June 26, 1934.

M. H. BALLARD

1,964,024

PRESSER MEMBER

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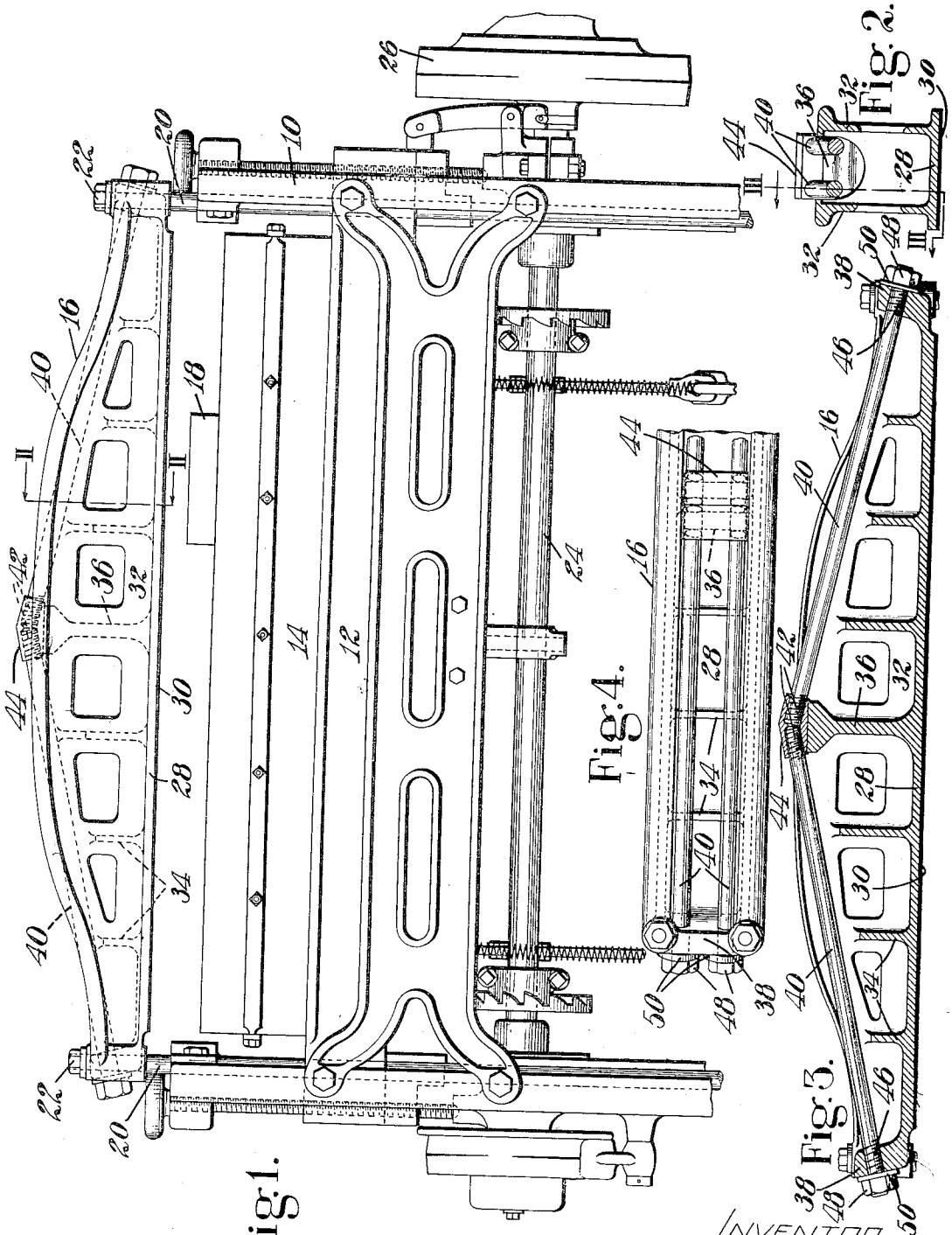


Fig. 1.



Fig. 2.



Fig. 4.



Fig. 3.

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## PRESSER MEMBER

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Application January 17, 1930, Serial No. 421,576

5 Claims. (Cl. 164—23)

This invention relates to presser members for use in presses for cutting blanks from sheet material such as leather or canvas and is herein illustrated as embodied in a sole-cutting machine of the type disclosed in United States Letters Patent No. 1,194,379, granted August 15, 1916 upon an application filed in the name of J. Gouldbourn and A. Bates.

Presses of the type referred to as heretofore constructed comprise a presser member or beam which is reciprocated toward and away from a cutting block in applying pressure to a cutting die positioned upon sheet material carried by the block. In machines of this kind which are used for cutting blanks from sole leather or for cutting blanks from a plurality of layers of canvas, the presser member or beam which is usually made of cast-iron has a large cross-section in order to withstand the great strains to which the beam is subjected and is consequently comparatively heavy.

