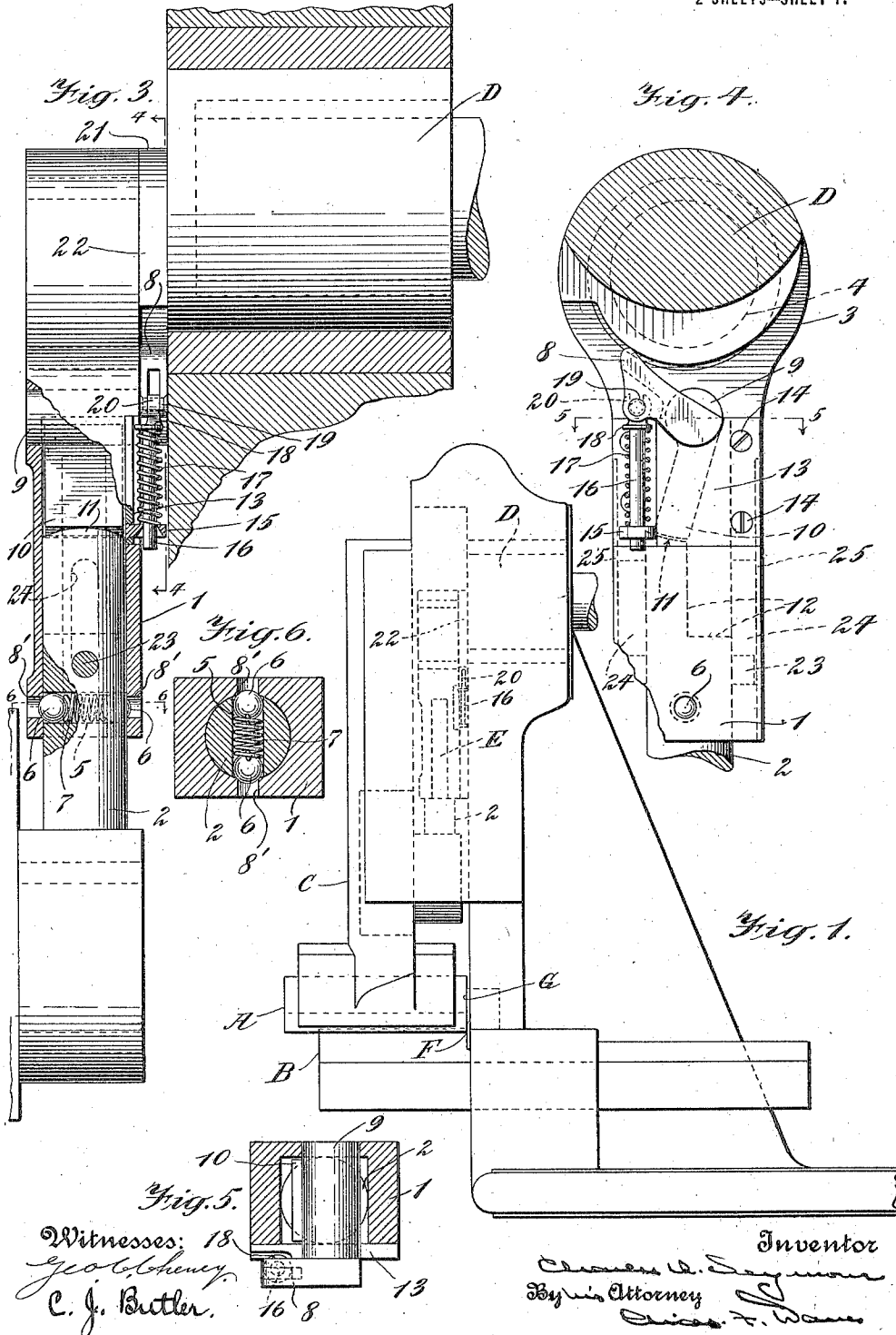


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SAFETY OPERATING MECHANISM.
APPLICATION FILED AUG. 8, 1914.

