

No. 618,065.

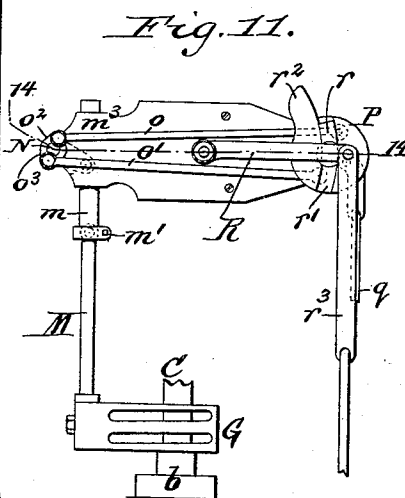
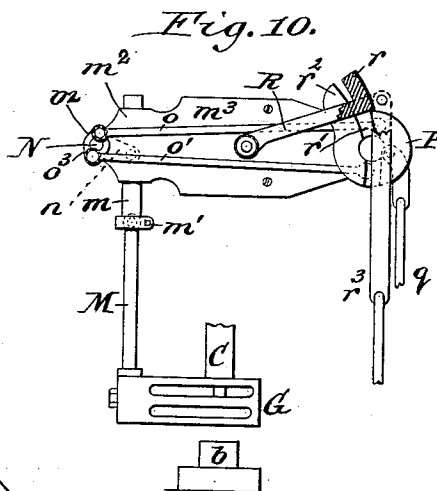
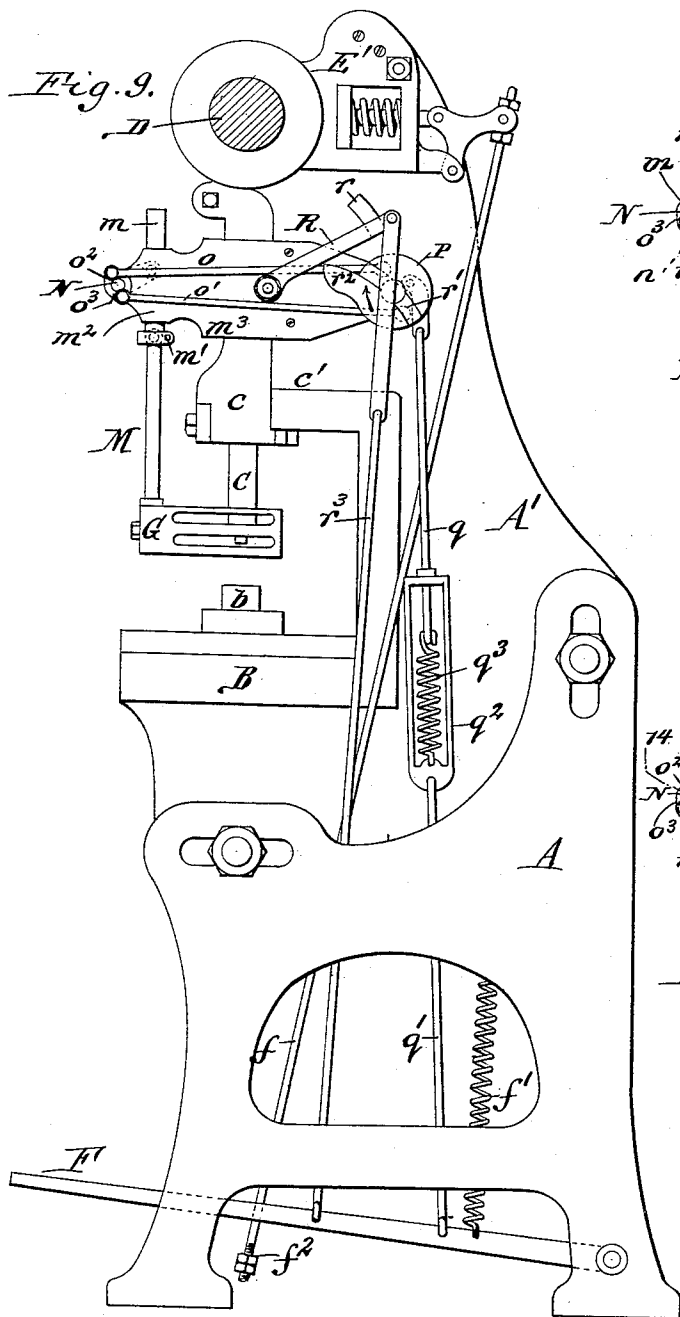
Patented Jan. 24, 1899.

T. A. DICKS & W. A. WARMAN.
SAFETY ATTACHMENT FOR PRESSES.

(Application filed June 10, 1896. Renewed June 18, 1898.)

