May 1, 1951 C. F. PYE 2,550,937

PUNCHING TOOL

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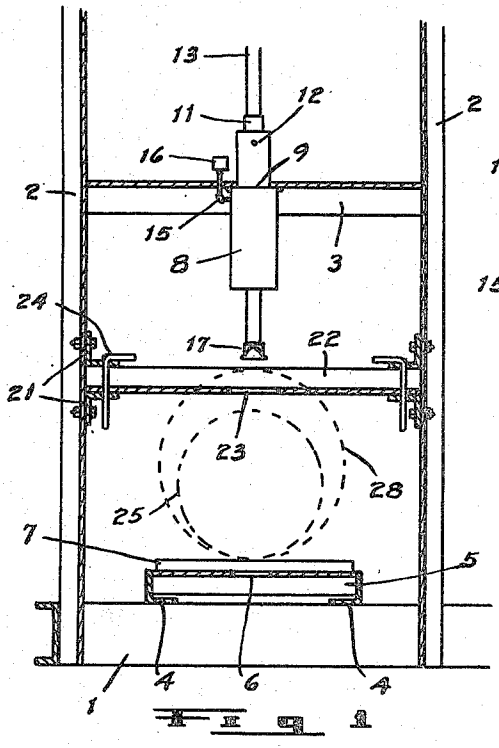


Fig. 1

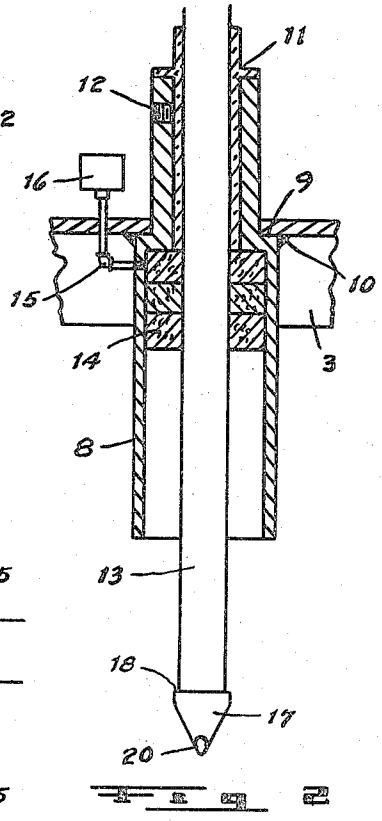


Fig. 2

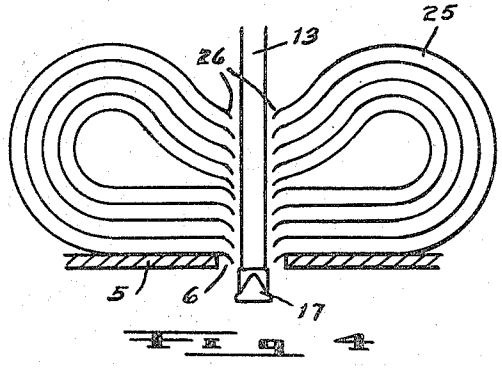


Fig. 4

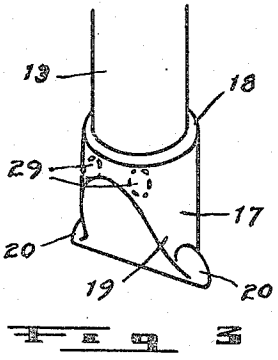


Fig. 3

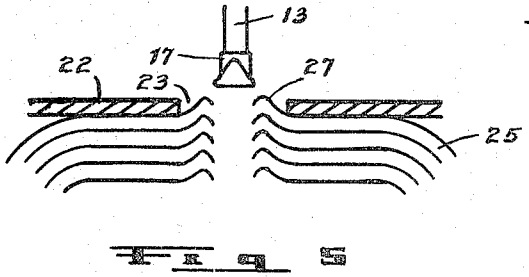


Fig. 5

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PUNCHING TOOL

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1 Claim. (Cl. 164—86)

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In explaining the objects and advantages of the invention, a short description of the manufacture of composition roofing is advisable for a clear understanding.

