

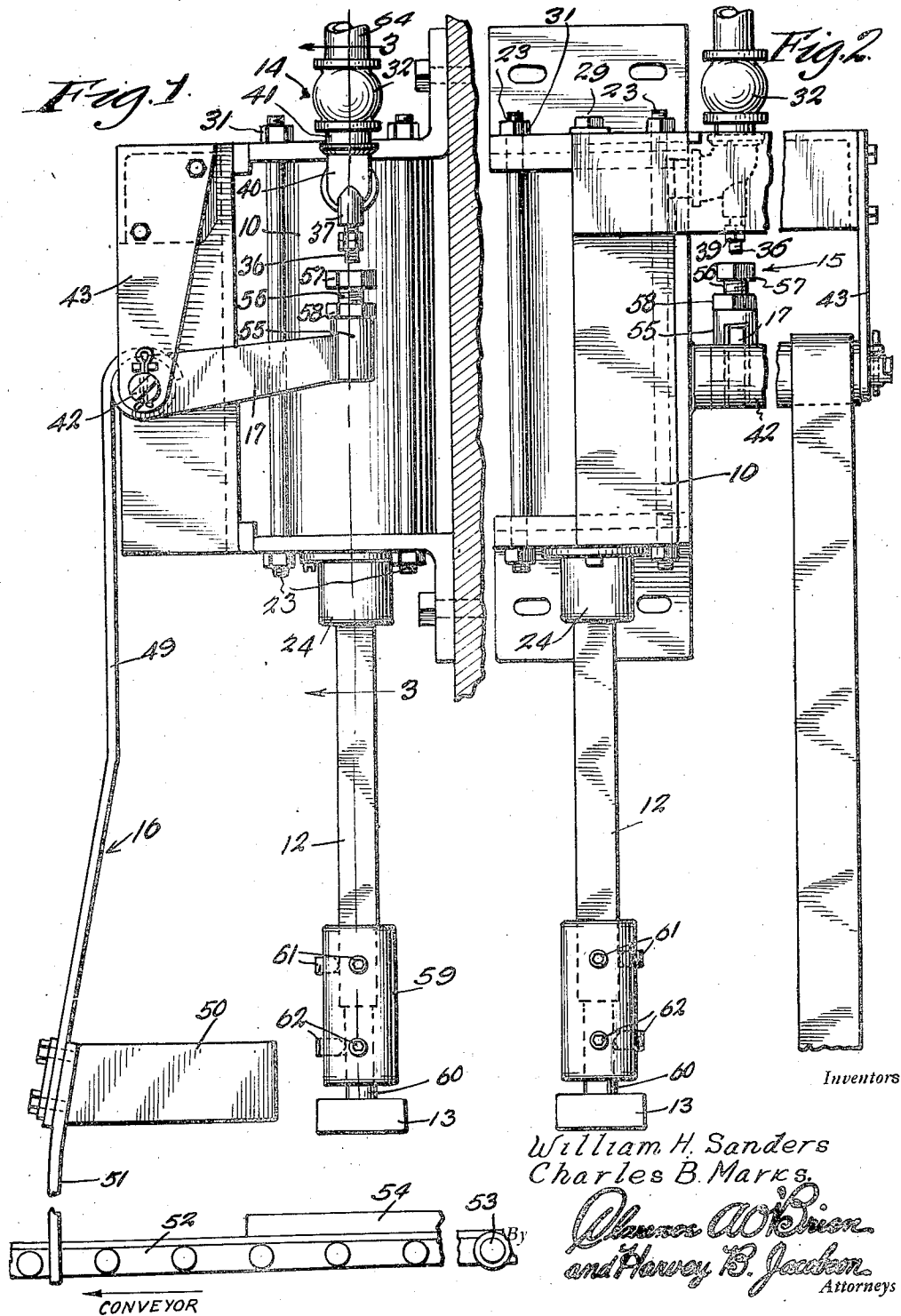
June 22, 1948.