(No Model.)

5 Sheets—Sheet 3.



Witnesses:
Theo. L. Popp.
T. Gustav Wilhelm.

Thos. A. Dicks
W. A. Warman } Inventors.
By Wilhelm H. Brown.
Attorneys.

No. 618,065.

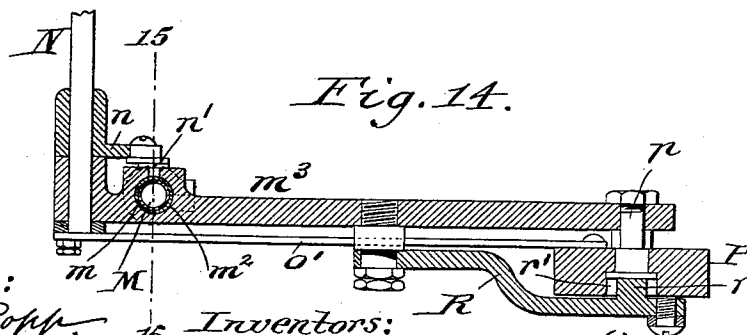
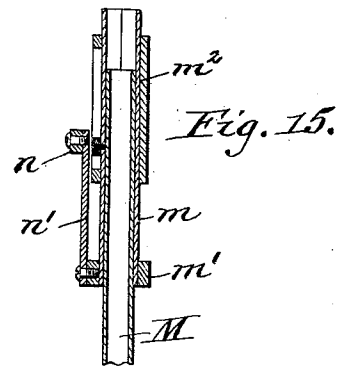
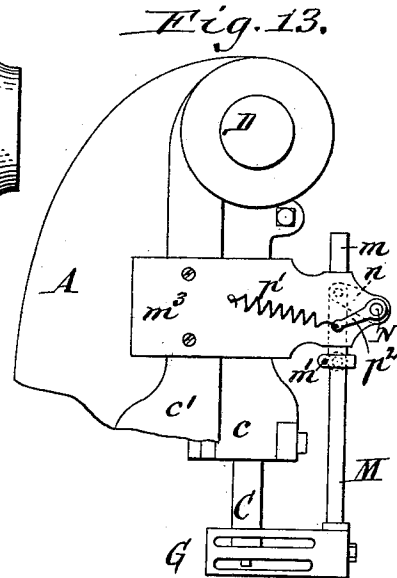
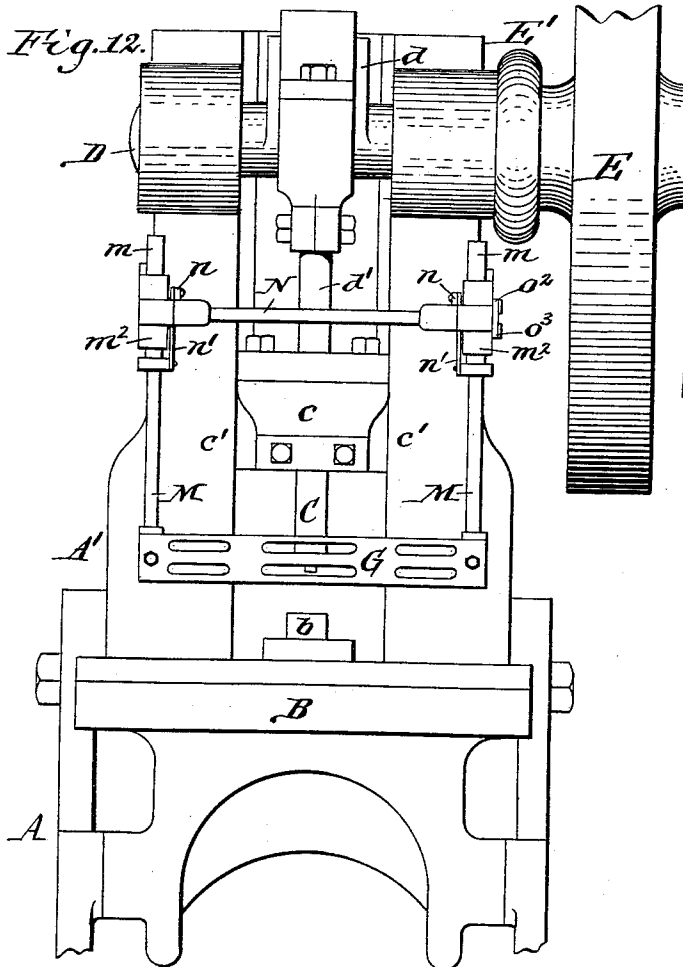
Patented Jan. 24, 1899.