A roll of heavy paper is fed into a long machine somewhat of the type of a newspaper printing press but of heavier construction. After passing through several rollers for specific purposes it is passed through a deep bath of composition asphalt or tar at a temperature of around 550° F. Hereinafter, this composition will be referred to as tar. In going through this bath the paper is completely impregnated with the tar. It then passes through rollers which remove the surplus tar and standardize the thickness. It is then positioned to hang in long loops which slowly move along the machine which permits the tar to cool before going through the balance of the machine. The paper is then re-coated with a thin layer of tar at high temperature, one side receives a blast of powder which dries that side of the paper for smooth movement over the rollers while the other side is sprayed with fine gravel, usually colored which adheres to the hot tar. It then passes through rollers which press the gravel into the paper and it is essential that the hot tar be at a certain high temperature in order that the gravel will be properly bonded thereto in this pressing operation. The paper is then cooled, and passes along the machine for various cutting operations which result in the finished product. The total length of paper passing through the machine amounts to a considerable number of rolls of the usual length.

As the machine is operated, the workmen at the side of the machine are constantly observing the conditions of the paper and if they observe a tear starting, the machine is carefully slowed down until this tear has passed through. The slowing down of the machine is a very delicate operation as the temperature of the tar falls fast and, even with the greatest of care it frequently cools before the gravel is pressed therein with the result that the gravel does not become bonded. Accordingly all the paper in this condition is useless for roofing purposes and must be discarded. Further, if the slightest tear is not observed quick enough, the whole sheet may tear across which requires the shutting down of the machine and again a large amount of roofing is unusable.

In the past this unusable roofing was formed into rolls and sent to the nuisance ground for disposal. Unfortunately, it found its way back

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into the trade, the buying public found that the gravel came off and accordingly the color and the dissatisfaction reacted against the quality of the good roofing turned out by the manufacturer.

The trade then paid for the removal of the roofing and its burning which was extremely costly. Various means were employed to mutilate the rolls so that they could not be used for roofing. They endeavored to shear the rolls but the tar smeared and dulled the blade while the stones, acting as an abrasive, broke the blade. Punches were used to punch holes through the rolls but the hardest steel broke. Drilling holes through the rolls was attempted but the drills filled with tar and the abrasive action of the gravel wore away the steel in a very short time. An acetyline torch was used to mutilate spots through the rolls but the ingredients in the tar, in mixing with the oxygen, reduced the hot flame to the similarity of an oil lamp. The insulating properties of the tar prevented the use of an electric torch.

The object of the present invention is to provide a punch of a special design which will tear a hole through a roll of composition roofing with a minimum of power and destroy it for roofing purposes.

A further object of the invention is to design the tool such that it will receive very little abrasive resistance from the rolls, is self clearing and will stand up to the work for a long period of time.

A further object of the invention is to design the tool so that the resulting hole punched through the roofing will have the edges formed in a nesting shape to lock the roll from unwinding.

A further object of the invention is to design the tool so that it will produce the hole without loss of the material and accordingly without debris collecting around the machine.

A further object of the invention is to construct the tool such that it will handle rolls of different sizes.

With the above important and other minor objects in view which will become more apparent as the description proceeds, the invention consists essentially in the construction and arrangement of parts hereinafter more particularly described, reference being had to the accompanying drawings in which:

Figure 1 is a vertical section through the lower part of the frame of the machine and showing the tool and bearing in side elevation.

Figure 2 is an enlarged side view through the tool and a vertical section through the bearing therefor.

Figure 3 is an enlarged perspective view of the head of the tool.

Figure 4 is a diagrammatic view of a roll of composition roofing after the tool has passed through.

Figure 5 is a diagrammatic view of the upper part of a roll of composition roofing after the tool has been drawn back through same.

In the drawings like characters of reference indicate corresponding parts in the several figures.

A pair of horizontal channel irons 1 are suitably fastened to and support a pair of spaced vertical channels 2 which are connected by a further higher horizontal channel 3. These channels form the lower framework of the machine.

A pair of angles 4 are supported by the channels 1. A horizontal channel 5 is secured across the angles 4 and is aligned between the channels 2 to form a base with a central opening 6 therein. Rollers 7 are carried by the angles 4, on either side of the base channel so that rolls of composition roofing can be pushed across the rollers between the channels 2 and over the opening 6.

A guide casting 8 is carried by the channel 3 in a position directly above the opening 6. This casting is tubular with the upper end being of smaller diameter than the lower end so that it can be slid up through a central opening in the channel 3 until the shoulder, indicated at 9, is reached and the casting is then welded as at 10 to the channel 3. The upper end of the casting is provided with a long bronze bushing 11 which is suitably secured in the casting as by set screws 12 and it slideably receives the shaft 13 of the punching tool. The lower end of the casting is hollow to receive a plurality of felt washers 14 which encircle the shaft 13 and are pressed firmly up in the casting. A suitable piping 15 screws into the casting 8 opposite the felt washers and the outer end passes up through the channel 3 to a large oil cup 16 so that oil can be constantly fed to the felt washers.

