J. O. HORTON.

SAFETY DEVICE FOR BOX STAYING MACHINES.

APPLICATION FILED MAY 3, 1916.

1,206,847.

Patented Dec. 5, 1916.

2 SHEETS—SHEET 1.

FIG. 2.

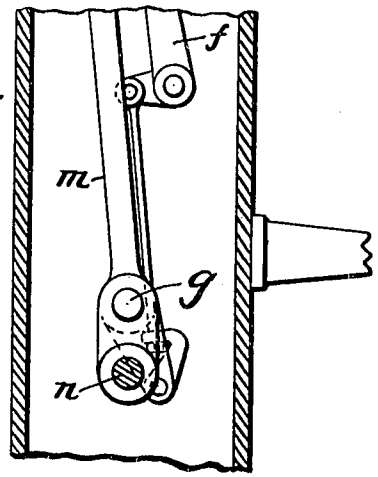


FIG. 1.

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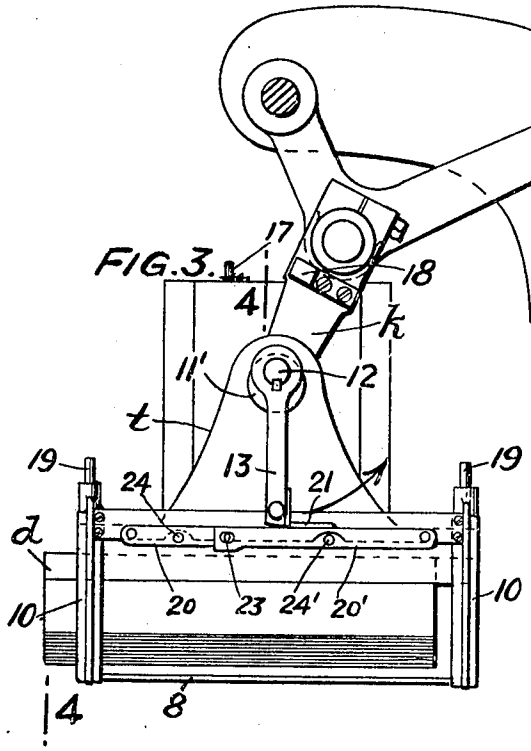


FIG. 3.

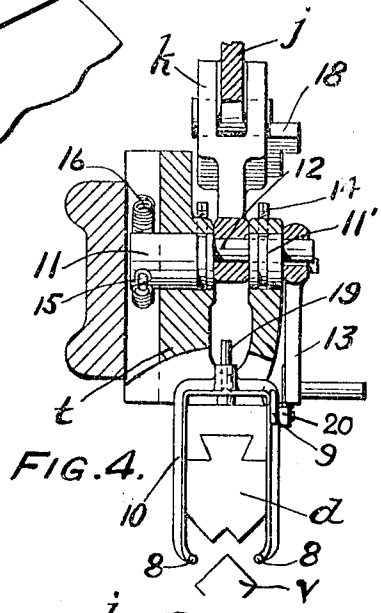


FIG. 4.

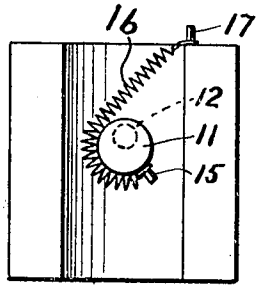


FIG. 5.

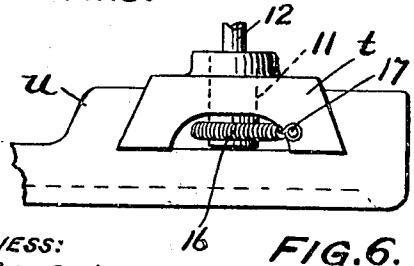


FIG. 6.

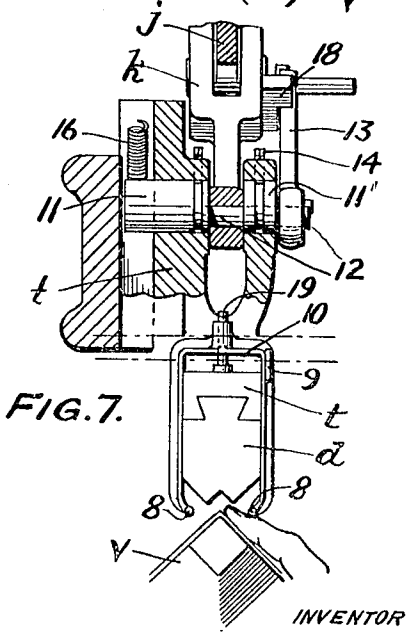


FIG. 7.

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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR BOX-STAYING MACHINES.

1,206,847. Specification of Letters Patent. Patented Dec. 5, 1916.

Application filed May 3, 1916. Serial No. 95,056.

To all whom it may concern:

Be it known that I, JOHN O. HORTON, a citizen of the United States, residing at Montrose, county of Susquehanna, and State of Pennsylvania, have invented a new and useful Improvement in Safety Devices for Box-Staying Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to that class of machines in which a die is caused to descend upon a stationary anvil, between which is placed a box and stay or other articles to be clamped together or compressed.