T. A. DICKS & W. A. WARMAN.
SAFETY ATTACHMENT FOR PRESSES.

(Application filed June 10, 1896. Renewed June 18, 1898.)

(No Model.)

5 Sheets—Sheet 4.



Witnesses:

Theo. L. Popp.
F. Gustav. Wilhelm.

Inventors:

T. A. Dicks.
W. A. Warman.

By Wilhelm Horner
Attorneys.

No. 618,065.

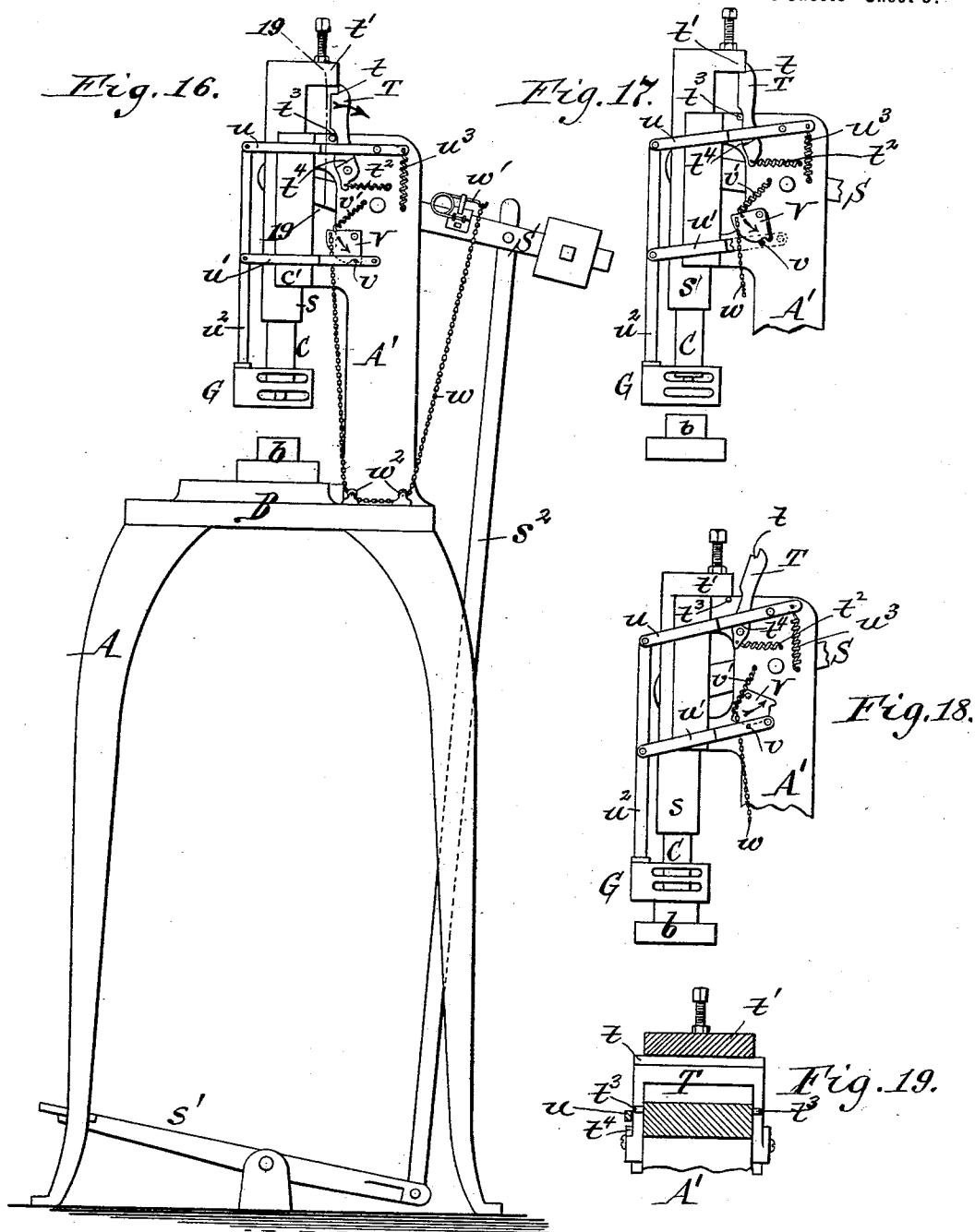
Patented Jan. 24, 1899.

T. A. DICKS & W. A. WARMAN.
SAFETY ATTACHMENT FOR PRESSES.

(Application filed June 10, 1898. Renewed June 18, 1898.)

(No Model.)

