

FIG. 3 is a transverse cross-section taken along line **3—3** of FIG. 1;

FIG. 4 is an enlarged fragmentary cross-section taken line **4—4** of FIG. 3;

FIG. 5 is a fragmentary cross-section taken along line **5—5** of FIG. 4;

FIG. 6 is a diagrammatic enlarged view showing successive positions of the force multiplying wedge as it moves between the reaction roller and the roller carried by the pressure ram; and

FIG. 7 is a smaller diagrammatic view of another embodiment of the wedge.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The embodiment of my invention as shown in the drawing is constructed with a main frame **1** made up of two generally C shaped side plates **2** and **3**. Each of these plates are stiffened and reinforced by a rib **4** welded along the rear and bottom edges of the plates and by a rib **5** welded along the edges of the plate at its C shaped opening. The two plates **2** and **3** are joined together to form the main frame **1** by means of transverse plates **6**, **7**, **8** and **9**, each welded to both plates **2** and **3**.

In order to support the work to be stamped, the machine is provided with a work table **10** carried at the upper end of a dovetail shaped ram **11** which is slidably mounted between a bearing plate **12**, fastened to the transverse plate **9**, and a pair of gibs **13** held in place by a pair of brackets **14** which are secured by bolts **15** which are threaded into the bearing plate **12**. The gibs **13** are located between the side arms of a U-shaped frame **16** mounted at the lower front portion of the main frame **1**. The work table **10** may be raised and lowered to any desired position by means of an elongated screw **17** rotatably fastened to the lower end of ram **11** and threaded through a threaded bushing **18** secured in the transverse portion **19** of the U-shaped frame **16**. The screw **17** may be rotated by a handle **20** fastened to its lower end.

This embodiment is adapted to stamp letters, characters or other design in metallic or pigmented foil upon workpieces supported on the work table **10**. Such stamping operation is performed by a stamping head **21** carried on the lower end of an upper dove-tail ram **22** which is slidably mounted between a bearing plate **23**, supported on the transverse plate **6**, and a pair of gibs **24** held in place by bolts **26** which pass through the gibs **24** and the bearing plate **23** and are threaded into the transverse plate **6**. The bearing plate **23** is held in the proper position by a pair of dowels **27** press-fitted into the plate **6**. These dowels project into a transverse slot **25** which extends across a major portion of bearing plate **23** and thus retain said plate in position. Fine adjustments in the positioning of the gibs **24** are provided by adjusting bolts **34**, threaded through side plates **2** and **3** and bearing on the outside faces of the gibs **24**.

The stamping head **21** is heated in any well-known manner to heat a stamping die **29** of any desired configuration and carried by said stamping head **21**. Below the die **29** is mounted a strip of stamping leaf **30**, which may be any well-known type such as a plastic strip coated on its lower surface with a metallic foil which is to be impressed on the work by the heated die. The strip of stamping leaf **30** is supplied from a roll **31** carried by a bracket **32** mounted on a frame **33** preferably mounted on and carried by the stamping head **21**. As the strip **30** comes off the roll **31** it passes under a pair of spring-tensioned rollers **63** and **66**, also carried by the frame **33** and is pulled through the machine by means of a pair of foil feed rollers **69** and **70**, the construction and action of which will be described in more detail later.

The ram **22** is power operated by means of a wedge **37** forced between a roller **38** mounted on the upper end of ram **22** and a reaction roller **39**, rotatably mounted between a pair of arms **40** depending from a crossbar **41** bolted firmly in place by bolts **42** on lugs **43** formed on the upper ends of side plates **2** and **3**. The wedge **37** is power activated by a pneumatic cylinder **44** whose internal piston **44***a* is connected to a thrust rod **45** fastened to the wedge **37**. Compressed air at high pressure is supplied to the cylinder **44** through a high pressure hose **46** from a controlled source of compressed air (not shown) by any of the well-known mechanisms commonly used in the art of roll leaf stamping machines. The cylinder **44** in combination with the wedge **37** is pivotally mounted by means of a sturdy pivot bar **47** on each side of the head **35** of the cylinder **44**, which bars **47** are carried by and journalled in side plates **2** and **3**.

