W. B. MURTHA.

SAFETY DEVICE FOR PAPER CUTTING MACHINES AND THE LIKE.

APPLICATION FILED NOV. 14, 1919.

1,408,020. **Patented Feb. 28, 1922.**

2 SHEETS—SHEET 1.

Fig. 1.

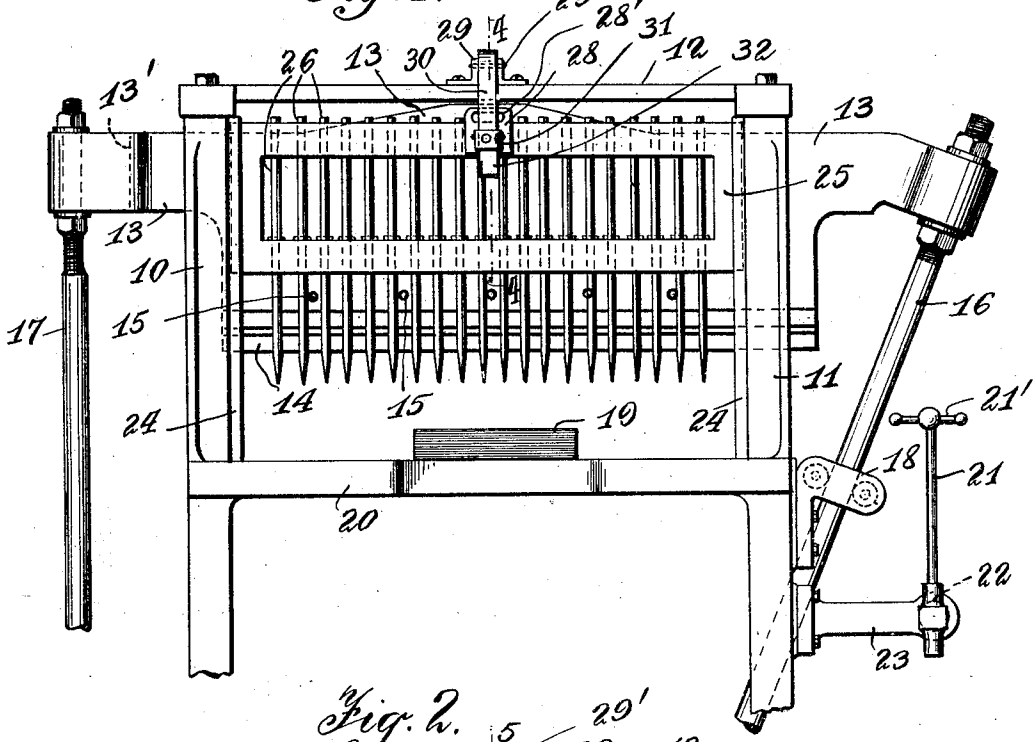
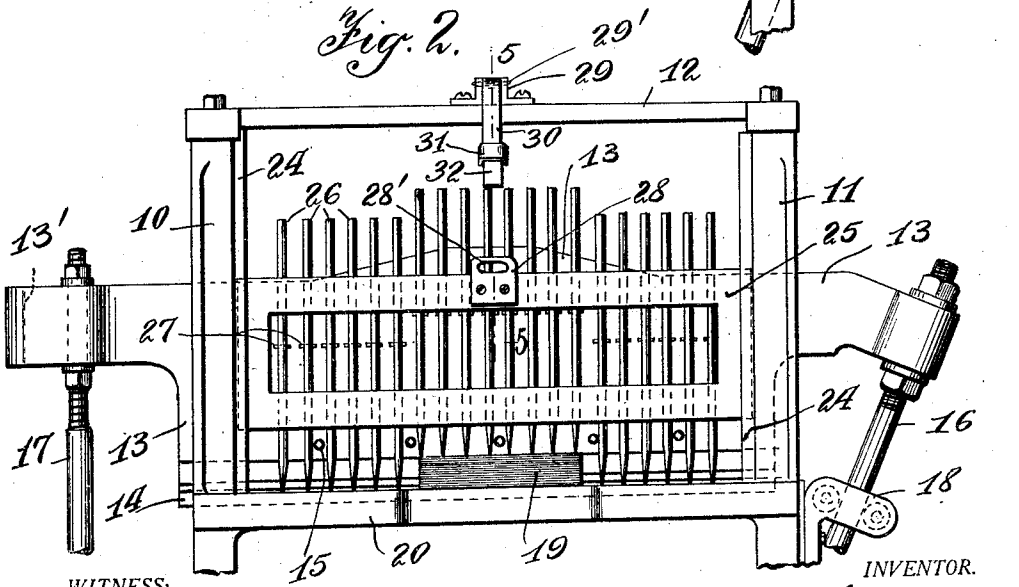


