R. B. BENJAMIN & W. COTTRELL.

APPARATUS FOR DELIVERING AN INTERMITTENT AIR BLAST.

APPLICATION FILED MAR. 2, 1914.

1,206,086. Patented Nov. 28, 1916.

Fig. 1

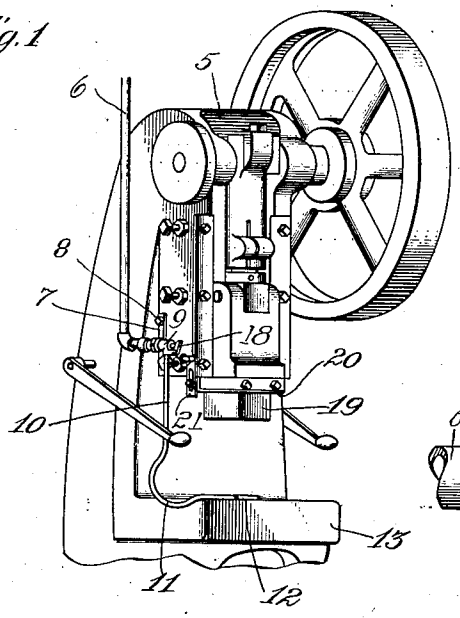


Fig. 2.

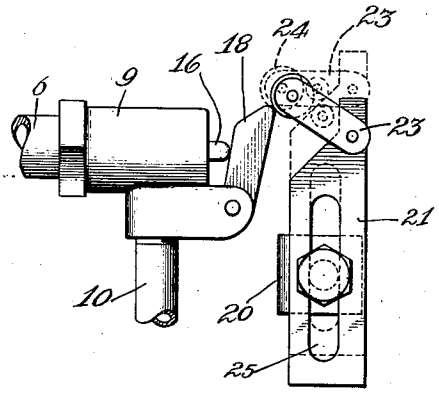


Fig. 3.

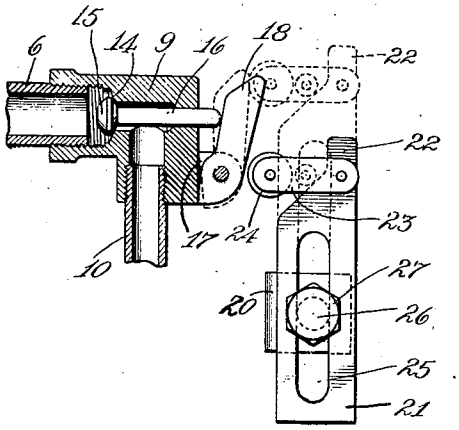
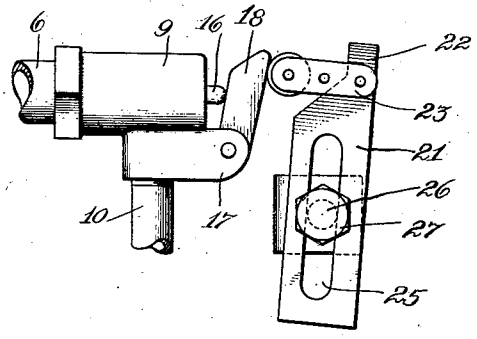


Fig. 4.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR DELIVERING AN INTERMITTENT AIR-BLAST.

1,206,086. Specification of Letters Patent. Patented Nov. 28, 1916.

Application filed March 2, 1914. Serial No. 822,082.

To all whom it may concern:

Be it known that we, REUBEN B. BENJAMIN and WILLIAM COTTRELL, both citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have jointly invented new and useful Improvements in Apparatus for Delivering an Intermittent Air-Blast, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

Our invention relates to improvements in apparatus for delivering an intermittent air blast.

It is one of the objects of our invention to provide an intermittent air blast apparatus that will deliver a blast at the proper time and of the proper intensity and duration, to remove work and waste materials from the working tables of punch presses, embossing and stamping machines, and the like.

It is a further object of our invention to provide means for adjusting the time of the blast with relation to the stroke of the machine with which it is used, and means for adjusting the intensity and duration of the blast delivered.

A further object of our invention is to provide an intermittent air blast apparatus that is simple and efficient in its operation, economical to manufacture, and readily installed on machines of various types.

Additional objects of our invention will be apparent from the following specification and accompanying drawing, taken in connection with the appended claims.

An air valve embodying our invention is described in the following specification and illustrated in the accompanying drawings, by way of example, it being clearly understood that numerous changes may be made in the form, construction and arrangement of the parts without departing from the spirit of our invention or exceeding the scope of the appended claims, the form of our invention herein disclosed being merely one preferred embodiment thereof.