1,294,959.

Patented Feb. 18, 1919.
2 SHEETS—SHEET 1.

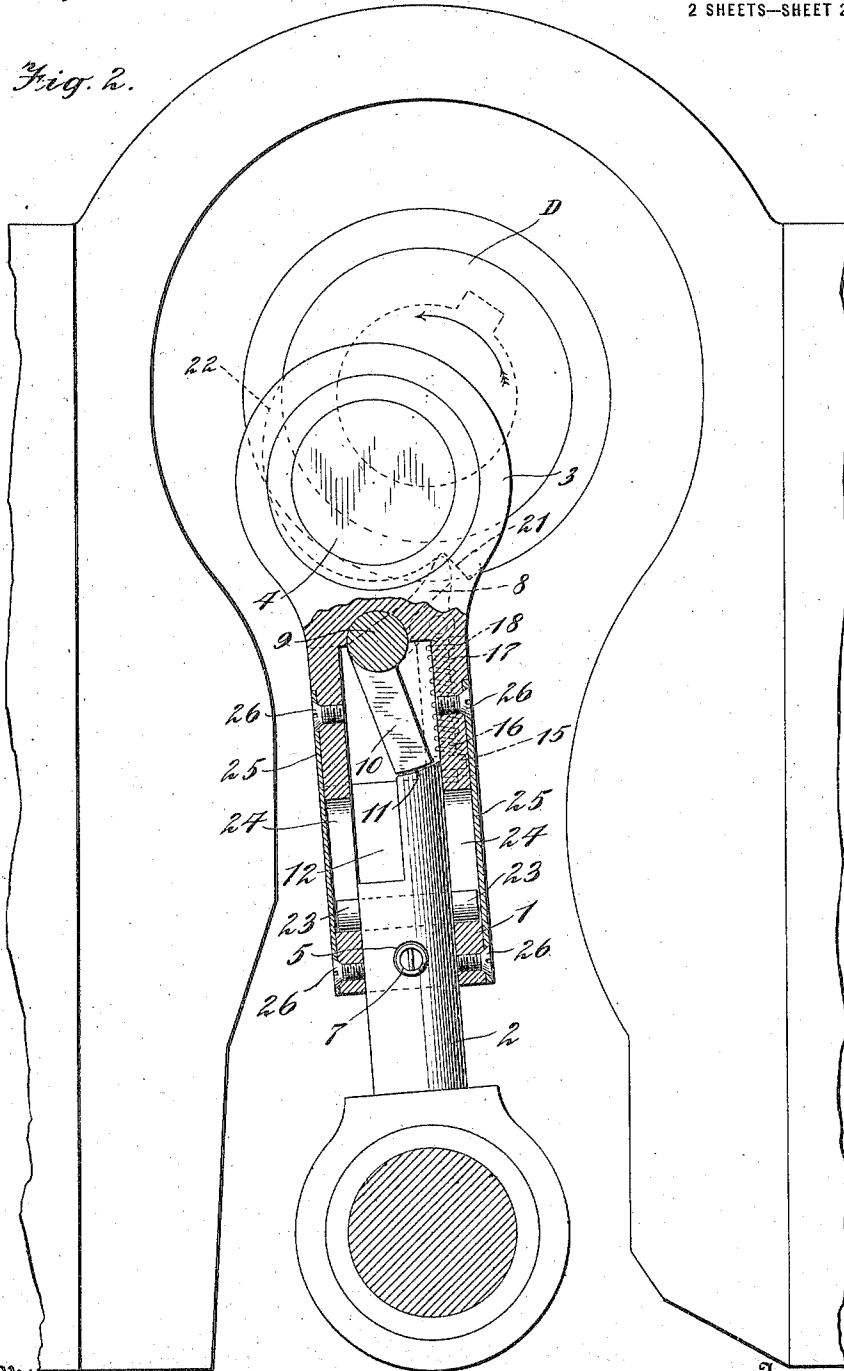


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Fig. 2.