In box staying machines, such as described in connection with my invention, the anvil is usually of rectangular cross section and positioned diamond-wise, with its horizontal active edge uppermost. Against this edge and contiguous surfaces the die descends and does its work. My invention may, however, be applied with equal effectiveness to machines in which anvil and die present flat horizontal surfaces between which the compression takes place.

In the operation, for example, of staying a box angle, the operator places the two sides to form said angle upon the faces of the anvil contiguous to the active edge, and holds them close with his fingers during the action of the die in the application of the stay. This requires that the operator shall keep his fingers close to the joint and yet not too close. To decrease danger of accident and protect the operator, it is desirable to provide some safety device therefor.

The object of this invention is to provide such a safety device, wherein appropriate parts are supplied, carried by the die holder and projecting downwardly in advance of the die, and so positioned as to contact with the operator's fingers if he has inadvertently placed them within the danger zone, and thereby be made to immediately reverse the movement of the die and raise it out of harm's way.

In the accompanying drawings, which illustrate a preferred embodiment of my invention: Figure 1 is a side elevation of a box-staying machine with my invention applied thereto. Fig. 2 is a partial sectional view of the machine. Fig. 3 is an enlarged detail view of the portion of the machine carrying my invention. Fig. 4 is a section on line 4—4 of Fig. 3. Fig. 5 is a view of the opposite side of the die holder from that shown in Fig. 3. Fig. 6 is a plan view of a portion of die holder and guide. Fig. 7 is an explanatory view similar to Fig. 4, but with the upper part of die holder shown in its raised position. The difference in the relative position of the upper and lower parts of Fig. 7 is indicated by the broken lines near the top of the yoke shaped pieces 10.

To understand the application of my invention to a box staying machine, it is advisable to first explain the general construction and mode of operation of such a machine.

The metal staying strip *a* is carried on a drum *b* at the rear of the machine, and led through a throat *c* to the under side of the die *d*. The strip is fed forward by a pawl *e* carried by a block, which slides along throat *c* and is actuated by a bell-crank *f*, which is given an oscillating movement by connection with the main crank pin *g*. The staying strip is held by a pawl *h* as it is fed forward. Die *d* is actuated vertically by a knuckle lever *j* and a link *k*, operated by a connecting rod *m* from main crank pin *g*. The main crank is on a shaft *n* which is connected by gearing *o* with a driving shaft *p* carrying a belt pulley *q*. A foot lever *r* operates a clutch (not shown) connecting shaft *n* with gearing *o*, such that by releasing the foot lever the clutch is opened and driving connection with the die holder is broken. In order that stoppage of the machine may be instantaneous when this takes place, shaft *n* is engaged by an adjustable friction clamp *s*. It is unnecessary to describe this mechanism in further detail, as it is old and well understood in the art.

Die *d* is carried by a die holder *t* slidable in ways *u* on the frame of the machine. The anvil *v* is rigidly mounted on the front of said frame directly below the die. A finger guard, of light frame construction, is carried by the die holder, and supports horizontal guarding rods on both sides of the die and slightly in advance thereof. These rods are supported close to the work-

ing edge of the die, not close enough to interfere with the normal working of the machine, but sufficiently to surely contact with the operator's fingers if they should be in dangerous position, as shown in Fig. 7.

The guard frame comprises the two guarding rods 8 above described carried by yoke shaped end pieces 10, which are rigidly connected together at their upper ends by a strip 9. The guard frame is slidable vertically upon pins 19 carried by the die holder. Thus it may be raised by contact with the operator's fingers as before stated. Such upward movement, by means to be hereinafter described, springs a catch, which instantly causes the die holder and die to be withdrawn upwardly.

For the usual supporting pin of the die holder t connecting it with link k, is substituted a built-up pin of a large diameter 11 turning in the die holder, and a small diameter pin 12 placed eccentrically of the large diameter pin and turning in the end of link k. In actual construction (see Figs. 4 and 7) pin 11 turns in the slide side of the die holder. Pin 12, of smaller diameter, but of considerable length, is secured thereto, to one side of the center, and passes through link k, and a tight collar 11′ a sufficient distance to carry an arm 13, whose action will be hereinafter described. The tight collar 11′ is equivalent to a continuation of the large pin 11, being concentric therewith and turning therewith. Parts 11 and 11′ are both provided with shallow grooves, into which extend set screws 14 to provide against end movement.

It is seen, from the position of pins 11 and 12 shown in Fig. 4, that the die holder t is hung in a low position from link k, whereas if pin 11 is turned 180° to the position shown in Fig. 7, the die holder is seen to be raised with respect to link k. The amount of this raise is twice the eccentricity of pins 11 and 12. This eccentricity is actually about half an inch, so that, in turning pin 11—12 as described, the die holder is raised about an inch with respect to the link k. This distance is sufficient to insure that in the continued downward movement of link k to its lowest position the die will not injure the operator's fingers upon the anvil.