In the drawing, Figure 1 is a view in perspective of a punch press having an intermittent air blast apparatus constructed in accordance with our invention attached thereto; Fig. 2 is a detailed view in side elevation showing the air valve and tripper mechanism; Fig. 3 is a similar view showing the air valve in cross section; and Fig. 4 is a similar view showing the adjustable feature of the tripper.

The air blast apparatus as illustrated in Fig. 1 is designed to deliver an intermittent blast at the table of the machine after the ram has commenced its upward stroke for the purpose of assisting in removing each piece of work after it has been stamped, and also the filings and other waste material.

Attached to the punch press 5 is a pipe 6 leading from a source of air under pressure. This pipe 6 is secured to the press 5 by a strap 7 which passes over the pipe and is bolted to the press as at 8. The end of the pipe is screw-threaded to make engagement with the threaded port of a valve casing 9 which is in the form of an elbow having also a screw-threaded opening for engagement with a pipe 10 to which is attached a flexible hose 11 leading to a nozzle 12 located near the work table 13 of the press. In the valve casing 9, approximately at the end of the feed pipe 6 is a slightly conical shaped valve seat 14, in which is located the valve member 15. Secured to the latter and extending forwardly therefrom is a valve stem 16 which protrudes a short distance from the valve casing 9. The valve 15 conforms in configuration with the valve seat 14, and as the stem is substantially loose in its bearings, valve and stem are freely rotatable. Accordingly the valve does not necessarily reseat in the same position and irregular wear of the parts is avoided. A lug 17 is formed at the lower part of the valve casing 9 and to this lug is pivoted a stem-displacing trigger 18. The inner edge of this trigger bears continuously on the end of the valve stem 16 and in its normal position the trigger is inclined slightly away from the vertical. It will be seen that if this pivoted trigger 18 is moved inwardly it will displace the valve stem, thereby opening the valve. Means are provided, therefore, for operating trigger 18 once every cycle of the ram 19 of the press 5. Attached to the ram 19 is a bracket 20 to which is bolted a tripper 21. At the upper end of the latter, pivoted to a lug 22, is a tripper arm 23 having at its free end a

roller 24. The tripper 21 is so positioned that it comes into contact with the trigger 18 at each stroke of the ram. In order that the valve may be operated only once for every cycle of the ram, the tripper arm 23 is so pivoted that it is free to swing upwardly, but is prevented from swinging downwardly. As a result of this construction, when the ram is making its downward stroke the tripper arm upon striking the upper end of the trigger 18 will merely be forced upward into an inoperative position. As the roller 24 moves out of engagement with the end of the trigger 18 it is free to drop back into normal position under the force of gravity. On the up stroke of the ram, however, as the trigger 18 is inclined across the path of the roller the former will be moved inwardly and the valve opened.

The tripper 21 is formed with a longitudinal slot 25 and is secured to the bracket 20 by means of a bolt 26, passing through the slot 25, and a nut 27. It will be seen that by loosening the nut 27 of the bolt 26 the position of the tripper 21 on the bracket may be varied, both vertically and angularly, the function of which is hereinafter referred to.

In operation, it being assumed that the ram of the press is making a regular reciprocating stroke, on the downward stroke of the ram there is no operation of the valve, as before described. This is shown by Fig. 2, the dotted lines showing the position of the parts at the moment the roller comes in contact with the trigger and the full lines showing the parts as the ram continues its downward stroke with the tripper arm 23 swung upward into inoperative position. The operation of the valve on the up stroke of the ram is shown in Fig. 3. The full lines denote the position of the tripping mechanism when the ram is at the end of its downward stroke. As it moves upward the tripper arm will force the trigger 18 inwardly as shown by the position of the parts in dotted lines. As the trigger bears on the stem 16, the latter will be displaced thus opening the valve and allowing the air to flow through the pipe 10 to the nozzle 12.

It will be seen that the valve remains open as long as the tripper arm 23 is in operative contact with the trigger 18. As the ram passes upward the arm 23 will roll clear of the trigger and, owing to the position of the valve member 15, the force of the air in the pipe 6 acting directly thereon, will cause the valve to automatically reseat, whereupon the valve and trigger will again take their normal position until the next upward stroke of the ram.

It will be apparent that the duration of the blast as well as its intensity will depend upon the extent to which the valve is opened and upon the time during which it is open. As the edge of the trigger which is in the path of the tripper roller is at an inclination, the extent and duration of the valve's displacement depends upon the point at which the tripper roller comes into operative contact with the trigger. Consequently the extent and duration of such displacement may be varied by varying the position of the tripper with respect to the stem-displacing trigger. This is done by loosening the nut 27 and swinging the tripper 21 to change its angular position one way or the other, as desired. If the tripper 21 is displaced from the vertical, as for example, to the position shown in Fig. 4, the tripper roller is farther away from the trigger 18 than it was in its normal position. As a result, its contact with the trigger is not made until the roller reaches approximately the upper end of the trigger. Consequently the tripper arm will give the trigger but a slight tap thereby opening the valve to but a slight extent, and for a short interval of time.