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UNITED STATES PATENT OFFICE.

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SAFETY OPERATING MECHANISM.

1,294,959.

Specification of Letters Patent.

Patented Feb. 18, 1919.

Application filed August 8, 1914. Serial No. 855,823.

To all whom it may concern:

Be it known that I, CHARLES R. SEYMOUR, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Safety Operating Mechanism, of which the following is a specification.

This invention relates to safety operating mechanism for punching machines, presses, box staying machines and the like, and has for its object to provide a novel safety operating mechanism of the same general type as that disclosed in the patent to Charles F. Root, No. 1,131,161, of March 9, 1915, but having the improvements hereinafter set forth.

In the patent above referred to a collapsible pitman comprising two normally yielding parts is disclosed for transmitting power from an actuating means to a work-performing element, the pitman having associated therewith a shiftable element automatically actuated just prior to the engagement of the work by the work-performing element to render the normally yielding parts of the pitman rigid and non-yielding. The actuation of the shiftable element, in the aforesaid patent, is effected by means of a relatively stationary part of the construction with which the shiftable element or certain construction associated therewith contacts during the movement of the pitman to render the pitman rigid and non-yielding just before the work-performing element of the machine acts upon the work. In the present instance, the equivalent of the shiftable element is actuated by means which is associated with the moving elements of the mechanism, and, therefore, the operating mechanism is practically self-contained, needing no stationary parts to effect the operation of the shiftable element, hereinbefore referred to. This constitutes the most important improvement over the construction disclosed in the aforesaid patent, but, as will hereinafter appear, certain other novel features exist in the present improved construction.

The main reason for employing the collapsible pitman or safety operating mechanism is to insure the safety of the operator,

as the parts of the pitman will yield at all times until the work-performing element is close enough to the work to finish its stroke without doing any damage, at which time, the shiftable element will be operated to render the parts rigid and non-yielding, so that sufficient power may be transmitted from the actuating means to the work-performing element to cause the latter to properly perform its function. If the work-performing element comes in contact with the operator's hand, or any part of his body, the parts of the pitman will, therefore, yield and the operator will be uninjured.

The invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation of a portion of a box staying machine showing the improved collapsible pitman applied thereto;

Fig. 2 is a broken front elevation of the collapsible pitman showing the front portion thereof broken away to illustrate the internal mechanism;

Fig. 3 is a side elevation of the collapsible pitman, certain parts being shown in section;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a horizontal section taken on the line 5—5 of Fig. 4; and

Fig. 6 is a horizontal section taken on the line 6—6 of Fig. 3.

The improved collapsible pitman may be used in combination with numerous different machines, but to illustrate its use, it is shown in the present instance in combination with a box staying machine having the usual movable pressing die or jam A, and the stationary box-supporting die or anvil B with which said movable die coöperates in applying a stay to a box corner. The movable die A is carried by a sliding head C, between which and the actuating shaft D, the collapsible pitman E is interposed.

The pitman comprises two relatively movable parts 1 and 2, one adapted to telescope within the other. In the present instance, the lower part, or that indicated at 2, telescopes within the upper and outer part 1. The lower part 2 is connected to the sliding head C of the staying machine, while the part 1 carries a sleeve 3 which encircles and

is actuated by a pin 4 eccentrically mounted on the actuating shaft D of the staying machine.

The relatively movable and yielding parts 1 and 2 are normally held in the position shown in the drawings, by the following means. The part 2 is provided with a transverse bore or opening 5, in which two spring-pressed balls 6 are positioned, said balls being separated by a spring 7. The outer member 1 is provided with openings 8' of less diameter than the balls and so situated that the spring 7 normally forces the two balls in opposite directions to cause a portion of the same to engage in the openings 8' of the part 1, as best shown in Figs. 3 and 6.