The pivot bars **47** are located at such a location on side plate **2** and **3** so that the axis of the cylinder **44**, which determines the direction of motion of the thrust rod **45**, forms a small angle, which may be of the order of a few degrees (e.g. five degrees), with the horizontal. In addition to a top operating face **53**, the wedge **37** is provided with two operating faces **48** and **49**. The upper operating face **48** is located at a substantial angle with respect to the axis of the cylinder **44** (e.g. about 45°). With a 45° disposition of the face **48**, the pressure applied vertically to the roller **38** is substantially equal to the pressure applied by the cylinder **44**. While the roller **38** rides along the face **48**, there is a component of pressure which is exerted horizontally against that roller as well as in the vertical direction. However, this is the approach portion of the stroke and the die **29** is not permitted to contact the work on the table **10** until the roller has passed from the face **48** to the face **49**. Since during the approach portion of the stroke the air pressure in cylinder **44** does not build up to full value, such horizontal or transverse pressure on the roller **38**, and therefore on the ram **22**, is not sufficient to cause any deleterious transverse flexing or wear on the ram structure. By selecting any desired value for the angular disposition of the face **48**, the length of the approach stroke as compared with the distance of travel of the piston in the cylinder **44** can be, within relatively wide limits, of any desired value. The stamping head **21** is biased in an upward direction in any desired manner, preferably by means of two pairs of springs **54** and **55**. The lower end of each of springs **55** is secured to a rod **57** carried by and projecting from the opposite side of head **21**. The upper ends of springs **54** and **55** are secured respectively to a pair of rods **58** and **59** carried by and projecting from a pair of levers **60** and **61** pivoted at their lower ends respectively in side plates **2** and **3**. Each of the levers **60** and **61** is provided with a handle **62** so that the levers **60** and **61** may be manually rotated from the upper position shown in FIG. 2 to a lowered position in which the tensions on the springs **54** and **55** are released and the stamping head **21** may be moved manually in setting up the work on the table **10** to produce the proper alignment between the work and the stamping die **29**. When the levers **60** and **61** are returned to their upper position, tension is restored to springs **54** and **55** and the head **21** carrying the ram **22** with its roller **38** are moved

upward until the roller **38** contacts the forward end of the wedge **37** along the face **48**.

The relationships between the wedge **37** and the rollers **38** and **39** may be better understood by referring to FIG. 6 which shows the wedge moving from an initial position I to successive positions II and III, while the roller **38** moves to corresponding positions I', II' and III'. With the ram **22** mounted to move along a vertical path, as shown in the drawings, the centers of the rollers **38** and **39** are located along a vertical center line **50**. The direction in which the thrust rod **45** moves the wedge **37** is along the line **51** which forms a small angle ϕ_1 with the horizontal **52**. The upper planar surface **53** of the wedge **37** may be parallel (but not necessarily so) to the line **51**, while the face **49** is located along the horizontal. Thus the face **49** forms a small angle ϕ_2 with the direction of travel of the wedge **37** and that small angle is substantially equal to ϕ_1. As previously indicated, this small angle is preferably only a few degrees, e.g. 5°. The size of the angles ϕ_1 and ϕ_2 is determined by the amount of pressure multiplication desired between the pressure exerted by thrust rod **45** and the pressurse to be exerted between the stamping head **21** and the work on table **10**. The greater the desired multiplication, the smaller will be ϕ_1 and ϕ_2 while the smaller the desired multiplication, the larger will be ϕ_1 and ϕ_2. The face **48** is disposed at any desired angle ϕ_3 with respect to the direction of travel **51** of the wedge **37** and, as previously indicated, may be of the order of 45°. The size of angle ϕ_3 is determined by the degree of motion multiplication desired between the motion of the thrust rod **45** and the motion of the ram **22**. The larger the desired movement of the ram **22** with respect to the movement of the thrust rod **45**, the larger will be ϕ_3. The smaller the desired ratio between these two movements, the smaller will be ϕ_3. For a value of ϕ_3 of 45°, when thrust rod **45** moves one unit of distance, the roller **38** and thus the ram **22** will also move one unit of distance. Instead of the plane of surface **53** being parallel to the line **52**, it could be disposed at an angle with respect thereto, as long as that angle is not equal to ϕ_1 during the portion of the stroke in which surface **49** rides on roller **38**, in which case surface **53** would be parallel to surface **49** and no vertical motion of roller **38** would occur as surface **49** moves across said roller. However, the preferred disposition of surface **53** during said portion of the stroke is parallel to the line **51**. Also, as indicated in FIG. 7, the surface **53** could be divided into two planar surfaces **53***a* and **53***b* which join each other at the point where the roller **38** moves from surface **48** to surface **49**, thus providing two planar surfaces corresponding to surfaces **48** and **49** respectively. The angular disposition of the plane of **53***a*, corresponding to surface **48**, could be virtually any desired value. However, as stated above, the preferred embodiment is a single plane for surface **53** lying parallel to line **51**.