Fig. 2.



WITNESS:

Charles A. Mathis.

INVENTOR.

Walter B. Murtha

BY

Lea & Hoffman

ATTORNEY.

W. B. MURTHA.

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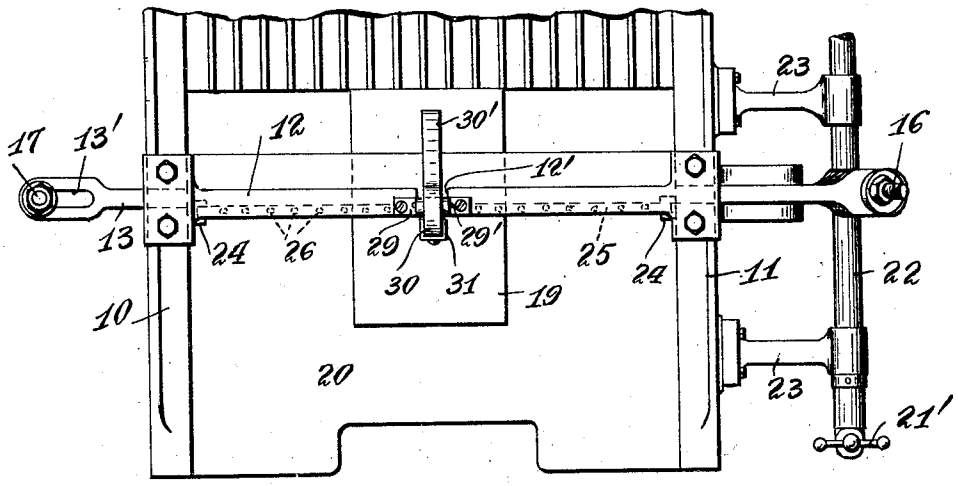


Fig. 3.

Fig. 4.

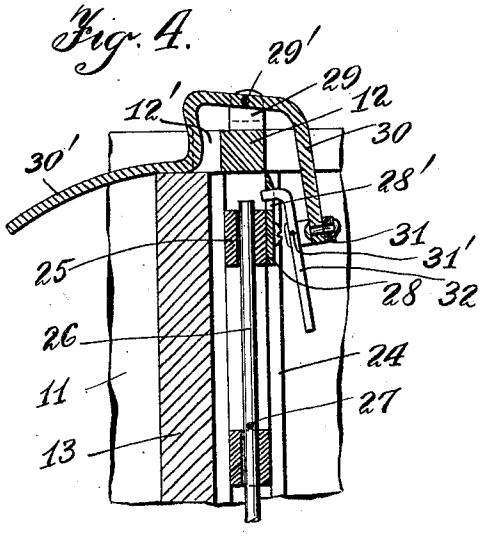
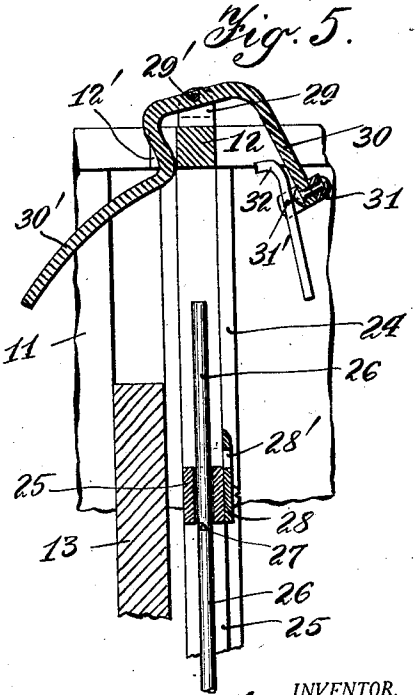


Fig. 5.