5 Sheets—Sheet 5.



Witnesses:

Thos. L. Popp.
F. Gustav Wilhelm.

Thos. A. Dicks
W. A. Warman } Inventors.
By Wilhelm Bonnet
Attorneys.

UNITED STATES PATENT OFFICE.

THOMAS A. DICKS AND WILLIAM A. WARMAN, OF NIAGARA FALLS,
NEW YORK.

SAFETY ATTACHMENT FOR PRESSES.

SPECIFICATION forming part of Letters Patent No. 618,065, dated January 24, 1899.

Application filed June 10, 1896. Renewed June 18, 1898. Serial No. 683,865. (No model.)

To all whom it may concern:

Be it known that we, THOMAS A. DICKS, a subject of the Queen of Great Britain, and WILLIAM A. WARMAN, a citizen of the United States, both residing at Niagara Falls, in the county of Niagara, in the State of New York, have invented new and useful Improvements in Safety Attachments for Presses, of which the following is a specification.

10 This invention has for its object to produce a safety attachment for stamping and other presses whereby injury to the hands of the operator is prevented; and it consists, briefly stated, of a guard, detector, or controlling device which moves down in advance of the
15 downward movement of the punch and prevents the punch from being moved down by its actuating mechanism if the guard or detector encounters in its downward movement
20 an obstruction—for instance, the hand of the operator—so that as a result of this arrangement the punch is prevented from moving down if the hand of the operator has not been removed before the guard or detector descends.
25

In the accompanying drawings, consisting of five sheets, Figure 1 is a side elevation of a power stamping-press, partly in section, provided with one form of our improved guard mechanism and showing the parts in their normal position. Fig. 2 is a similar view of the guard mechanism, showing the position of the parts when the guard strikes an obstruction on or adjacent to the die. Fig. 3
35 is a similar view showing the position of the parts when the guard descends its full extent. Fig. 4 is a front elevation of the stamping-press shown in Fig. 1. Fig. 5 is a fragmentary side elevation of the upper portion of the stamping-press and the guard mechanism,
40 viewed from the side opposite to that shown in Fig. 1. Fig. 6 is a vertical section, on an enlarged scale, in line 6 6, Fig. 1. Fig. 7 is a horizontal section in line 7 7, Fig. 6. Fig. 8 is a top plan view of the guard and connecting parts. Fig. 9 is a side elevation of a power stamping-press provided with a modification
45 of our improved guard mechanism, showing the position of the parts when the punch is elevated. Fig. 10 is a similar view of the guard mechanism, showing the position of

the parts when the guard strikes an obstruction on or adjacent to the die. Fig. 11 is a similar view showing the position of the parts when the guard descends its full extent. Fig. 12 is a front elevation of the press and guard mechanism shown in Fig. 9. Fig. 13 is a fragmentary side elevation of the upper portion of the press and guard mechanism, viewed from the side opposite to that shown in Fig. 9. Fig. 14 is a horizontal section, on an enlarged scale, in line 14 14, Fig. 11. Fig. 15 is a vertical section in line 15 15, Fig. 14. Fig. 16 is a side elevation of a foot-press provided with a modification of our guard mechanism and showing the position of the parts when the punch is raised. Fig. 17 is a similar view showing the position of the parts when the guard in its descent strikes an obstruction adjacent to the die. Fig. 18 is a similar view showing the position of the parts when the guard descends freely. Fig. 19 is a vertical cross-section, on an enlarged scale, in line 19 19, Fig. 16.

Like letters of reference refer to like parts in the several figures.

In Figs. 1 to 8 one form of our improved guard mechanism is shown in connection with a power sheet-metal-stamping press, which consists, essentially, of a lower frame-section or base A, an upper frame-section or standard A', adjustably connected with the lower frame-section and provided with a table B, a lower die *b*, mounted on the table, an upper punch C, cooperating with said die and secured to a vertically-reciprocating cross-head *c*, which slides in guides *c'* on the upper portion of the standard, a driving-shaft D, journaled horizontally in bearings at the upper end of the standard and having an eccentric or crank *d* connected with the cross-head by a rod *d'*, a continuously-rotating driving wheel or pulley E, which is coupled with or uncoupled from the crank-shaft by a clutch E' of usual and well-known construction, and a treadle F, pivoted with its rear end on the base and connected by a clutch-rod *f* with the clutch. The latter is preferably of such construction that the driving-pulley is coupled with the driving-shaft upon depressing the treadle, while upon raising the treadle by means of a spring *f'* the shaft is automatic-
100

ally uncoupled from the driving-wheel after the shaft has made one complete revolution and the punch is in its normal or highest position. The clutch-rod is loosely connected with the treadle, so that the latter will not operate the clutch during the first portion of its downward movement. This loose or slack connection may be made in various ways—for instance, by passing the rod loosely through an opening in the treadle and arranging a screw-nut or shoulder f^2 on the rod a sufficient distance below the treadle to permit of the requisite initial dead movement of the treadle, as shown in Fig. 1.

