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SAFETY DEVICE FOR CLUTCHES.

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1,066,750.

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Fig. 1.

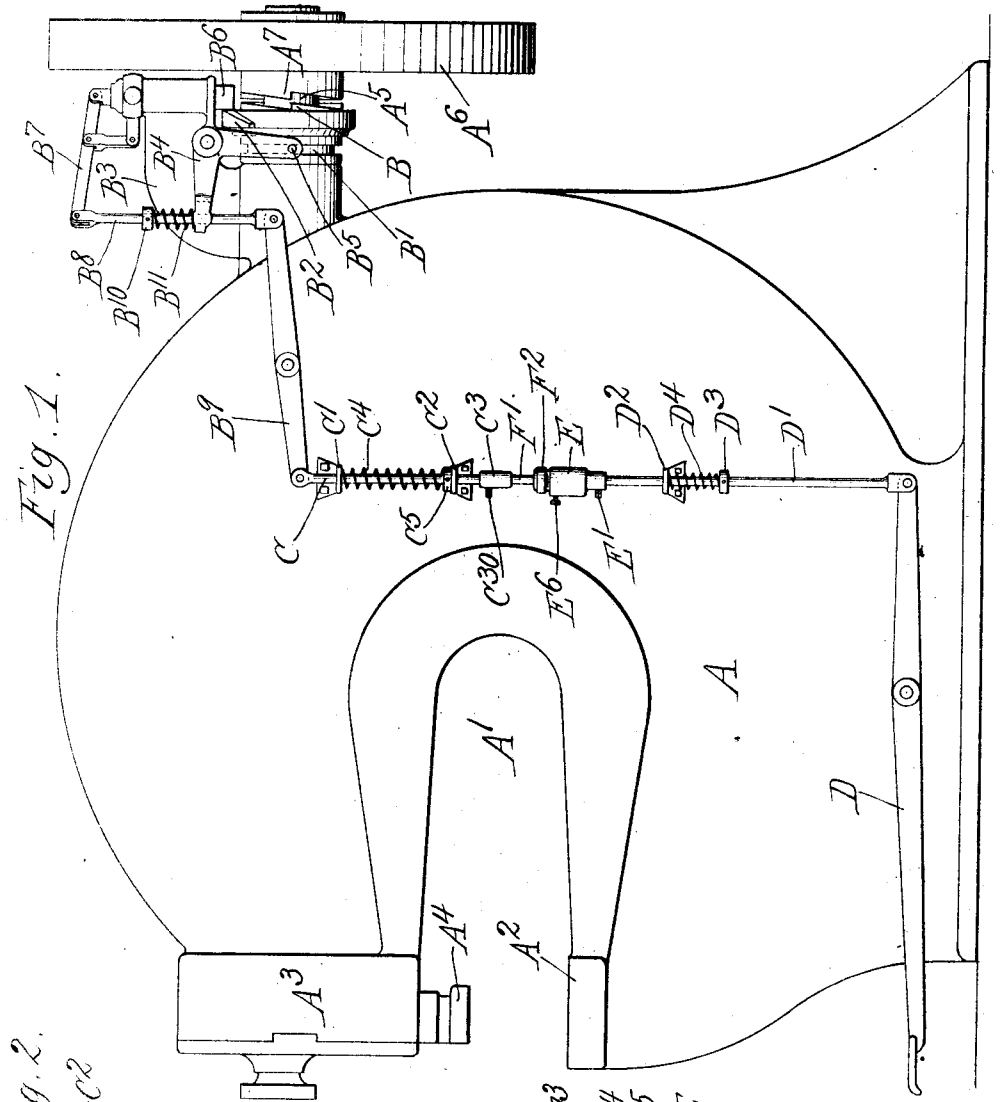
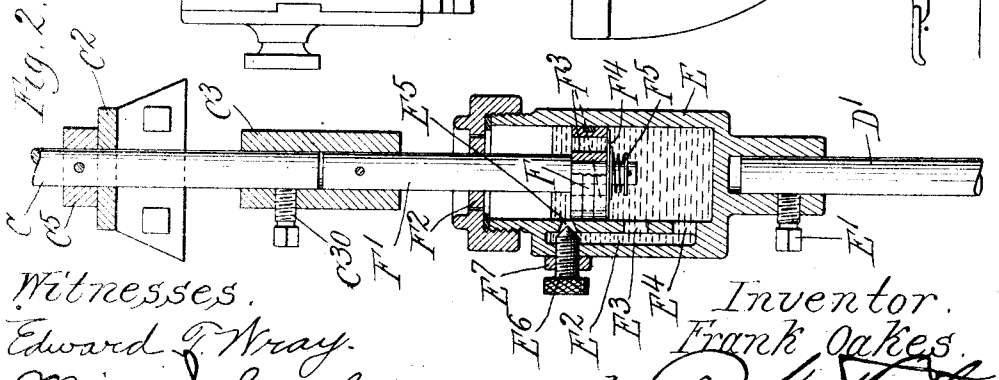