WITNESS:

Charles A. Mattis.

INVENTOR.

Walter B. Murtha

BY

Glascock Hoffman

ATTORNEY.

UNITED STATES PATENT OFFICE.

WALTER B. MURTHA, OF NEW YORK, N. Y.

SAFETY DEVICE FOR PAPER-CUTTING MACHINES AND THE LIKE.

1,408,020. Specification of Letters Patent. Patented Feb. 23, 1922.

Application filed November 14, 1919. Serial No. 337,906.

To all whom it may concern:

Be it known that I, WALTER B. MURTHA, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Safety Devices for Paper-Cutting Machines and the like, of which the following is a full, clear, and exact specification.

This invention relates to safety devices for paper-cutting machines or similar machines, and its object is to provide a device of this character which will be simple in construction, yet very effective in operation. Another object is to so construct the device that it will be brought into action automatically by the starting of the machine, and that it will remain in its active position until it has been removed therefrom by the action of the operator. These and other objects and advantages will appear fully from the description following hereinafter, and the novelty will be pointed out in the appended claims.

While my invention will be described below and illustrated in the accompanying drawings as applied to a paper-cutting machine this is to be considered merely as one example of the manner in which it may be applied and used, and it is to be understood that my device may be used on other machines, such as for instance punching presses, or other presses, in fact on any machine in which a member such as a knife, punch, plunger or similar device moves toward a table of other support holding the work to be treated or to be acted upon by such member and where there is likelihood of the operator's hand or fingers being injured by the moving member, and the description and claims are to be understood as intended to cover my invention as applied to any machine of this general character.

In paper-cutting machines particularly, in which a knife mounted in the machine frame moves downward to cut a stack of paper lying on a table, there is a tendency among operators to still adjust the stack of papers, even after the knife has started on its cutting movement, resulting frequently in serious injury to the hand or fingers of the operator. With a machine provided with my safety device it will be practically impossible for the operator to touch the paper or other article on the table, or at least to keep his hand or fingers in the plane of movement of the knife or other moving member, once this latter has started on its downward movement. This is accomplished by a safety gate which is allowed to drop down on the table by gravity, as soon as the knife or other member begins to move. While the gate will not injure the operator in case his hand should still be in the path of the gate it will cause him to withdraw it quickly, and thus prevent injury by the knife.

In the drawings, Fig. 1 is a fragmentary elevation of a conventional type of paper cutting machine, with my safety device in the raised or inoperative position; Fig. 2 is a view similar to Fig. 1, but showing the safety device in its active or lowered position; Fig. 3 is a plan view of the machine shown in Figs. 1 and 2, with the safety device attached; Fig. 4 is an enlarged detail section taken on line 4—4 of Fig. 1; and Fig. 5 is a corresponding section taken on line 5—5 of Fig. 2.

10 and 11 are vertical frame members connected at the top by a cross bar 12, and forming vertical guides for the knife carrier 13 carrying at its lower portion the knife 14 secured thereto by screws 15. The knife, carrier is supported, on the outer side of the frame members 10, 11, on rods 16, 17 one of which, 16 is inclined and passes through a guiding bracket 18 on the frame member 11. This rod 16 is reciprocated in the direction of its axis by well-known mechanism (not shown), and imparts to the knife 14 a similarly inclined downward movement, so as to cut a stack of paper 19 supported on a stationary table 20 rigidly connected with the frame members 10 and 11. The rod 17 extends in a vertical direction and passes through a slot 13′ in the knife carrier 13, so as to allow the knife carrier to move sideways during its downward movement.