G represents a guard or detector adapted to descend in advance of the punch and to control the operation of the clutch which couples and uncouples the driving wheel and shaft. This guard or detector has preferably the form of a U-shaped frame and extends along the front and the sides of the die and punch, as shown in Fig. 8.

H H' represent upper and lower horizontal rock-levers, a pair of which is arranged parallel on each side of the standard and pivoted with their rear ends by bolts h to a supporting plate or bracket h' on the standard and connected at their front ends with the guard or detector. This connection between each pair of rock-levers and the guard or detector may be made in any suitable way, but consists, preferably, of a vertical bar h^2 , pivotally connected with the outer ends of the pair of rock-levers, an intermediate bar h^3 , adjustably connected with the lower portion of the vertical connecting-bar h^2 by bolts h^4 , and a lower transverse bar h^5 , adjustably connected with the intermediate bar and the detector. The two pairs of rock-levers on opposite sides of the standard are caused to rise and fall together for maintaining the detector in its proper horizontal position by means of a rock-shaft I, journaled in the front portions of the supporting-plates and provided at opposite ends with rearwardly-projecting rock-arms i , which are connected by links i' with the upper rock-levers H, between the front and rear ends thereof. The rock-levers are yieldingly held in an elevated position for holding the detector normally above the die by means of springs i^2 , connecting the intermediate portion of the upper rock-levers with the vertical connecting-bars h^2 . These springs are strained when the detector is depressed by reason of the upper rock-levers and the vertical connecting-bars being shifted into an obtuse angle with reference to each other during this movement, as shown in Fig. 3. When these parts are free to ascend, the springs draw the vertical bars and upper rock-levers together into a substantially right-angle position. As the rock-levers and the vertical bars are drawn together they are at the same time caused to move upwardly with the detector and connecting parts by the lower rock-levers H', which latter partake of the movement of the vertical bars.

J represents a rod connected at its lower end with the treadle and at its upper end with the rock-levers by intermediate devices, so that the detector will be carried downwardly with the treadle, this connection being preferably constructed as follows:

j represents a vertical guide-rod sliding through a perforated lug j' on one of the lower rock-levers and provided at its lower end with a head j^2 , bearing normally against the under side of the lug j' and connected with the upper end of the rod J by a pin j^3 .

j^4 represents a spring surrounding the guide-rod and bearing with its ends against the upper side of the lug j' and a screw-nut j^5 at the upper end of the guide-rod j .

If during the descent of the detector the latter strikes an obstruction which is arranged upon or adjacent to the die, the downward movement of the treadle will be arrested by a stop contrivance before the driving wheel and shaft have been coupled, this stop contrivance being preferably constructed as follows:

K represents a vertically-movable slide which is arranged between the supporting-plate h' and one pair of upper and lower rock-levers and which is provided with guide-slots k , through which the bolts h pass.

K' represents an intermediate lever which is arranged below the lower rock-lever H' and which is pivoted with its front end to the lower portion of the adjacent supporting-plate and connected loosely at its rear end to the slide by means of a bolt K², secured to the lower end of the slide and passing through a slot in the rear end of the rock-lever K'. The pin j^3 , which connects the upper end of the connecting-rod J with the head of the guide-rod j , also passes through the rock-lever K', so that the latter is compelled to move with the treadle.

L represents a stop which is arranged on the slide between the pivots of the upper and lower rock-levers and which preferably consists of two arms or lugs $l l'$, secured to the slide and connected at their outer ends by a bar l^2 , forming an eye or loop, as shown in Fig. 7.

L' represents a stop which is arranged on the upper side of the lower rock-lever, adjacent to the pivot of the latter, and which is adapted to stand in the path of the stop on the slide, so as to obstruct the downward movement of the slide or to clear the path of the slide-stop, so as to permit the slide to move freely downward. This stop of the rock-lever consists, preferably, of three upwardly-projecting fingers or pins $l^3 l^4 l^5$, forming two slots between the central finger l^4 and the adjacent front and rear fingers $l^3 l^5$. The outer ends of the front and center fingers are curved concentrically with the pivot of the lower rock-lever, and the lower side of the slide-stop is curved on its under side on the same radius as the outer ends of the front and center fingers. The rear finger of the

rock-lever stop projects upwardly beyond the lower face of the slide-stop, so that as the slide descends and the lower rock-lever turns the rear stop-finger will strike the rear side of the slide-stop.