W. H. SANDERS ET AL
AUTOMATIC STAMPING MACHINE

2,443,779

Filed Jan. 22, 1945

3 Sheets-Sheet 1



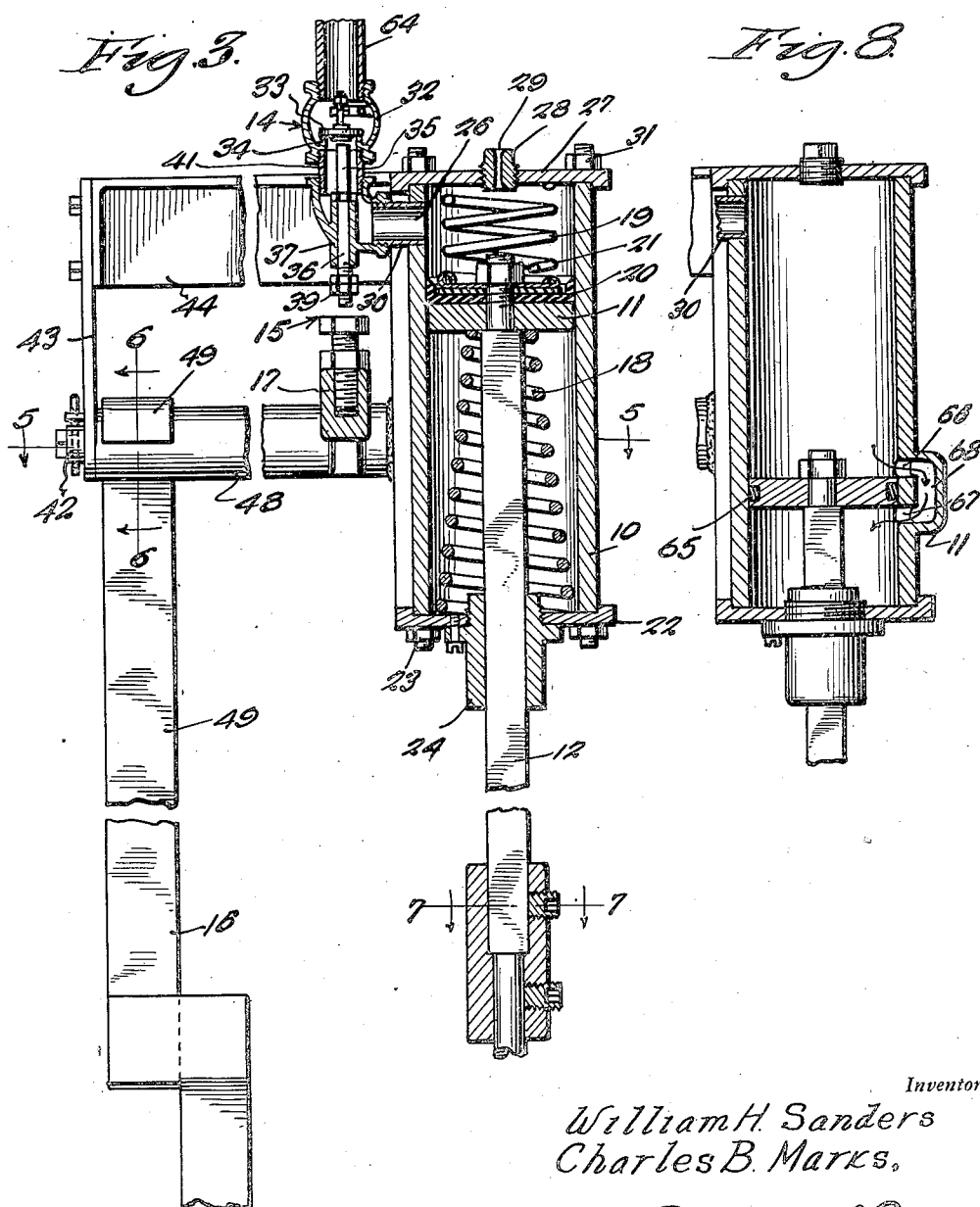
June 22, 1948.