Fig. 2.



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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR CLUTCHES.

1,066,750. Specification of Letters Patent. Patented July 8, 1913.

Application filed April 27, 1912. Serial No. 693,531.

To all whom it may concern:

Be it known that I, FRANK OAKES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Safety Devices for Clutches, of which the following is a specification.

My invention relates to improvements in safety devices for clutches and the like as illustrated diagrammatically in one form of the accompanying drawing, wherein—

Figure 1 is a side elevation of a punch showing my device attached; Fig. 2, a detailed elevation and section of my safety device.

Like parts are indicated by like numbers.

The usual punch frame A, having the jaw A^1, anvil A^2, head A^3 and slide A^4, contains the drive shaft A^5 upon which is rotatably mounted the pulley or fly wheel A^6 carrying the clutch member A^7 in opposition to a clutch member B. The clutch member B is feathered on the shaft A^5, provided with the annular groove B^1 thereabout and has the cam B^2 thereon. The bracket B^3 carries the bell crank lever B^4 having the finger B^5 in engagement with the groove B^1. The plunger B^6 slidably mounted in the bracket B^3 is in opposition to the cam B^2 and is controlled by the lever B^7. The link B^8, which is pivotally mounted at one end on the lever B^7 and at the other end on the lever B^9, carries the tappet B^{10} in opposition to the end of the bell crank lever B^4. The lever B^9 is pivotally mounted on the frame A. The rod C, which is slidably mounted in the lugs C^1, C^2 on the frame A, is pivotally mounted at one end on the lever B^9 and at the other end engages the sleeve C^3 being held therein by a set screw C^{30}. The spring C^4 surrounds the rod C and abuts at one end on the lug C^1 and at the other end on the flange C^5 on the rod C.

The controlling lever D is pivotally mounted on the frame A and carries pivotally mounted at one end the rod D^1, which is slidably mounted in the lug D^2 on the frame and carries the flange D^3 rigidly mounted thereon. The spring D^4 abuts at one end on the lug D^2 and at the other end on the flange D^3.

The cylinder E is mounted on the upper end of the rod D^1 being held thereon by the set screw E^1 and is provided with the by pass E^2. The ports E^3 E^4 lead from the by pass E^2 into the interior of the cylinder E adjacent its bottom. The port E^5, controlled by the adjusting screw E^6 held in position by the lock nut E^7, leads from the upper end of the by pass E^2 into the interior of the cylinder E above the piston F, which is slidably mounted in the cylinder E and is carried by the piston rod F^1 which is held at its upper end in the sleeve C^3 and slidably mounted in the cap F^2 on the upper end of the cylinder E. The return passages F^3 through the piston F are controlled by the valve disk F^4 held in position by the spring F^5. The cylinder E is filled with oil or other suitable liquid to a level slightly above the port E^5. The cylinder E is carried considerably above the oil level in order to provide for foaming or frothing of the oil without the loss thereof.