As the wedge **37** moves from position I to position II and the roller **38** moves correspondingly from position I' to position II', we see that a relatively large travel is imparted to roller **38**. During this travel one component of pressure is exerted on roller **38** downward along the vertical direction **50** and a substantially equal component of force is exerted transversely on the roller **38** in a horizontal direction. With the 45° relationship, this vertical pressure is substantially equal to the pressure exerted by the thrust rod **45**. However, during this portion of the stroke of the ram **22**, which is the portion during which the stamping head **21** carrying the die **29** approaches, but does not contact the work, there is only a comparatively small amount of pressure exerted on the roller **38** sufficient merely to move the ram **22** and its associated structure downwardly against the tensions of the springs **54** and **55**. Therefore, the fact that a correspondingly small transverse pressure is exerted against the roller **38** does no harm.

Just before the work is contacted, the roller **38** moves off face **48** and moves onto face **49**. The wedge **37** now moves to position III and the roller **38** moves to its corresponding position III' where it is stopped by the fact that the die **29** has contacted the work preventing further downward movement of the roller **38**. It should be noted that, due to the angular relationships described, the face **49** moves substantially solely in a vertical direction throughout the time it is in contact with roller **38**. Therefore, its pressure is exerted against the roller **38** substantially solely in a vertical direction so that there is virtually no transverse component of pressure exerted against the roller **38**. The pressure exerted during this operation is quite large. For example, using a 3½ inch bore for the cylinder **44** with an air pressure of 100 p.s.i. and with the 5° disposition of angle ϕ_1, the pressure exerted vertically by the ram on the work is 10,000 pounds. Using a 4½ inch bore cylinder and with the same air pressure, somewhat in excess of 7½ tons will be applied to the work by the ram. It will be recognized that with pressures of such magnitudes, any substantial component of the pressure which is exerted transversely against the roller **38** will exert a large bending force on the ram **22** tending to make it bind in its gibs and producing large amounts of wear between the ram and its gibs. Such bending force also tends to produce misalignments between the stamping head and the works resulting in undesirably nonuniform stamping results. The translations of the pressures exerted by the cylinder **44** through the wedge **37** necessarily result in a transverse component of pressure. However, that is absorbed substantially entirely by the reaction roller **39**. Any bending, twisting or wear in the structure associated with roller **39** has virtually no effect on the operation. The position of the roller **39** is not at all critical and its shaft and associated bearing surfaces can undergo large amounts of wear without adverse effects on the operation. Also, it is very easy and inexpensive to replace the roller **39** as compared with any replacement of the structure of the ram **22**.

Due to the planar relationships described, the multiplication between the pressure exerted by the thrust rod **45** and the pressure exerted upon the work is due solely to the magnitude of the angle ϕ_1 and not upon the position of the head along its direction of travel, as occurs in prior machines of this general kind. Therefore, it makes little, if any, difference on the resulting work at what point the die **29** actually contacts the work. Thus, variations in the thickness of the work or in the level at which it is supported do not alter the stamping pressure. The result is that such variations, which are intolerable in such other machines, are easily and adequately handled by the present machine with excellent results.

The die **29** exerts its pressure upon the work through the stamping leaf **30** which is interposed between the die **29** and the work. The stamping stroke transfers some of the metallic foil from the leaf **30** and therefore, between each stamping stroke, the leaf **30** must be advanced through the machine so as to present a fresh strip beneath the die **29** for the subsequent stamping stroke.