Mounted in the upper portion of the part 1 is a pawl 8 carried by a short stub shaft 9, which serves to pivotally mount the pawl 8 on the part 1. The stub shaft 9 also carries a depending portion or shiftable element 10, which assumes the position shown in Fig. 2, when the pawl 8 is in its raised position. When in such position, the depending portion or shiftable element 10 contacts with the upper extremity 11 of the lower part 2 of the pitman, thereby preventing yielding or relative movement of the parts 1 and 2. When said shiftable element 10 is moved to the left, however, the same will be in alinement with a cut-out portion or recess 12, provided in the part 2, and, therefore, parts 1 and 2, under such conditions, are permitted to further telescope or move relative to each other.

In order to facilitate assembling of the parts, a removable plate 13 is held in place on the back of the pitman by any suitable means, such as the screws 14. This plate permits the stub shaft 9 to be positioned, and when the plate is in place, a portion of the upper edge thereof constitutes a bearing for one end of the stub shaft or pivot 9. The plate 13 also carries a projection 15 through which a pin 16 passes, said pin being connected at its upper end to the pawl 8. A spring 17 interposed between the projection 15 and a suitably formed shoulder 18 on the pin, serves to yieldingly hold the pawl 8 in its raised position, shown in the drawings. The connection between the pawl 8 and the pin 16 is preferably such that the pin 16 and spring 17 may be readily removed, so, in order to accomplish this, the pawl 8 is provided with a cross-pin 19, and the upper extremity of the pin 16 is bifurcated, as shown at 20, so that the pin 19 of the pawl rests in the slot formed in the bifurcated end of the pin 16. In this way, the pin may be readily removed at any time by simply depressing the same, so that the bifurcated extremity of the pin will be disengaged from the cross-pin 19 of the pawl. As the shiftable element 10 or depending portion 10 moves unitarily

with the pawl 8, it will assume the position shown in the drawings to render the parts of the pitman rigid when the pawl 8 is in its raised position.

Interposed between the actuating shaft of the staying machine and the pin 4, is a cam 22 having a peripheral operative face with which the pawl 8 engages. This cam may be formed as an integral part of the actuating shaft D and the pin 4, so that as the pin moves bodily through its circular path, the pawl 8, moving relative to the peripheral face of the cam, will be controlled thereby. The operative face of the cam is so formed that during the major part of the down stroke of the pitman, the pawl 8 will be depressed and the shiftable element, 10, will be in alinement with the recess 12. In other words, the pawl 8 will be in engagement with the high part of the cam during the major portion of the down stroke of the pitman. If any obstruction lies in the path of the work-performing element or the die A, such as the operator's hand or finger, the parts 1 and 2 will yield and the motion of part 1 will, therefore, not be transmitted to the part 2. The strength of the spring 7 is such that the parts 1 and 2 will retain their relative positions, if no obstruction is met with. In the present instance, the spring 7 is of such strength as to permit the cutter F at the rear end of the die A, upon the descent of the pitman, to cooperate with the stationary cutter G and cut off the box stay, but the spring is not of sufficient strength to resist the yielding of the parts in case an obstruction, such as the operator's hand or the like, is encountered during the movement of the pitman.

When the work-performing element or the movable die A is about one-eighth of an inch from the work, the pawl 8 will encounter a depression in the cam, shown at 21, so that the spring 17 will immediately raise the pawl 8, thereby shifting the element 10 into the position shown in Figs. 2 and 4. As the element 10 will then contact with the upper extremity 11 of the part 2, the normally yielding parts 1 and 2 will be rendered rigid and non-yielding for the remainder of the stroke, and the work will be properly acted upon by the work-performing element. The low part of the cam 21 is of sufficient length to permit the shiftable element 10 to remain in this position until after the work has been operated upon. On the up stroke of the pitman, the swell 22 of the cam will shift the pawl 8 and throw the element 10 into alinement with the recess or cutout portion 12 of the part 2, in which position, said element will be held by the cam until the work-performing element on its down stroke is again within one-eighth of an inch of the work.