W. H. SANDERS ET AL
AUTOMATIC STAMPING MACHINE

2,443,779

Filed Jan. 22, 1945

3 Sheets-Sheet 2



Inventors
William H. Sanders
Charles B. Marks,

By *Clarence A. O'Brien*
and Harvey B. Jackson
Attorneys

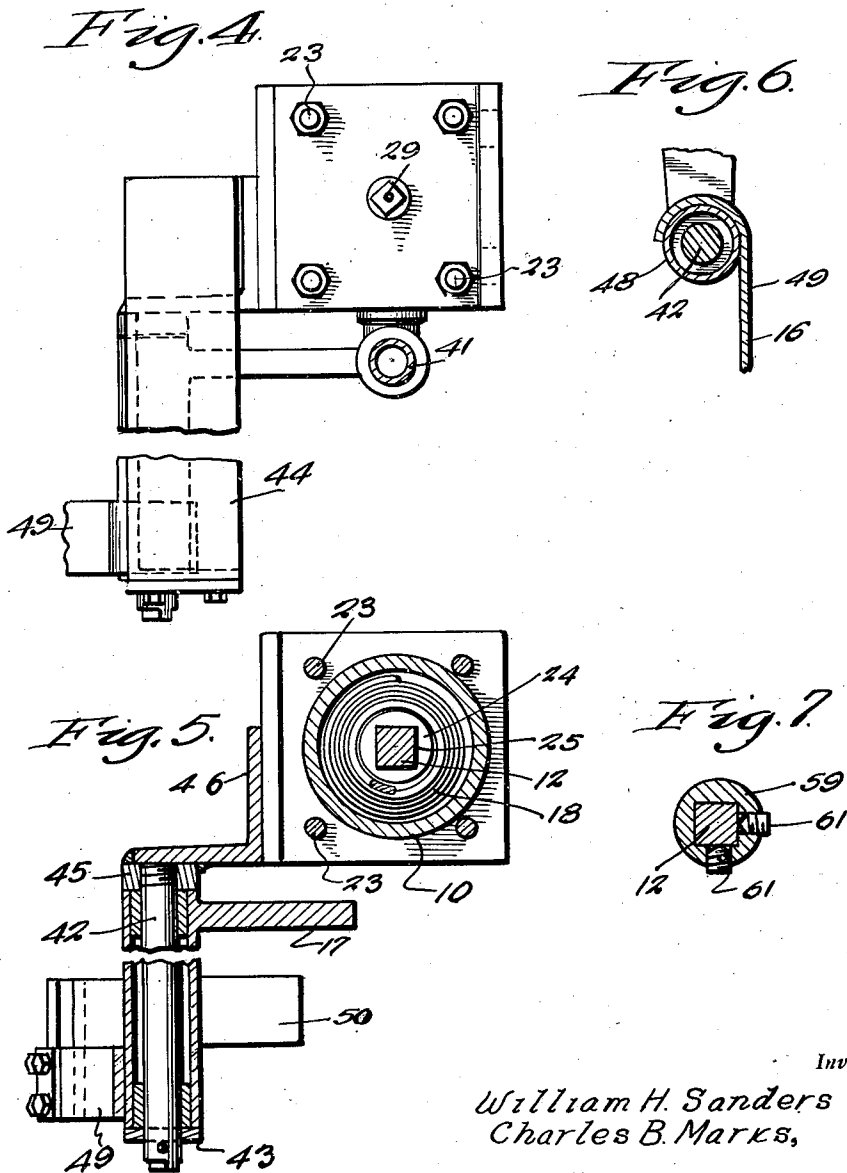
June 22, 1948.

W. H. SANDERS ET AL
AUTOMATIC STAMPING MACHINE

2,443,779

Filed Jan. 22, 1945

3 Sheets-Sheet 3



Inventors

William H. Sanders
Charles B. Marks,

By

Clarence A. O'Brien
and Harvey B. Jackson
Attorneys

UNITED STATES PATENT OFFICE

2,443,779

AUTOMATIC STAMPING MACHINE

William H. Sanders, Henderson, and Charles B. Marks, North Las Vegas, Nev.

Application January 22, 1945, Serial No. 573,870

5 Claims. (Cl. 101—35)

1

This invention relates to stamping machines and to other machines of this type performing a large number of operations in succession and it has for its main object to provide a stamping or other machine provided with a head striking against an object which is simple in design and reliable in operation, does not require maintenance and is not connected positively or by permanent intervening mechanisms with the conveyor or other feeding mechanism which brings the objects to be operated on into an operative position so that it may be mounted on any conveyor, rotating table or other feeding mechanism.

It is a further object of the invention to operate the stamping machine automatically at the passage of each object or at certain desired time intervals or after the passage of certain stretches of a conveyor without using any positive connection between those parts of the stamping machine which are tripped or moved by the passage of objects or of their conveying means and the head, die or matrix carrying mechanism, this connection permitting independent movement of all parts so that clogging or damage to the entire machine is avoided when one of the parts is moved or is jammed accidentally.