The operation of our improved guard mechanism is as follows: When the parts are in their normal or retracted position, the punch and detector are raised so as to clear the die, the slide K is raised so that the slide-stop is out of engagement with the lever-stop, and the latter is swung rearwardly, so that its front and center fingers stand in the path of the lugs on the slide-stop, as represented in Fig. 1. During the first portion of the downward movement of the treadle the slide K is carried downwardly with the same by the rock-lever K' and the detector is also moved downwardly, the spring j^1 being sufficiently stiff for this purpose to produce a practically rigid connection between the rod J and the lower rock-lever H' during this part of the movement. If the detector during its downward movement strikes no obstruction, the lower rock-lever H' is permitted to turn until the rear finger of its stop strikes the rear side of the slide-stop, after which the downward movement of the detector ceases. During the continued downward movement of the treadle the lugs of the slide-stop are caused to engage with the slots of the lever-stop and the spring j^1 is compressed, as represented in Fig. 3. Shortly after the lugs of the slide-stop enter the slots of the lever-stop the treadle strikes the stop at the lower end of the clutch-rod, and during the continued downward movement of the treadle the clutch is operated for coupling the driving-shaft with the driving-pulley, thereby causing the punch to be moved toward and from the die. Upon permitting the treadle to rise the clutch is operated for uncoupling the driving-shaft and the driving-wheel when the punch is at its highest position and the guard mechanism is restored to its normal retracted position. In the event of the detector striking an obstruction during its descent—for instance, the hand of the operator—its downward movement is arrested before it reaches the end of its downward stroke. This prevents the lower rock-lever from being turned sufficiently to permit the lugs of the slide-stop to enter the slots of the lever-stop, but the front and center fingers of the latter will stand in the path of the front and rear lugs of the slide-stop, whereby the latter in descending strike, these fingers, as represented in Fig. 2, thereby arresting the downward movement of the treadle and preventing the latter from being depressed sufficiently to engage with the shoulder f^2 of the clutch-rod, whereby the clutch is prevented from coupling the driving wheel and shaft.

The modification of our guard mechanism shown in Figs. 9 to 15 is constructed as follows: M M represent two vertical supporting-rods carrying the guard or detector at their lower ends and arranged with their up-

per ends in tubular slides m , to which the rods are adjustably secured by clamps m' . The slides are guided in vertical ways m^2 , arranged at the front ends of brackets m^3 , which are secured to opposite sides of the standard. N represents a rock-shaft journaled transversely in the front ends of the brackets and provided on the inner sides of these brackets with rearwardly-projecting rock-arms n , which are connected with the slides by links n' . $o o'$ represent two horizontal connecting-rods which are connected with their front ends to rock-arms $o^2 o^3$, secured to one end of the rock-shaft, on diametrically opposite sides thereof, and with their rear ends to diametrically opposite sides of a rotary disk P. The latter is pivoted by a horizontal screw p to the rear portion of one of the supporting-brackets, so as to turn in the same plane as the rock-shaft. Upon turning the rotary disk this movement is transmitted to the rock-shaft and from the latter to the detector or guard for lowering the same toward or raising the same from the die. The detector is yieldingly held in a raised position by a spring p' , secured with its ends to one bracket and an arm p^2 on the rock-shaft or to any other suitable part. The rotary movement of the disk for lowering the detector is derived from the treadle by means of a sectional connecting-rod, the upper section q of which is eccentrically connected with the rear portion of the disk, while its lower section q' is connected with the treadle. The two sections of the connecting-rod are yieldingly connected in any suitable manner, so that the lower section can move down independent of the upper section. As shown in Fig. 9, this yielding connection consists of a yoke q^2 , rigidly connected with the lower section and provided with a guide-opening for the upper section, and a spring q^3 , connected at one end to the yoke and with its other end to the upper rod-section. R is a stop-arm pivoted with its rear end to the side of the supporting-bracket which carries the rotary disk and provided at its free rear end with a stop-lug r , which is adapted to engage with a curved groove r' in the face of the rotary disk, the sides of the stop-lug and the groove being curved from the same radius to permit these parts to interlock during the normal operation of the machine. The upper portion of the rotary disk is provided with a stop-finger or projection r^2 , which forms an upward continuation of the front side of the groove in the same and which is adapted to bear against the front side of the stop-lug to limit the rotary movement of the disk. The rear end of the stop-arm is connected with the treadle by a connecting-rod r^3 .