The spring B^{11} is interposed between the lever B^4 and tappet B^{10} and its function is to permit the tappet B^{10} to move down when the lever D is depressed, thus depressing the spring until the two parts of the clutch are rotated to such a point that the teeth engage. Thus no excess of pressure is brought to bear upon the dash pot such as might interfere with its working.

The use and operation of my invention are as follows: When the operator wishes to bring the punch into place he puts his foot on the pedal and presses rapidly down. This raises the cylinder E rapidly and causes the oil in the cylinder to press up against the piston raising the piston. This operates through the link and lever mechanism as shown to withdraw the locking plunger and engage the clutch. As soon, however, as any pressure is exerted on the oil it commences to pass out through the two ports leading from the cylinder through the by pass and up through the port above the piston. This passage of the oil or other liquid through the by pass will permit the piston to gradually fall to the bottom of the dash pot or cylinder, and the speed with which the piston falls may be controlled by controlling the rapidity with which the oil passes from that part of the cylinder below to that part of the cylinder above the piston. This result is obtained by controlling the area of the upper port by means of the needle valve. When pressure is put upon

the cylinder forcing it upward, the piston rises with it, but as the oil escapes it gradually falls with respect to the cylinder, sinking slowly downward until it reaches the point where the intermediate port will discharge above it. It will then rapidly drop to the bottom of the cylinder. The cylinder is of such length that when the piston is at the bottom of the cylinder the locking pin will descend into the path of the cam and as the clutch rotates the cam will strike this plunger and falls rearwardly away from the fly wheel carrying with it the clutch out of mesh. The only way in which the operator can again throw the clutch is to release the pressure on the pedal and allow the cylinder to sink down. When this is done the oil will pass from the upper portion of the cylinder through the passages in the piston past the disk valve and will fill the lower portion of the cylinder beneath the piston. The parts will then be in position as indicated in the Fig. 2 ready for another operation. My device, therefore, is a safety device wherein when once the operator has thrown the clutch or moved the operating levers to produce the desired result or cycle of operation the cycle or result would be repeated without the releasing by the operator of the closing or operating means. My controlling means are responsive only to a rapid controlling movement. A slow gradual pressure by the operator on the lever would not throw the clutch, since the oil would merely pass into the chamber above the piston without lifting it. The control of the discharge port leading from the by pass at its top to the space above the piston is provided, in order that my device may be set or timed for different speeds. If, where, as I have indicated in my drawing and specification, my device is applied to a clutch, it is desirable to have but a single working stroke made for every pressure upon the pedal, this will be accomplished by so timing the oil flow by an adjustment of the port that the oil will pass to the chamber above the piston and permit it to descend before the second working stroke of the press can take place.

I claim:

1. The combination with controlling means for clutches and the like of a dash pot connection interposed between said clutch and the controlling means.

2. The combination with controlling means for clutches and the like of a connection interposed between said clutch and said controlling means and means responsive to the operating movement of the controlling means for throwing said connection out of operation.

3. The combination with a plurality of connecting rods of a piston on one and a closed cylinder on the other, a by-pass communicating with said cylinder above and below the piston, and means for resisting the flow of liquid through the by-pass at the beginning of the stroke, together with means for releasing the resistance to the flow at the end of the stroke.

4. The combination with controlling means for clutches and the like of a yielding connection interposed between the clutch and the controlling means, said connection comprising a cylinder connected to the controlling means and a piston connected to the clutch, liquid carried within said cylinder, a by-pass communicating therewith above and below the piston and means for controlling the flow of liquid from the space beneath the piston to the space above the piston responsive to the movement of the controlling means.

5. In a device for intermittently throwing a tool into operation, the combination of a moving part under the control of the operator with a movable part adapted to throw the tool into operation, and a connection between them comprising two rods movable with reference to each other and a dash pot whereby they are operatively connected once only for each stroke of the moving part.

Signed at Chicago, Illinois, U. S. A., this 20th day of April 1912.

FRANK OAKES.

Witnesses:
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