As the leaf **30** comes off the roll **31** it passes under a roller **63**, the ends of which are journalled in the ends of a pair of spring pressed rods **64**, only one of which can be seen in FIG. 2, each of which is mounted in a hole in frame **33** and biased downwardly by a spring **65**. The leaf **30** continues beneath the die **29** and under a second roller **66**, the ends of which are journalled in the ends of a pair of spring pressed rods **67** (both of which can be seen in FIG. 1). Each of the rods **67** is mounted in a hole in frame **33** and biased downwardly by a spring **68**. The purpose of the roller **63** and **66** is to strip the leaf **30** from the die **29** and to hold the leaf away from contact with the die **29** as the leaf is pulled through the machine and to permit the die **29** to contact the leaf only during the actual stamping operation.

As the leaf **30** leaves the roller **66**, it passes over the upper surface of a knurled feed roller **69** (shown in FIG. 4) and then between the roller **69** and a spring biased roller **70**, which may be of a suitable yielding material such as rubber. The roller **70** is biased toward the roller **69** by means of a leaf spring **71** carried by a bar **72** mounted transversely across the frame **33**. The bias leaf **71** is urged against a U-shaped member **73** having bifurcated end arms **73***a* which bear against the ends of the shaft **70***a* of the roller **70**. A cam **74** is rotatably mounted in bar **72** by means of a shaft **74***a*, the outer end of which passes through an opening in the leaf spring **71** and is secured to the U-shaped member **73**. The cam **74** bears against the outer end of a bearing pin **76** set into the bar **72**. The cam **74** may be manually rotated by an arm **75** (see FIG. 1). When the cam is in the position with its high point adjacent the pin **76**, the shaft **74***a* pulls the member **73** away from the shaft **70***a* thus relieving the roller **70** from the bias of the spring **71**. When the cam **74** is rotated so that its low point is adjacent the pin **76**, the spring **71** pushes the member **73** against the ends of shaft **70***a* and thus pushes the roller **70** towards the roller **69** so that the foil **30** is held firmly between the two rollers **69** and **70** and as roller **69** is turned it pulls the foil through the machine. Sufficient play is provided between the shaft **70***a* and the frame **33** to permit such biasing action.

The bar **72** is extended below the frame **33** to provide a rounded guiding edge **77** over which the leaf **30** passes to a take-up roll **78** journalled in the frame **33**.

The feed roller **69** is driven by a gearing mechanism shown most clearly in FIG. 5. One end of the shaft **79** of the roller **69** is journalled in and passes through a wall of the frame **33** into a gear box **80**. The shaft **79** carries two gears **81** and **82** mounted on the shaft by means of one-way clutches **83** and **84** of any well-known type. A drive rack **85** engages the top of gear **81** and a drive rack **86** engages the lower side of gear **82**. The directions of transmission of the clutches are such that as the rack **85** moves in a direction out of the plane of FIG. 5 it drives clutch **83** to rotate the roller **69** to feed the leaf **30** through the machine, and as the rack **86** moves back into the plane of FIG. 5 it drives clutch **84** to continue the rotation of the roller **69** to feed the leaf **30** through the machine. The racks **85** and **86** are reciprocated in unison by a pneumatic drive cylinder **87** mounted on the back of frame **33** between the side plates **2** and **3**. Due to the unidirectional gearing arrangement, the length of the drive cylinder **87** need only be one-half of the length of cylinders of this kind which have been required in prior machines of this nature.

The amount by which the leaf **30** is pulled through the machine between each stamping stroke may be adjusted by the position of an adjustable stop **88** which is adapted to be contacted by a bar **89** mounted on the ends of racks **85** and **86** as they emerge from gear box **80**. The stop **88** activates a pneumatic control valve **89** which is mounted by a conduit **90** to any well-known type of pneumatic control which reverses the direction of actuation of the cylinder **87**. Therefore, the cylinder **87** moves the racks **85** and **86** in one direction until bar **89** activates valve **89** and then it reverses its direction to reverse the direction of motion of the racks, but not of the roller **69**. The position of the valve **89** carrying the stop **88** may be adjusted by a screw **91** threaded through a block **92** mounted on the frame **33**. The screw **90** carries a knurled head **93** so that it may be turned to its desired position of adjustment.