The lower end of the punch shaft 13 is slightly enlarged to form a head 17 having an upper shoulder 18. This head is circular and the lower end is forged into a chisel shape as indicated at 19. Each end of the chisel knife projects outwardly in the form of a bead 20. These beads are a continuation of the knife blade.

A further pair of angles 21 are carried on the interior of each of the channels 2 between the channels 1 and 3. These channels are spaced apart to receive the ends of a cross channel 22 which passes directly under the punch head 17 and is provided with an opening 23 through which the punch can travel. It will be noted that the opening 23 is of larger diameter than the opening 6 in the base channel. L-shaped rods 24 pass through the angles and through the ends of the channel 22 to retain said channel in position but when the rods are withdrawn the channel can be removed from the machine.

By observing the bearing formed in the guide casting shown in Figure 2 it will be seen that the punch shaft 13 is mounted for vertical sliding movement through the bushing 11. In the machine I have made, this movement is controlled by a hydraulic ram which can be operated in either direction as desired by manual control. As the operation of a hydraulic ram is well known, I have not shown the construction thereof and in this connection it might be mentioned that any means for reciprocating the shaft 13 can be employed such as hydraulic, mechanical or electrical operations.

In operation and assuming a small roll is to be punched, it is placed on the rollers 7 as indicated at 25 and pushed over the channel 5 until one end is over the hole 6. The control (not shown) is operated to move the punch 13 down. The chisel head of the tool flattens the roll down until it takes the shape shown in Figure 4, squeezing the center part of the roll against the channel 5. At this time it might be mentioned that the gravel side of the roofing is on the inside of the roll so that the tool is pressing against the tar side. The chisel point then presses and cuts a line slit in the roofing and the beads 20 have a tendency to tear. As the tool continues through the different layers, one layer after another becomes cut and the edges are pushed downward as indicated at 26, the last few layers passing through the holes 6 in the channel 5. As the tool passes through the hole formed in the roofing, the upper part of the head, being of a larger diameter, spreads and presses the opening larger with the result that tears occur all around the hole. In this connection it might also be mentioned that as the gravel is on the inside of the roll, it is pressed outward away from the tool so that for the first half of the roll the tool head is passing by the tar and is protected against the abrasive action of the gravel and receives practically no wear. Further, the tar from the upper part moves down and covers a certain amount of the gravel on the lower half of the roll so that a minimum of gravel abrasive is encountered by the tool. When the head of the tool has passed through the opening 6 it stops at the end of its travel. The operator then reverses the control (not shown) and the tool starts the return movement back up through the roll. As all the edges of the opening formed in the roofing are pointing down, they encounter the shoulder 18 of the head of the tool. Accordingly this shoulder lifts the roll upward until it contacts the channel 22 and then starts to press the edges of the hole upward. This reverses the shape of the roll. The flattened portion forms at the top and the roll is again squeezed in the center. As the tool moves upward the upward pressure against the edges of the holes through the roofing causes them to take an ogee or serpentine shape as shown at 27 in Figure 5 until the edges slip past the head of the tool and it passes out through the opening 23 in the channel 22 leaving the roll of roofing therebelow. This ogee shape is possible because the opening 23 larger than the opening 6. The roll is then pushed through the machine to the center where a second hole is pressed through and then a third hole is passed through the opposite end. These three holes are usually sufficient to mutilate the roll so that it cannot be used for roofing purposes. The roll is then pushed out of the machine ready for the next roll.

If a large roll is to be punched, the L-shaped rods 24 are withdrawn and the channel 22 removed from the machine. This permits a large roll, indicated by the reference numeral 28, to be placed on the rollers 7 between the guide casting and the base channel 5. In the operation of the tool on this larger roll the lower part of the guide casting acts in the same capacity as the channel 22, the head of the tool moving up inside

the guide casting. While I have only shown one channel **22**, it will be understood that several might be employed at different heights for varying sizes of rolls.