The operation of the guard mechanism shown in Figs. 9 to 15 is as follows: Upon depressing the treadle when the space above the die is clear of all obstructions the first portion of the movement causes the rotary disk to be turned in the direction of the ar-

row, Fig. 1, whereby the guard is depressed until the stop-finger of the disk engages with the stop-lug of the stop-arm, when the rotation of the disk ceases and its groove is shifted into a position concentric with the pivot of the stop-arm. The spring q^3 is sufficiently stiff so that in effect it is practically a rigid connection between the two sections of the rod which connects the treadle with the rotary disk. During the continued downward movement of the treadle the stop-arm is swung downwardly and its lug slides into the groove of the disk, as represented in Fig. 11, whereby the treadle is permitted to bear against the shoulder of the clutch-rod for coupling the driving-shaft with the driving-wheel and operating the punch. During the continued downward movement of the treadle after the rotary movement of the disk has been arrested the lower section of the sectional connecting-rod is permitted to follow the treadle independent of the upper section by the yielding of the spring in the connection between the two sections. If the detector strikes an obstruction over or adjacent to the die, so as to arrest its downward movement before the treadle has exhausted the slack between itself and the clutch-rod, the rotary disk is prevented from turning sufficiently in the direction of the arrow, Fig. 1, to enable the lug of the stop-arm to register with the groove of the disk, which causes the lug to bear against the periphery of the disk in rear of its groove, as represented in Fig. 10, thereby arresting the downward movement of the treadle before the same engages with the shoulder of the clutch-rod and preventing the same from coupling the driving wheel and shaft for operating the punch. Upon releasing the treadle after the punch has performed its operation the treadle is raised by its spring, whereby the clutch is permitted to automatically uncouple the driving wheel and shaft, the stop-lug is moved out of engagement with the groove in the rotary disk, and the rock-shaft is turned by the spring p' for restoring the guard mechanism to its normal position, as shown in Fig. 9.

A modified form of the guard mechanism particularly designed for foot - presses is shown in Figs. 16 to 19 and is constructed as follows: S represents the actuating rock-lever, which is pivoted on the standard and which is connected at its front end with the punch carrier or slide s for moving the same toward and from the die. s' is the treadle, connected with its rear arm to the rear arm of the rock-lever by a connecting-rod s^2 . The punch is normally held in an elevated position by a weight mounted on the rear arm in the usual manner. T represents a stop or catch pivoted with its lower end on the upper end of the standard and provided at its upper end with a shoulder t , which is adapted to engage with a rearwardly-projecting lug t' on the upper end of the slide. The upper end of the catch

is yieldingly moved forward into the path of the slide-lug by a spring t^2 , connecting the lower end of the catch with the standard, this forward movement of the catch being limited by a stop t^3 on the standard. The catch is provided on its side adjacent to the pivot with an inclined trip face or shoulder t^4 . $u u'$ represent a pair of rock-levers pivoted one above the other on the side of the standard and pivotally connected at their outer ends by a vertical connecting-bar u^2 with the guard or detector. The rock-levers and the detector are normally held in an elevated position by a spring u^3 , connecting the rear end of the upper rock-lever with the standard. The upper rock-lever is arranged with its front arm in the path of the shoulder on the catch and is adapted to engage therewith in the normal operation of the mechanism for removing the catch from underneath the lug of the slide and permitting the latter to descend with the punch. V represents a cam which is pivoted on the side of the standard and which is adapted to engage with a pin v on the lower rock-lever for depressing the same and the detector in advance of the downward movement of the punch. This cam is yieldingly held in its retracted position by a spring v' and is turned in the direction of the arrow for lowering the detector by a chain w , which is fastened with its ends to the cam and to a spring w' on the rear arm of the slide - operating lever and passes with its intermediate portion around rollers w^2 , mounted on the table or bed of the foot-press. In the normal or retracted position of the parts, as shown in Fig. 16, the lug of the slide is arranged a short distance above the catch, and the latter is arranged with its shoulder underneath the slide-lug with its inclined trip-face at an angle to the upper lever which supports the guard. Upon depressing the treadle when no obstruction is on or adjacent to the die the first portion of the downward movement of the front arm of the treadle causes the cam to be turned by the slide-lever S , thereby lowering the guard or detector in advance of the downward movement of the punch. As the guard descends the upper rock-lever supporting the same bears against the trip-face of the catch and turns the same in the direction of the arrow, Fig. 16, until the upper rock-lever bears flatly against the entire trip-face of the catch, whereby the upper end of the latter is moved rearwardly from underneath the slide-lug and the slide is permitted to move downward its full extent with the punch, as represented in Fig. 18. If an obstruction prevents the guard from moving downward its full extent, the upper rock-lever will not shift the catch rearwardly, so as to clear the slide-lug, which causes the latter during the initial portion of its downward movement to strike the catch, whereby it is arrested against further downward movement. The

spring *w'* forms a yielding connection between the slide-lever and the guard-operating mechanism, so as to prevent the guard from injuring the hand of the operator in bearing upon the same.