The take-up roll **78** is driven by a pulley **94** engaged by a belt **95** which in turn is driven by a pulley **96** mounted on the shaft of drive roller **69**.

Instead of releasing the tensions of the springs **54** and **55** by lowering the levers **60** and **61** in order to move the ram **22** for setting up the work, the machine may be provided with an elongated lever **97** bolted at its rear end to the back of cylinder **44** by means of bolts **98**. The forward

end of the lever **96** is formed into a handle **99** and extends over the top front of the main frame **1** in a position which is readily accessible to the operation. By grasping the handle **99** and drawing it downward, the associated structure is rotated about the pivot bars **47** and the forward end of wedge **37** pushes the roller **38** and its ram **22** downward toward the surface of the work table **10** against the tension of the springs **54**. For many purposes such operation is more rapid and more convenient.

It is to be understod that the machine is provided with the proper controls for supplying and regulating compressed air to the cylinders **44** and **87** in proper sequence and for supplying and regulating heating current to a heating element within the stamping head **21**. However, since such details of such controls are standard and form no part of this invention, they are not shown or described herein, inasmuch as their nature and arrangement will be apparent to persons skilled in the art of hot leaf stamping machines.

Although this invention has been described in connection with a hot leaf stamping machine, it is to be understood that the principles of this invention may be applied to any kind of stamping or pressing machine in which it would be desirable to have the pressure on the work independent of the position of the working head and to have the stamping or pressing mechanism free of transverse pressure during the power portion of the stroke. Other applications of the principles of this invention and of variations in its details will be apparent to those skilled in the art to which it pertains. Therefore, the scope of the invention is defined as set forth in the annexed claims.

What is claimed is:

1. A stamping machine comprising:
- a stamping head adapted to exert stamping pressure upon a work piece;
- a ram carrying said head and mounted to reciprocate along a first linear path within a supporting structure;
- a wedge member provided with surfaces adapted to be forced between a reaction member, carried by said structure, and an end of said ram opposite said stamping head;
- power means for driving said wedge along a second linear path disposed at a substantially fixed, relatively small angle with respect to a perpendicular to said first linear path;
- said wedge member being inflexibly attached to said power means in relation to said second linear path;
- the surface of said wedge member, which contacts said reaction member during the final portion of the stamping stroke, comprising a plane;
- the surface of said wedge member, which contacts said ram during said final portion of the stamping stroke, comprising a plane disposed substantially perpendicular to said first linear path.

2. A stamping machine according to claim **1** in which the surface of said wedge member, which contacts the ram during the initial portion of the stamping stroke, comprises a plane disposed at a substantially greater angle with respect to said perpendicular than said relatively small angle.

3. A stamping machine according to claim **1** in which the power means comprises a pneumatic cylinder having an internal piston inflexibly connected to said wedge member.

4. A stamping machine according to claim **3** in which said power means is supported in said supporting structure solely by being pivoted to said supporting structure about a pivot axis which is transverse to the direction of travel of said piston, in which there is provided a work table adapted to support the work, and in which said stamping head is biased away from said work table and a manually operable lever is secured to said cylinder at a point removed from said pivot axis, whereby the stamping head may be moved manually toward and away from said work table.

5. A stamping machine according to claim 1 in which said reaction member is inflexibly attached to said supporting structure.

6. A hot leaf stamping machine which includes:

a stamping head adapted to exert stamping pressure upon a work piece and adapted to carry a heated stamping die;

a strip of stamping leaf adapted to be supported between said die and said work piece;

means for advancing said strip through said machine comprising a pair of cooperating feed rollers;

and means for driving one of said rollers comprising a pneumatic cylinder connected to a pair of rack members engaging opposite sides of a pair of gears respectively, said cylinder being adapted to drive said racks in a linear reciprocating motion, said gears being mounted through one-way clutches to a driving shaft on said one of said feed rollers, said clutches

being oriented to cause said latter feed roller to be driven in the same direction for both directions of travel of said racks.

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