To operate the knife, the machine is provided with the customary starting lever 21 having at its upper end a handle 21′ and being connected at its lower end with an operating rod 22 supported in brackets 23 rigidly connected with the frame of the machine (see Figs. 1 and 3). The details of this mechanism have not been shown, as they are well-known in the art and do not form part of my invention. It will suffice to state that a turning movement of the handle will unlock the starting mechanism, and a swing-

ing movement of the lever 21 will cause the mechanism to reciprocate the knife toward and from the table, as referred to above.

My safety device is constructed as follows: Forwardly of the knife and knife carrier, the frame members 10, 11 are formed with, or have attached thereto, vertically-extending guideways 24 in which is adapted to move upward and downward a gate comprising a rectangular frame 25. The upper and lower frame members are provided with a series of aligning holes, through which extend loosely and slidably rods 26, the lower ends of which may be made pointed or tapering. The rods 26 slide freely in the frame 25, but this movement is limited by a pin 27 extending through each rod 26 intermediate the upper and lower gate frame members. To the upper gate-frame member is secured a plate 28 extending beyond the upper edge of the gate and provided in this upward extension with a hole 28′, for the purpose of suspending the gate in its inactive position, as will be described presently.

The cross bar 12 of the machine frame is provided with brackets 29 in which is hingedly supported as at 29′ an arm consisting of a portion 30 extending forwardly, and a portion 30′ extending rearwardly. At a short distance from the pivot 29′, the arm portion 30 is bent downwardly and carries at its lower end a U-shaped bracket 31 rigidly secured thereto. To this bracket 31 is fulcrumed, as at 31′, a hook-shaped member or latch 32, the upper portion of which is adapted to enter at times the hole 28′ in the plate 28 secured to the gate 25 and thus hold the gate in its upper or inactive position (see Figs. 1 and 4).

The arm portion 30′ is substantially S-shaped, that is, it extends from the pivot 29′ first rearwardly then downwardly, and then again rearwardly, and is considerably longer and consequently heavier than the arm portion 30. It follows that when allowed to swing freely, the arm portion 30′ will swing down and the portion 30 will swing up, thus carrying the bracket 31 and latch 32 away from the plane of the gate 25.

With the knife and knife carrier in their uppermost position or position of rest, the upper edge of the carrier holds the arm portion 30′ up (Fig. 4) and thus the arm portion 30 is held in a position in which the latch 32 supports the safety gate 25 in its upper or inactive position.

The operation of my safety device is as follows: After the operator has adjusted a stack of paper to be cut (such as 19) on the table 20, he throws in the knife-operating mechanism by operating the handle 21′ and lever 21 as described above. As soon as the knife carrier starts to move on its downward stroke, the arm portion 30′ (owing to the excess of its weight over the arm portion 30) follows this movement, thus swinging the arm portion 30 upward and the hook or latch 32 away from the gate plate 28. The gate 25 is then no longer suspended and will quickly drop by gravity until it comes to a stop, with some of the rods 26 resting on the stack of paper and some on the table 20. Inasmuch as the movement of the knife is controlled by the mechanism and is comparatively slow, while the gate falls by gravity, the latter reaches its lower position considerably sooner than the knife. Should the operator, after having started the mechanism still be adjusting the stack of paper, as happens frequently, or should he for any other reason happen to place his hand or fingers in the path of the moving knife, the falling gate will strike his hand and cause him to withdraw it quickly from the path of the moving knife.

Owing to the fact that the rods 26 are supported yieldably in the gate frame 25, these rods will give when striking the operator's hand and are therefore not liable to injure him. In the upper or inoperative position of the gate, the rods 26 will be held in the frame members 25 by the pins or stops 27 engaging the lower frame member, while in the lower or active position of the gate the frame will be supported by the stops 27 on those rods which come to rest on the stack of papers to be cut, these stops engaging the upper frame member from below as shown in Fig. 2.