It is a further object of the invention to construct a simple machine in which little power is required to start the operation of the stamping machine, this little power being, however, furnished by the stamping machine itself, when released for operation by the conveying or feeding mechanism.

A still further object of the invention consists in using compressed air for operating the stamping machine, the latter having such a simplified design that it operates with one valve only.

Further objects will be apparent from the following detailed specification which describes two modifications of the invention, which are also illustrated in the accompanying drawings.

In these drawings:

Figure 1 is an elevational side view of the entire stamping machine showing a small portion of a conveyor carrying the objects to be stamped in order to illustrate its operation.

Figure 2 is an elevational front view of the stamping machine.

Figure 3 is an elevational sectional view of part of the stamping machine, the section being taken through the cylinder along line 3—3 of Figure 1.

Figure 4 is a top view, while

Figure 5 is a sectional top view, the section being taken along line 5—5 of Figure 3.

Figures 6 and 7 are sectional views of details, Figure 6 illustrating the mounting of the sleeve carrying the stamping head on the piston rod.

Figure 8 is a sectional view of a modification of the air cylinder.

2

It is to be understood that the nature of the operation performed on the object by means of the machine hereinafter called a stamping machine is not material and is, in fact, not connected with the invention. The operation performed may be a stamping operation, requiring a stamping head or die, an impression requiring a matrix, a simple printing operation using ink or colors requiring a printing head, or the operation may simply be used to drive in some clamp, nail or other fixing means by a blow, this requiring merely a head with a suitable surface. In the following specification, the member which is pressed or struck against the object is called a head or a stamping die but it is to be understood that this term is only used as an abbreviation for an enumeration designed to include all the above-mentioned members and some further members which will suggest themselves to those skilled in the art.

It is also to be understood that in accordance with this operation, the title or designation applied to the invention has to be modified and that the title "stamping machine" is an abbreviation used to avoid enumerations of various titles and includes all the designations applied to the machines above enumerated.

The stamping machine according to the invention consists essentially of the air cylinder 10 with piston 11, piston rod 12, head 13 and of the air inlet valve 14 and of its operating mechanism generally designated by the reference numeral 15 and of the pendulum 16 and arm 17 operating the valve mechanism 15.

The air cylinder 10, as shown in Figure 3, is provided with a piston 11 which is supported between a return spring 18 and an upper spring 19 opposing each other, the latter being much weaker than the former. The piston 11 is provided with the conventional leather or rubber cup 20 and is fixed on a square piston rod 12 by means of a screw bolt 21 projecting therefrom.

The lower part of the cylinder is closed by a lid 22 fixed in the conventional manner by screws 23 and carrying a guide piece 24 with a square hole 25 through which the piston rod 12 passes. The guide piece holds the square piston rod 12 in its position and prevents rotation of the same and of the head 13 carried by it.

The upper part of the cylinder is provided with an air inlet opening 26 and is closed by a lid 27 fixed to the piston by screws 31, carrying a plug 28 provided with an air escape hole 29.

The piston is shown in its uppermost position in Figure 3. It, therefore, cannot overrun the air inlet 26.

The latter is connected by a tubular extension 30 to the inlet valve arrangement 14 which consists of a housing 32 surrounding the valve 33 and valve seat 34 and the push rod 35 for the same. The latter is guided in a long bronze guide 37

3

brazed to the elbow 30 which is supporting the housing by means of a nipple 41. Its lower end is screw-threaded (as shown at 38) and carried several nuts 39 serving as adjustable stops. It also is provided with a shoulder or collar 36 for seating it on the guide 37, which acts as a stop.

The valve 33 itself is a conventional flapper check valve such as used in installations of all kinds.

A shaft 42 is supported on a suitable support arm 43 secured to an angle piece 44 attached to the cylinder or to some part connected with it. On the other side, said shaft is supported by a supporting nut 45 secured to a vertical angle piece 46 screwed directly or by means of a spacing plate to the cylinder 10.

On the shaft 42 a sleeve 48 is mounted and held which carries the pendulum 16, which consists of a steel spring 49 and a weight 50.