It is an object of my invention to improve machines of the type referred to by providing a novel presser member or beam which, while retaining the advantages of beams as heretofore constructed, will be comparatively light in weight but at the same time will have sufficient strength to withstand the hard usage to which it may be put. To this end and as illustrated, the beam comprises a striking portion and a strut extending therefrom to which are connected steel reinforcing members which extend from the strut to the ends of the beam. The reinforcing members are placed under tension, thereby imparting an initial strain in the striking portion of the beam so that the striking portion is deflected in a directon opposed to the direction of application of the load. As a result of this, in the operation of the press the stresses assumed by the beam in forcing a die through the material will be transmitted to the reinforcing members which will take up the greater part of the stress which would otherwise be taken by the beam itself. By means of this construction, comprising reinforcing members which are capable of withstanding great tension, it is possible to utilize a beam of a cross-section of considerably smaller area than would otherwise be the case. The weight of the beam can be still further reduced as in the present instance, by utilizing a light metal such as an aluminum alloy in place of cast-iron as the material for the beam.

The advantages of a light beam constructed as above set forth are numerous. For example, in cutting blanks from sheets of material it is common practice for an operator to manipulate the starting mechanism of the press in such a way that the beam is reciprocated toward and away from the cutting block with great rapidity, the operator moving the die laterally over the material between successive reciprocations of the beam. However, where heavy beams are used it is common to find that as the operator advances the die across the material the speed of reciprocation of the beam is decreased owing to the fact that the energy stored up in the fly-wheel is decreased to such an extent that the beam is slowed down after a number of operations in rapid succession. However, with the construction provided by the present invention the beam is sufficiently light so that the energy required for reciprocating it in producing a rapid succession of pressure applications for forcing dies through the material to produce blanks will be sufficiently small that there is no appreciable slowing up of the beam in cutting the heaviest material. This results in a more rapid production of blanks and consequent increase in the efficiency of the machine. Furthermore, the speed of downward movement of the beam will enable the operator to cut blanks from a pile of layers of fabric such as canvas without producing slanting cuts in the lower layers of the pile as has heretofore been common. The reason for this is that the more rapid forcing of the die through the material will avoid the deformation of the die as it reaches the lower layers of the pile.

The reduced weight of the beam further makes it possible more readily to handle the beam in assembling it in the machine, and considerably reduces the amount of vibration during its operation.

Other objects and features of the invention will appear from the following detailed description and claims when taken in connection with the accompanying drawing, in which

Fig. 1 illustrates the upper portion of a press embodying a reinforced beam constructed according to the invention;

Fig. 2 shows a transverse cross-section of the beam along section II—II of Fig. 1;

Fig. 3 shows a longitudinal, vertical, cross-sectional view of the beam along section III—III of Fig. 2, showing the reinforcing members in position; and

Fig. 4 is a plan view of a portion of the beam showing the arrangement of the reinforcing rods.

As illustrated in Fig. 1, the sole-cutting ma-

chine comprises a frame 10 having a bed 12 supporting a cutting block 14, and a beam 16 which is arranged for reciprocation toward and away from the cutting block in producing pressure-applying operations upon a die such as die 18. For supporting and reciprocating the beam 16 there are provided four vertical standards 20 slidably mounted in the frame and rigidly secured to the beam at its corners by nuts 22. The standards at opposite ends of the beam have their lower ends connected by means of yokes and eccentrics (not shown) to a shaft 24 arranged to be driven by a fly-wheel 26 upon operation of a treadle (not shown). For further details of construction and operation of the parts thus far described reference may be had to the aforementioned Letters Patent No. 1,194,379.

The beam 16, best shown in Fig. 3, consists in a hollow casting preferably composed of aluminum alloy and having a striking portion comprising a plate 28 which has a flat striking surface 30 disposed toward and parallel to the bed 12. Extending upwardly from the plate 28 are side plates 32 which are connected by reinforcing webs 34. Located at the central portion of the beam casting is a strut 36 extending transversely of the casting and upwardly from the plate 28. The ends of the beam are turned upwardly to form flanges 38 also extending transversely of the beam.

In order to distribute the stresses caused by application of a load to the beam, reinforcing members are provided which co-operate with the strut 36 and flanges 38 to transfer to the ends of the beam stresses applied to the striking surface 30, particularly at the central portions thereof. As shown, these reinforcing members comprise rods 40, Figs. 2, 3, and 4, preferably composed of steel having high tensile strength, which extend from the flanges 38 inwardly to the strut 36. The inner ends 42 of the rods 40 are screw-threaded into a steel cap 44 which loosely rests upon the strut 36. The outer ends 46 of the rods 40 pass through the flanges 38 and are secured in position by nuts 48 and washers 50. The cap 44 being slidable upon the strut 36 provides for the adjustment of the rods longitudinally of the beam in securing the rods in position. In assembling the reinforcing rods 40 on the beam the nuts 48 are taken up to place the rods under considerable tension with the result that the rods acting through the cap 44 exert pressure upon the strut 36, and consequently the striking portion 28 of the beam is deflected downwardly at the central portions thereof. This is for the purpose of placing the beam in condition better to withstand the forces due to applications of a load acting upwardly against the striking surface 30.