By the above method it will be seen that the shape of the tool head permits pressing of a hole completely through a roll of roofing by the act of tearing in such a manner that very little abrasive action results against the tool and it will last indefinitely. Further, the movement of the tool is direct through the roll and without rotary or other movement to insure that very little abrasive rubbing will occur. A further advantage of this construction is that no material or at least very little, is lost as the material cut is merely displaced and does not tear off. Accordingly, the floor around the machine is not littered with pieces but the roll is ruined for its original purpose. Although very little abrasive action occurs against the tool the extreme pressure of the roofing against the tool causes a certain amount of tar to adhere to the tool head and the shaft **13**. This in time would accumulate and have to be manually removed. To avoid this operation the felt washers **14** have been inserted in the guide casting. In the operation of the machine a proportion of the tar piles up inside the guide casting and this holds the felt washers firmly in place. The cup **16** is filled with oil, preferably coal oil and this coal oil runs down the pipe **15** into the felt washers. Accordingly, as the shaft **13** is moving up and down it is constantly running in the coal oil which has a cutting action against the tar adhering to the shaft **13**. As the shaft **13** moves through the roofing, the friction of the roofing, plus the cutting action of the coal oil maintains the said shaft **13** in a relatively clean condition.

While the beads **20** have a tearing action on the roofing when the tool is going therethrough and the enlarged part of the head of the tool tends to split the edges of the hole thereformed, this action could be speeded up by forming more such beads around the upper part of the head of the tool such as those indicated by the dotted circles **29**. This would have a tendency to relieve pressure from the tool in its movement through the roll. Should these beads wear off it would be a simple matter to meld new material thereon and this could be done while the tool is on the machine.

From the above disclosure it will be seen that I have invented a tool which fulfills a long felt requirement. As mentioned in the preamble, various methods have been employed to mutilate composition roofing without success due to the viscosity of the material, the abrasive action of the gravel, the composition of the material and the possibility of fire. With the design of this device all these hazards have been reduced to a minimum. The vertical movement of the tool permits the shortest possible movement of same through the roll. The method of operation and the design forces the tar against the gravel and so reduces the abrasive action thereof. The tearing action reduces the resistance so that the tool does not break in performing its function and the return movement of the tool forms the edges of the hole into a nesting shape and prevents the roll from unwrapping. The friction is never sufficient to ignite the material, and lastly; the coal oil keeps the tool clean. As the roll is still warm when the punching operation takes place, the tar is plastic and would smear and dull any kind of a cutting blade. As this kind of punching is

accomplished by tearing, the material being soft and pliable is in an ideal condition for the purpose and can be torn with a minimum of power outlay. When the roll is removed from the machine, its natural resilience brings it back to the circular shape which is a very compact form and the easiest method by which such roofing can be handled. The tar later hardens in the nested shape to firmly hold the rolls from unwrapping. The operation of the tool results in a roll which cannot be re-placed on the market to endanger the reputation of the good material produced and it can therefore be transported to the nuisance grounds without fear and at small cost, or used for other purposes, or for burning.

In the present disclosure, I have shown and described the head of the tool as "chisel-shaped." That is, a single blade. The advantage of this type of tool is, that it can be easily sharpened and maintained in good repair. A diamond-shaped head, that is one having three or more equi-spaced blades projecting from the center might offer a better cutting and spreading action and could be used very advantageously for the purpose in place of the chisel-shaped one described. Accordingly, it will be understood that I wish the words "chisel-shape" to include such shape variation, above mentioned, when the scope of the claim is considered. The reason I have not used this cutting edge is that it takes more work to keep in repair and sharpened, which increases the expense of operation.

What I claim as my invention is:

A punching tool for mutilating roofing rolls, comprising: a shaft vertically mounted on a framework for reciprocating movement of one end thereof into and through a pair of openings positioned in aligned spaced relation in said framework; means for supporting a roll of roofing between the openings in said framework; said end of said shaft provided with an enlarged head to form an outer shoulder on said shaft; the working face of said head formed in a chisel-shape; outwardly projecting beads formed around said head; each of said openings being considerably larger than said head so that said head, in its downward movement, will pass through one opening, tear through said roofing roll, pressing the torn edges of the holes so produced downwardly and then pass through the second opening, with sufficient clearance therebetween for the torn edges of the lower holes to project downwardly therein as said tool passes therethrough; said opening above said roofing roll of larger diameter than said lower opening so that, on the return up movement of said head, said shoulder will contact said downwardly projecting edges and bend same upwardly as said head passes therethrough and press the upper layers of said torn edges into said upper opening to form an ogee nesting shape to said edges and lock said roll from unwinding.

CARL F. PYE.

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The following references are of record in the file of this patent:

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