We claim as our invention—

1. The combination with the punch or plunger of a press, of a controlling device or detector which is independent of said punch or plunger, and which is caused to move toward the die before the punch or plunger begins its effective movement, and a stop mechanism which is controlled by said controlling device or detector and which prevents the effective movement of the punch or plunger when the normal movement of the controlling device or detector does not take place, substantially as set forth.

2. The combination with the punch or plunger of a press, of a controlling device or detector which is independent of said punch or plunger, a treadle whereby said controlling device or detector is caused to move toward the die before the punch or plunger begins its effective movement, a stop connected with said controlling device or detector, a stop connected with said treadle and adapted to register with the stop of the detector or controlling device, and means whereby the actuating mechanism of said punch or plunger is controlled by the registering of said stops, substantially as set forth.

3. The combination with the punch or plunger of a press, and a clutch whereby said punch or plunger is coupled with or uncoupled from the driving mechanism, of a controlling device or detector which is independent of said punch or plunger, mechanism whereby said controlling device or detector is caused to move toward the die before the punch or plunger begins its effective movement, a rock-lever connected with said detector or controlling device and provided with a stop, and a slide which is connected with the parts which operate the clutch and which is provided with a stop adapted to register with the stop of said rock-lever, substantially as set forth.

4. The combination with the punch or plunger of a press and a clutch whereby said punch or plunger is coupled with or uncoupled from the driving mechanism, of a detector which moves in advance of the punch or plunger, a rock-lever connected with said detector and provided with a stop, a slide provided with a stop adapted to register with the stop of the rock-lever, and a treadle loosely con-

nected with said clutch and rigidly connected with said slide, substantially as set forth.

5. The combination with the punch or plunger of a press and a clutch whereby said punch or plunger is coupled with or uncoupled from the driving mechanism, of a detector which moves in advance of the punch or plunger, a rock-lever connected with said detector and provided with a stop, a slide provided with a stop adapted to register with the stop of the rock-lever, a treadle loosely connected with said clutch and rigidly connected with said slide, and a yielding connection between said rock-lever and treadle, substantially as set forth.

6. The combination with the punch or plunger of a press, the clutch controlling the movement of the punch or plunger and the treadle loosely connected with the clutch, of a detector which moves in advance of the punch or plunger, a rock-lever connected with said detector and provided with a stop, a slide provided with a stop adapted to register with the stop on the rock-lever, a rod rigidly connected at its lower end with the treadle, an intermediate rock-lever connected with the upper end of said rod and with said slide, and a yielding connection between the rock-lever carrying the stop and the intermediate rock-lever, substantially as set forth.

7. The combination with the standard, the punch or plunger guided in the standard, the clutch controlling the movement of the punch or plunger and the treadle connected loosely with the clutch, of a detector which moves in advance of the punch or plunger, upper and lower rock-levers arranged on each side of the standard and connected with the detector, a transverse rock-shaft provided with arms connected with the upper rock-levers, a slide provided with a stop adapted to register with a stop on one of the lower rock-levers, an intermediate rock-lever connected with the slide and with the treadle, a guide-rod connected with said intermediate rock-lever and guided in a lug on the rock-lever carrying the stop, and a spring interposed between said guide-rod and said lug, substantially as set forth.

Witness our hands this 6th day of June, 1896.

THOMAS A. DICKS.
WILLIAM A. WARMAN.

Witnesses:

JNO. J. BONNER,
ELLA R. DEAN.

DISCLAIMER.

618,065.—*Thomas A. Dicks* and *William A. Warman*, Niagara Falls, N. Y. SAFETY ATTACHMENT FOR PRESSES. Patent dated January 24, 1899. Disclaimer filed July 6, 1915, by *The Dicks Press Guard Manufacturing Company*, assignee by mesne assignments.

Enters this disclaimer as follows:

“1. All that subject-matter and language referring to foot-presses and included between lines 64 and 74, both inclusive of page 1 and also all that subject-matter and language included between line 49 of page 4 and line 5 of page 5, both lines inclusive, of the specification of said Letters Patent, and also Sheet 5, containing Figs. 16, 17, 18 and 19 of the drawings of said Letters Patent.

“2. Where the specification and claims of said Letters Patent refer to a press or to the punch or plunger thereof, all types or constructions of presses except power presses.”

[*Official Gazette*, July 13, 1915.]