Pin 11 projects beyond its bearing in the die holder and carries a small pin 15, to which is attached one end of a tension spring 16, the other end of which is attached to a pin 17 in the top of the die holder. Spring 16 is wrapped partly around the end of pin 11, and tends to turn it from the position shown in Figs. 4 and 5 to that shown in Fig. 7, or in a counter-clockwise direction looking at Fig. 3. This would turn arm 13, in the direction of the arrow. To provide a stop for this movement of arm 13, allowing it practically 180° of throw, a projection 18 is secured to link k, so when arm 13 is allowed to turn, spring 16 will cause it to whirl half way around until it strikes projection 18, as shown in Fig. 7, turning pin 11—12 with it, and thereby raising the die holder with respect to the parts which are carrying it. Arm 13 is latched in its lower position and caused to be sprung free by the following means connected with the finger guard before described.

To the upper member 9 of the guard frame, which is on the same side of the die holder as the arm 13, are pivoted two horizontal levers 20, 20′, the inner ends of which are connected together by a slot and pin 23 to allow of some movement by the levers. Said levers are fulcrumed at 24, 24′, midway of their length to studs projecting from the side of the die holder. The parts are so proportioned that when the guard frame is hanging freely on the die holder, levers 20, 20′ are in alinement; and a catch 21 secured upon the inner end of the longer lever 20′ receives the end of arm 13, when turned down and set in its normal position. Any slight raising of the guard frame will, by raising the outer ends of levers 20, 20′, depress catch 21 and cause lever 13 to become unlatched and allow it to spring around to its upper position, raising the die holder, as before described, out of harm's way. In this raising of the die holder, the guard frame falls into place again, and levers 20, 20′ reassume their horizontal position. The operator then brings lever 13, by means of the handle thereon, down into latching engagement with its notch again, and the machine continues to press as before. Thus it is not necessary to stop the machine, involving the loss of time and power incident thereto, nor is it necessary to disconnect any of the parts of the machine, but the instant withdrawal of the descending die and the safety of the operator is assured by the simple turning of the pin 11—12 as described.

The finger guards may extend, as shown, the full length of the die holder, which may be the full length of the die, thereby providing effective protection at any point of the working edge. The guard frame is made so light and hangs so easily upon the die holder, that no crushing of or injury to the fingers can occur when the device is operatively in use.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. In safety stops for machinery, the combination with a member the operation of which it is desired to automatically render ineffective, of driving mechanism and connections between the same allowing the retraction of said member relative to the driv-

ing mechanism, a spring adapted to effect the retraction of said member, a tripping arm adapted to normally maintain said spring inoperative, a guard, and a device normally holding said tripping arm in position to render said spring inoperative, but adapted to be actuated by the guard to release the tripping arm and render the spring operative.

2. In safety stops for machinery, the combination with a member the operation of which it is desired to automatically render ineffective, of driving mechanism and connections between the same allowing the retraction of said member relative to the driving mechanism, a spring adapted to effect the retraction of said member, a tripping arm adapted to control said spring, a guard, a device normally holding said tripping arm in position to render said spring inoperative, but adapted to be actuated by the guard to release the tripping arm and render the spring operative, and a stop restraining the released tripping arm from overriding a position relative to the extreme retraction of said member.

3. In safety stops for machinery, the combination with a member the operation of which it is desired to automatically arrest, of driving mechanism, an eccentric pin connection between the driving mechanism and said member adapted to be revolved to vary the stroke of said member, a spring adapted to turn said eccentric pin a fraction of a revolution and a tripping arm adapted to control the action of said spring.

4. In safety stops for machinery, the combination with a member the operation of which it is desired to automatically arrest, of driving mechanism, an eccentric pin connection between the driving mechanism and said member, a spring adapted to turn said eccentric pin so as to retract said member relative to the driving connections, a tripping arm carried by said pin, a guard, and a device normally restraining any movement of the tripping arm but adapted to be actuated by the guard to release said tripping arm.

5. In safety stops for machinery, the combination with a member the operation of which it is desired to automatically arrest, of driving mechanism and connections between the same allowing the retraction of said member relative to the driving mechanism, a tripping arm, a spring tending to move said tripping arm into position to so retract said member, a guard frame carried by, and movable relatively to, said member, a pair of levers fulcrumed to said member and movably connected together, pins connecting said levers to the guard frame, one of said levers adapted to engage the tripping arm and hold it from operation by its spring but adapted, when the guard frame is retracted relatively to said member, to turn on its fulcrum and release the tripping arm.

6. In safety stops for machinery, the combination with a member the operation of which it is desired to automatically arrest, of driving mechanism, an eccentric pin connection between the driving mechanism and said member, a tripping arm carried by said pin and adapted to turn into position to retract said member relatively to the driving connections, a guard frame carried by, and movable relatively to, said member, a pair of levers fulcrumed to said member and movably connected together, pins connecting said levers to the guard frame, one of said levers adapted to engage the tripping arm and hold it from operation, and a fixed stop adapted to prevent said tripping arm overriding its extreme position for withdrawing said member.

In testimony of which invention, I have hereunto set my hand, at Montrose, on this 27th day of April, 1916.

JOHN O. HORTON.

Witnesses:
H. W. BATESON,
R. E. BEEBE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."