If desired, I might provide means whereby the gate is again raised automatically by the upward movement of the knife and knife carrier. However, for the sake of additional safety, I prefer to arrange and construct the device in such a manner that the gate will stay in its lowered or active position until it is raised by the operator by hand. This is of special importance for the reason that in machines of this character the knife often "repeats", that is to say, instead of stopping after it has been returned to its upper position, the knife moves down a second time, due to the fact that the knife actuating mechanism has not been stopped properly or in proper time. In this case additional protection is afforded the operator, in that before he can remove the stack of paper which has just been cut he is compelled to raise the gate by hand, and if then the knife has not come to a stop in its position of rest, he is unable to secure the gate in its upper position, and he has to hold it up either by hand or allow it to drop again, until he has adjusted the knife-operating mechanism so that the knife will not repeat again.

In order to allow the arm portion 30′ to swing downward, the cross bar 12 is provided with a suitable recess 12′, which also

serves to limit the swinging movement of the arm. The upward movement of the knife carrier swings the arm from the position shown in Fig. 5 to that shown in Fig. 4, in which the latch member 32 will be in the path of the plate 28 when the latter is moved upward with the gate 25. The upper edge of the plate 28 is beveled, for the purpose of pushing the upper portion of the latch member back when the plate moves up. The latch member will then snap into the hole 28′ of the plate 28 and the gate 25 will thus be suspended in its inactive position, until the knife carrier mechanism is set in motion again, releasing the gate, as described above.

In case the machine to which my safety device is to be applied, has no cross bar, such as 12, or other suitable part to which the latch mechanism can be attached, a separate cross bar or other member may be provided, which member will, of course, be connected with the machine frame rigidly.

It is to be understood that the description given above and the illustrations in the drawings are meant as an example only of my invention, and that various modifications may be made without departing from the nature of my invention as set forth in the appended claims.

I claim:

1. In a machine having a support and a member movable toward and from said support, a safety device carried by said machine and normally resting in operative position on said support, means for latching the safety device in its inoperative position means whereby when the member is at the point farthest from its support said latching means is rendered operative, and means operable at the beginning of the movement of said member toward its support for releasing said safety device and allowing it to move by gravity to its normal operative position.

2. In a machine having a support and an operating part having a relatively slow movement toward and from said support, a safety device carried by said machine and normally resting in operative position upon said support, means for latching the safety device in its inoperative position, means whereby when the operating part is at the point farthest from the support said latching means is rendered operative, and means operable at the beginning of the movement of said operating part toward the support for releasing said safety device and allowing it to move by gravity to its normal operative position at a speed greater than that of said operating part.

3. In a machine having an operating part and a safety device therefor, both adapted to move toward said support, means for holding said safety device in its inoperative position, away from said support, while said operating part is in its inactive position, and a releasing device operated by the active movement of said operating part, to release said safety device and allow it to move toward said support by gravity.

4. In a machine having a support and an operating member movable toward and from said support, a safety device mounted on said machine for movement toward and from said support, a catch member for temporarily supporting said safety device in its position away from said support, and means for operating said catch member to release said safety device when said operating member begins its active or working stroke toward said support.

5. In a machine having a reciprocating operating part and a support for an article to be worked on by said operating part, a safety device carried on said machine and adapted to be moved toward said support during the working stroke of said operating part, said device consisting of a frame and rods movable in said frame in the direction of movement of said device.

6. In a machine having a reciprocating operating part and a support for an article to be worked on by said operating part, a safety device carried on said machine and mounted for movement toward and from said support and adapted to be brought into active position on said support during the movement of said operating part toward said support, said device comprising a frame, rods movable in said frame in the direction of movement of said device, and stops on said rods for limiting their movement with respect to the frame.

In testimony whereof, I affix my signature, in presence of two witnesses.

WALTER B. MURTHA.

Witnesses:
AGNES M. SHEA,
ROSE TURK.