The part 2 of the pitman preferably carries a cross-pin 23, whose extremities engage in oppositely disposed vertical slots 24

formed in the sides of the outer member 1. On the up stroke of the pitman, the lower ends of these slots will therefore engage with the extremities of the pin 23, and the outer member 1 will "pick up" the part 2 during the upward movement of the former. The part 2 is, therefore, moved upwardly in a positive manner by this pin and slot construction, but, as will be obvious, this construction will not interfere with the collapsing or yielding of the parts as hereinbefore described. In order to conceal the slots 24, removable closure plates 25 are provided which are secured to the sides of the part 1, preferably by means of the screws 26. For the sake of neatness, the outer surface of each of these plates is preferably flush with the corresponding side of the part 1, as will be apparent from Fig. 2.

From the foregoing, it will be seen that the safety pitman is practically self-contained, as no structure other than that associated directly with the moving parts of the mechanism, is needed to effect the actuation of the safety devices. It will also be noted that the pawl 8 cannot be shifted to bring the element 10 over the extremity 11 of the part 2 until it is the proper time for this condition to exist, to wit, when the work-performing element is about one-eighth of an inch from the work to be operated upon. The shiftable element 10 can therefore always be relied upon as being in alinement with the recess 12 during the down stroke of the pitman and up to the time that the work-performing element is within the desired distance of the work, and, therefore, it is impossible for the operator to become injured, if his hand, or any part of his body, should lie in the path of the work-performing element.

What I claim is:—

1. Safety operating mechanism for operating the work-performing element of machines of the kind described, comprising a pitman having relatively movable parts, means for actuating the same, yielding means for causing said pitman parts to move as a unit during the working stroke of the pitman, locking means operative to render said parts rigid and non-yielding, and means associated with said relatively movable parts and with the actuating means therefor automatically operative near the end of each working stroke of the pitman and just prior to the engagement of the work by the work-performing element to render said locking means operative.

2. Safety operating mechanism for operating the work performing element of machines of the kind described, comprising a pitman having relatively movable and yielding parts, means for actuating the same, locking means effective in its operative position to render said parts rigid and non-

yielding, a cam operative to maintain said locking means in its inoperative position during the initial movement of the pitman, but ineffective to maintain the locking means in such inoperative position just prior to the engagement of the work by the work performing element, and means for rendering the locking means operative.

3. Safety operating mechanism for operating the work performing element of machines of the kind described, comprising a pitman having relatively movable and yielding parts, means for actuating the same, locking means effective in its operative position to render such parts rigid and non-yielding, means for maintaining the locking means in inoperative position during the initial movement of the pitman, and means associated with said relatively movable parts and with the actuating means therefor, automatically operative near the end of each working stroke of the pitman and just prior to the engagement of the work by the work performing element to render said locking means operative.

4. The combination with a work-performing element and its actuating means, of connections between the same, yielding means to cause said connections to move as a unit during the working stroke of said element, means to render said connections rigid and non-yielding, and means associated with the actuating means to automatically render said last-named means ineffective until and just prior to the engagement of the work by the work-performing element.

5. The combination with a work-performing element and its actuating means, of connections between the same, yielding means to cause said connections to move as a unit during the working stroke of said element, means to render said connections rigid and non-yielding, and a cam associated with the actuating means to automatically render said last-named means ineffective until and just prior to the engagement of the work by the work-performing element.

6. Safety operating mechanism for operating the work-performing element of machines of the kind described, comprising a pitman having relatively movable parts, yielding means for causing said parts to move as a unit during the working stroke of the pitman, a pivoted element carried by one of said parts adapted to be shifted to render said parts rigid and non-yielding, a cam associated with the actuating means and operative during each working stroke of the pitman to maintain the pivoted element in inoperative position until just prior to the engagement of the work by the work-performing element, and means for shifting the pivoted element to its operative position.

7. Safety operating mechanism for oper-

ating the work-performing element of machines of the kind described, comprising a pitman having relatively movable parts, yielding means for causing said parts to
 5 move as a unit during the working stroke of the pitman, a pivoted element carried by one of said parts, a spring to shift the same to render said parts rigid and non-yielding, and a cam operative during each working
 10 stroke of the pitman to prevent shifting of said pivoted element until just prior to the engagement of the work by the work-performing element.