The steel spring is bent around the sleeve and is firmly secured thereon by welding or by some mechanical fixation means. The weight is attached to the spring 49 by screws and carries a trip finger 51 which projects into the path of the conveyor 52 or adjacent thereto, and which may be moved by trip contact 53 projecting from the conveyor 52 and arranged on the same at suitable distances.

The object 54 to be stamped, impressed, printed or otherwise acted upon is shown as placed on the conveyor 52.

The sleeve 48 which carries the pendulum 16 also carries the arm 17 which may be integral with the sleeve. Said arm carries sleeve-like projection 55 provided with internal screw threads into which a screw bolt 56 is fitted which carries an operating head 57 and which may be fixed in the projection by means of a counter-nut 58.

The head 57 serves as an operating means for the push rod 35 and is so adjusted that it is clear of the end of the rod and at a small distance therefrom.

The piston rod 12 carries the stamp holder sleeve 59 by means of screws 61 to which the stamp head, die, matrix or the like 13 is fixed by means of its stem 60 and screws 62.

For operating the stamping machine, the air inlet arrangement 14 is connected with a pipe 64 containing compressed air.

When the conveyor or table 52 with the objects 54 placed on them is running, the trip contact projections 53 swings the pendulum 16 to the left (in Figure 1) in the direction of the arrow. The sleeve 48 is rotated and the arm 17 is moved downwardly. After having carried the trip finger 51, through a certain distance the trip finger will slip off the trip contact 53 allowing the pendulum 16 to return under the influence of weight 50. Thereby the sleeve 48 is rotated in the opposite direction and arm 17 is moved upwardly.

The pendulum therefore starts to operate at a predetermined time interval after one of the conveyor trip fingers has reached a predetermined position, at which the pendulum is released.

The head 57 lifts the push rod 35 only for a short distance during the movement of the arm 17 as the stop nuts 39 arrest the movement of the rod 35 when it reaches the sleeve 37, and thereby arrest the head 57 on arm 17. The momentum of the pendulum due to the weight will, however, carry the pendulum further to the right, and this results in an elastic deformation

4

of the spring 49 until its tension stops the further movement of the pendulum. The accumulated tension of the spring 49 now starts the pendulum on its return movement. When the flapper valve 33 was opened during the forward movement of the pendulum compressed air, entering through inlet 28, moves piston 11 downwardly and operates head 13. When the pendulum starts on its return movement arm 17 moves downwardly, head 57 moves away from end 38 of push rod 35, and the air pressure together with the action of gravity close the flapper valve 33.

The return spring 18 pushes the piston back, the air escapes slowly through opening 29 of plug 28 and the piston returns to its normal position, the upper spring preventing its movement beyond the pre-determined limit.

The conveyor movement and the operation of the air admission valve to the cylinder are thus linked in a manner which is equivalent to a positive linkage, but which is nevertheless time controlled. This linkage also permits to produce a valve movement over a short distance with considerable force, using the steady and continuous advance of the conveyor carrying the goods to be treated, as a source for such movement.

The pendulum may, if the trip contacts are arranged at considerable distance from each other, perform several oscillations but their amplitude is not large enough to open valve 33 until again lifted by the trip contact 53.

In the modification shown in Figure 8 no return spring is used in order to accelerate the return of the piston 11. The latter may be provided with piston rings 65. The cylinder is provided with ports 66, 67 and a communication channel 68 is arranged between them.

When air rushes in it will push the piston 11 downwardly until it reaches the position between the two ports 66, 67. In this moment compressed air flows to the lower half of the cylinder below the piston, stops the movement of the piston and as soon as the flapper valve has been closed during the return of the pendulum this compressed air overcomes the pressure in the upper half of the cylinder which communicates with the outer air by means of the opening in the plug 28. The piston stops when equalization of pressure has been reached, but it may be preferable to use the upper spring 19 shown in Figure 3 also with this modification to avoid accidental overrunning of the correct position.

It is to be understood that the fact that merely two modifications of the invention are shown is not to be interpreted in a limitative way. The modifications illustrated show embodiments by way of example and other embodiments and modifications are clearly within the ambit and scope of the appended claims, even if some other members, parts and combination of parts are used or some further members or mechanisms are added.

What we claim is:

1. An automatic stamping, marking, printing or hammering device comprising a conveyor carrying work pieces, a striking head periodically striking against said work piece, pneumatic means for actuating said striking head, a pendulum suspended for free oscillation, means on said conveyor for engaging said pendulum, for displacing it with respect to its position of rest, and for releasing it at a predetermined distance from said position of rest for return by free oscillation, and means on said pendulum for controlling

5

the air admission to said pneumatic means during said return stroke.