By altering the vertical position of the tripper 21 with respect to the bracket 20 the time at which the blast is delivered with relation to the time of the stroke of the ram can be adjusted as desired. If the tripper 21 is shifted until the nut 27 is at the lower end of the slot 25 the blast will come earlier on the upward stroke of the ram than it does in the normal position illustrated in Fig. 3. On the other hand, if the nut 27 is at the upper end of the slot 25 the blast will be delayed. By this simple adjustment of the tripper on the bracket of the ram, we are enabled to vary the time, intensity and duration of the air blast delivered to meet practically all the demands of the various kinds of machines and work with which our apparatus may be used.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is;—

1. An apparatus for delivering an intermittent air blast, adjacent the material operated on by an intermittently operated machine comprising the combination with a valve, of a reciprocating member, means associated therewith for opening said valve at desired intervals, and adjustable means for varying the duration and extent of said opening thereby to vary the duration and intensity of the blast.

2. An apparatus for deliverying an intermittent air blast, adjacent the material operated on by an intermittently operated machine comprising the combination with a valve, of a reciprocating member, means associated therewith for opening the valve at desired intervals, adjustable means for varying the time of said opening with respect to the position of said reciprocating member, and adjustable means for varying the intensity and duration of the blast delivered.

3. In an apparatus for delivering an in-

termittent air blast, a valve having a stem protruding from the valve casing, a reciprocating member having a tripper associated therewith, a stem-displacing member associated with said valve stem and operated by said tripper to open the valve, and means for varying the position of said tripper with respect to said stem-displacing member to vary the intensity and duration of said air blast.

4. In an apparatus for delivering an intermittent air blast, a valve having a stem protruding from the valve casing, a reciprocating member having a tripper associated therewith, a stem-displacing member associated with said valve stem and operated by said tripper to open said valve, means for varying the position of said tripper with respect to the position of said reciprocating member to vary the time of said air blast with respect to the stroke of said member, and means for varying the position of said tripper with respect to said stem-displacing member to vary the intensity and duration of said air blast.

5. In an apparatus for delivering an intermittent air blast, a valve having a stem protruding from the valve casing, a reciprocating member having associated therewith a vertically and angularly adjustable tripper, and a stem-displacing tripper-operated member associated with said valve stem.

6. The combination with an intermittently operated machine having a tool movable in a definite path, of means for delivering a blast adjacent the path of said tool, means for controlling said blast comprising a valve and automatic means whereby said valve is intermittently operated in time with the movement of said tool, and means whereby the extent of opening of said valve may be varied.

7. A device for use with an intermittently operated machine having a tool movable in a definite path, said device comprising means for delivering a blast adjacent the path of said tool, means for controlling said blast comprising a valve, and automatic means controlled by said machine whereby said valve is intermittently operated, and means whereby the extent of opening of said valve may be varied.

8. A device for use with an intermittently operated machine having a tool movable in a definite path, said device comprising means for delivering a blast adjacent the path of said tool, means for controlling said blast comprising a valve, automatic means controlled by said machine whereby said valve is intermittently operated, and means whereby the extent of opening of said valve may be varied and whereby the time of operation of said valve with respect to said tool may be varied.

9. A device for use with an intermittently operated machine having a tool movable in a definite path, said device comprising means for delivering a blast adjacent the path of said tool, means for controlling said blast comprising a valve having a casing, means for securing said casing in a fixed position, and a movable member controlled by said machine whereby said valve is intermittently operated, and means whereby said movable member can be manually adjusted to vary the extent of opening of said valve.

10. A device for use with an intermittently operated machine having a tool movable in a definite path, said device comprising means for delivering a blast adjacent the path of said tool, means for controlling said blast comprising a valve having a casing, means for securing said casing in a fixed position, and a movable member controlled by said machine whereby said valve is intermittently operated, and means whereby said movable member can be manually adjusted to vary the extent of opening of said valve, and also to vary the time of operation of said valve with respect to said tool.

11. A device for use with an intermittently operated machine having a tool movable in a definite path, said device comprising means for delivering a blast adjacent the path of said tool, means for controlling said blast comprising a valve having a casing, means for securing said casing in a fixed position, and a movable member controlled by said machine whereby said valve is intermittently operated, and means whereby said movable member can be manually adjusted in one direction to vary the extent of opening of said valve and in another direction to vary the time of operation of said valve with respect to said tool.

In witness whereof, we have hereunto subscribed our names in the presence of two witnesses.

REUBEN B. BENJAMIN.
WILLIAM COTTRELL.

Witnesses:
E. R. KING,
W. PERRY HAHN.