8. Safety operating mechanism for operating the work-performing element of machines of the kind described, comprising a pitman having relatively movable parts, yielding means for causing said parts to
 20 move as a unit during the working stroke of the pitman, means to render said parts rigid and non-yielding, a cam associated with the actuating means and adjacent said pitman and operative during each working stroke of the pitman to prevent actuation
 25 of said means until just prior to the engagement of the work by the work-performing element, and means for actuating the aforementioned means to render the movable parts rigid and non-yielding.

9. In a machine having a reciprocating work-engaging element and an anvil, means having a breakable joint for operating the element, means for making the joint when
 30 there is free space between the element and anvil, and means to automatically and positively prevent the making of the joint when the element encounters an obstruction extraneous to the work.

10. The combination with a work-performing element and its actuating means, of
 40 a connection between the two which is capable of being rendered operative and inoperative, and positively acting means for controlling the action of the connection to permit it to become operative just prior to the
 45 engagement of the work by the work-performing element.

11. The combination with a work-performing element and its actuating means, of
 50 a connection between the two which is capable of being rendered operative and inoperative, and cam means for controlling the action of the connection to permit it to become operative just prior to the engagement of
 55 the work by the work-performing element.

12. The combination with a work-performing element and its actuating means, of a connection between the two which is capable of being rendered operative and inoperative, and positively acting means for retaining the connection inoperative until just
 60 prior to the engagement of the work by the work-performing element.

13. The combination with a work-performing element and its actuating means, of

a connection between the two which is capable of being rendered operative and inoperative, and a cam for retaining the connection inoperative until just prior to the engagement of the work by the work-performing
 70 element.

14. The combination with a work-performing element and its actuating element, of means capable of being rendered operative and inoperative to actuate the work-
 75 performing element, and means associated with the aforementioned means and with one of said elements to retain said means inoperative until just prior to the engagement of the work by the work-performing
 80 element.

15. The combination with a work-performing element and its actuating element, of means capable of being rendered operative and inoperative to actuate the work-
 85 performing element, and cam means associated with the aforementioned means and with one of said elements to retain said means inoperative until just prior to the engagement of the work by the work-perform-
 90 ing element.

16. The combination with a reciprocating work-performing element and normally inoperative driving means therefor, of means
 95 connecting said element to the driving means, cam means rotated by the driving element to control said connecting means to maintain the same inoperative and to allow the same to be rendered operative, and
 100 means controlled by the movements of the work engaging element to actuate said connecting means to render the same operative.

17. The combination with a reciprocating work-performing element and driving means
 105 therefor, of means capable of being locked and unlocked for actuating the work-performing element from the driving means, rotary cam means to normally retain the first named means unlocked, and means to
 110 lock the first named means when the path of the element to the work is free.

18. The combination with a reciprocating work-performing element and a driver therefor, of means capable of being rendered operative and inoperative for actuating the
 115 work engaging element from the driver, and cam means rotated by the driver to permit the aforementioned means to be rendered operative just prior to the engagement of the work by the work-performing element.
 120

19. In a safety device for imparting movement to a reciprocating work-performing member, two link connections and a locking
 125 bar therefor, and automatic means controlled by the movements of the member for actuating the locking bar to lock and unlock the links.

20. In a machine of the kind described, the combination with the actuating means and a work-performing element, of a normally in-
 130

operative power transmitting element pivot-
ally associated with the work-performing ele-
ment, and means associated with and actu-
ated by the actuating means, automatically,
5 just prior to the engaging of the work by
the work-performing element to permit such
power transmitting element to shift to its
operating position.

Signed at Rochester, in the county of Mon-
roe, and State of New York, this 3d day of 10
August A. D. 1914.

CHARLES R. SEYMOUR.

Witnesses:

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