2. An automatic stamping, marking, printing or hammering device comprising a conveyor carrying work pieces, a striking head periodically moved against said work pieces, pneumatic means for actuating said striking head, a pendulum comprising an elastic arm, suspended for free oscillation around a fulcrum, means for controlling the pneumatic actuating means for the striking heads, means carried by the conveyor for engaging said pendulum, displacing it with respect to its position of rest, and for releasing it at a predetermined distance from said position for return by free oscillation, means operatively and positively connected with the pendulum for controlling the air admission to said pneumatic means, said means including a striking member arrested in its motion when becoming operative and arresting the movement of the pendulum around the fulcrum, the pendulum continuing its motion under deformation of the elastic arm upon arrest of the movement around its fulcrum.

3. In an automatic stamping, marking, printing or hammering device, a conveyor carrying work pieces, a striking head moved periodically against said work pieces, an air cylinder and a piston for moving said striking head, means controlling the air admission into said cylinder including a substantially stationary control member capable of performing a limited control movement, operating means for said air admission controlling means, including a pendulum with a weight carried by an elastic pendulum arm, suspended for free oscillation around a fulcrum, means on said conveyor for moving the elastic arm of said pendulum with respect to its position of rest to an inclined position, and for releasing it at a predetermined distance from said position of rest for a return movement by free oscillation, a striking member for operating said control member, positively connected with the pendulum and arranged for striking against the control member in a position reached after the passage of the position of rest during the return movement of the pendulum following release of the same, the striking of the control member arresting the movement of the pendulum around its fulcrum and producing elastic deformation of the arm, thereby generating a return impulse towards the position of rest after a predetermined interval.

4. In an automatic stamping, marking, printing or hammering device, a conveyor carrying work pieces, a striking head moved against said work pieces, an air cylinder and a piston for moving the striking head, means for admitting air into said cylinder, said means including an air admission pipe and a check valve, means for operating said check valve including a push rod performing a limited stroke, a pendulum having a weight and an elastic pendulum arm, suspended for free oscillation around a fulcrum, a rigid arm

6

operatively connected with said pendulum, a striking head on said rigid arm, means on said conveyor for positively engaging said pendulum arm, for displacing it, and for releasing it after displacement and after having travelled with the conveyor for a predetermined distance, said pendulum returning after release by free oscillation, said rigid arm and striking head being arranged on said pendulum so as to strike against said push rod when the pendulum has performed more than one half of the return stroke but less than a full return stroke, the striking head upon being arrested, arresting further movement of the pendulum around the fulcrum and entailing elastic deformation of the pendulum arm, thus producing the impulse urging the pendulum arm towards the position of rest after a predetermined interval.

5. An automatic stamping, printing, marking or hammering device, comprising a conveyor for carrying work pieces, a striking head moved against said work pieces, an air cylinder, a piston therein, a piston rod carrying the head forced against said object, means to supply said cylinder with compressed air, an air inlet valve, a push rod for operating and opening said valve, a stop on said push rod for limiting its stroke, a rocking shaft, mounted for free oscillation around its axis, a weighted pendulum fixedly connected with said shaft, said pendulum including an elastic pendulum arm and a weight carried by it near its end, a rigid arm mounted on said rocking shaft, a striking member on said arm, a trip finger on said pendulum, tripping lugs on said conveyor, adapted to engage said trip fingers, to move said pendulum positively over a predetermined stretch into an inclined position and to release it for return by a free oscillating movement upon completion of said stretch, the rigid arm and its striking member being so disposed that the latter is moved towards the push rod during the return movement of the pendulum, strikes the push rod and is arrested thereby after the pendulum and the rocking shaft have completed more than one-half but less than a complete oscillating return movement, thereby producing elastic deformation of the pendulum arm, and an impulse towards return into the position of rest upon arrest of the pendulum.

WILLIAM H. SANDERS.
CHARLES B. MARKS.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
337,837	Kriete et al.	Mar. 16, 1886
1,925,236	Doyle et al.	Sept. 5, 1933
1,929,703	McDonough	Oct. 10, 1933
2,113,867	Weymouth	Apr. 12, 1938