In the operation of the machine a die, such as die 18, is placed upon one or more layers of sheet material located upon the cutting block 14, and through the operation of a treadle (not shown) the beam 16 is caused to reciprocate toward and away from the cutting block in a pressure-applying operation which results in the forcing of the die through the material to form a blank or blanks.

In this operation the standards 20 acting at the ends of the beam tend to pull the beam downwardly against a load, which acts between the ends of the beam and results from the resistance encountered by the die in passing through the material and upper surface portions of the cutting block. The load tends to deflect the striking portion 28 of the beam upwardly and consequently to return the striking portion to its normal position, thereby relieving the strain which was applied to the beam initially. Stresses which are transmitted from the striking portion through the strut 36 and cap 44 tend to force the rods 40 upwardly against the components of the forces in standards 20 which tend to pull the outer ends of the rods downwardly. This action operates to spread apart the outer ends of the rods, placing them under greater tension. Thus, part of the load is taken up by the reinforcing rods without increasing the bending stresses in the remainder of the beam. As the load increases, the striking portion of the beam is deflected upwardly and the increased stresses are taken up partly by the material of the beam casting and partly by the reinforcing rods 40 which are placed under still greater tension.

The employment of reinforcing members constructed and arranged as above set forth thus makes it possible to make use of a beam casting of a cross-section of considerably smaller area than would otherwise be practical. If desired, the beam may be still further lightened by using a comparatively light metal, such as aluminum alloy. The decrease in the amount of metal in the beam can thus be effected without sacrificing ruggedness of construction and ability to withstand the great stresses to which such beams are subjected.

Typical examples of alloys suitable for use as material for beam castings of the kind illustrated herein are indicated by the following approximate formulæ:—

(*a*) 94% aluminum; 4% copper; 1% nickel; 5% manganese; and .5% magnesium.

(*b*) 89.05% aluminum; 7% zinc; 2.75% copper; 1.2% iron.

The use of a light metal, such as an aluminum alloy composed according to one of the formulæ above referred to, makes it possible to reduce considerably the weight of beams for presses. For example, a nine-foot beam of the shape of that illustrated herein would weigh approximately 1300 lbs. if it were composed of cast-iron, whereas a corresponding aluminum alloy beam would weigh approximately 800 lbs.

An advantage resulting from use of a cutting machine equipped with the reinforced light metal beam herein described as compared with the same machine equipped with a cast-iron beam is that the machine in the former case can be operated at higher speed under the same power. As a result of this, the beam thereof can be utilized to produce a succession of pressure-applying operations upon a die which is moved with great rapidity across the surface of the material being operated upon, the beam being sufficiently light that the energy stored up in the fly-wheel is not reduced to the point where the reciprocations of the beam will be appreciably slowed up after a number of pressure-applying operations.

The increased rapidity of reciprocation of the beam is particularly advantageous in cutting sheet material comprising several plies of fabric such as canvas for the reason that the rapid forcing of the die through the material will insure the cutting of blanks of uniform size, the die being forced through the material before its cutting edges can be forced inwardly which would result in the blanks cut from the bottom of the pile being smaller in size than those cut from the top of the pile.

Having described my invention, what I claim as new and desire to secure by Letter Patent of the United States is:

1. A beam for die presses comprising a casting having a normally flat striking portion, and means extending freely from the central portion of the casting to the ends thereof for placing the striking portion under an initial strain.

2. A beam for die presses comprising a casting having a flat striking portion and a strut extending from the striking portion centrally thereof, and a plurality of members forming connections between the ends of the casting and the strut for imparting an initial strain to the striking portion of the beam.

3. A beam for die presses comprising a casting having a normally flat striking portion, the ends of the casting being provided with flanges extending at an angle to said striking portion, a strut extending transversely of the casting at the central portion thereof, and members extending between the strut and the flanges to reinforce the casting.

4. A beam for die presses comprising a casting having a striking portion and rigid strut positioned centrally thereof, a cap loosely mounted upon the strut, and a plurality of members extending from the cap to the ends of the casting constructed and arranged to place the striking portion of the casting under an initial strain.

5. A beam for die presses comprising a casting composed of an alloy containing a high percentage of aluminum and having a striking portion and a strut extending from the central part of the striking portion, and steel members extending from the strut to the ends of the striking portion for reinforcing the casting and for imparting an initial strain to the striking portion of the casting.

MILTON H. BALLARD.

CERTIFICATE OF CORRECTION.

June 26, 1934.

Patent No. 1,964,024.

MILTON H. BALLARD.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 10, claim 2, before "strut" insert the word rigid; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 11th day of September, A. D. 1934.

Leslie Frazer

Acting Commissioner of Patents.

(Seal)