

H. C. SMITH.
RESILIENT CLUTCH.
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1,387,017.

Patented Aug. 9, 1921.

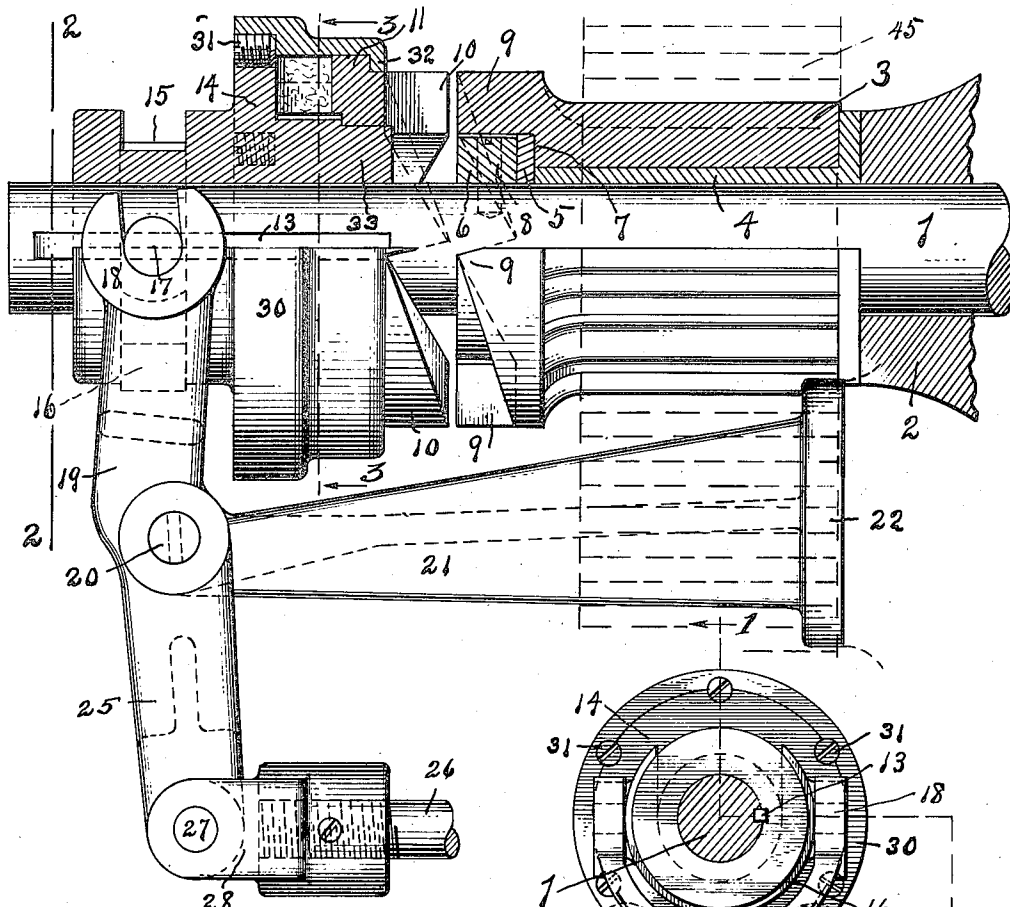


Fig. 1

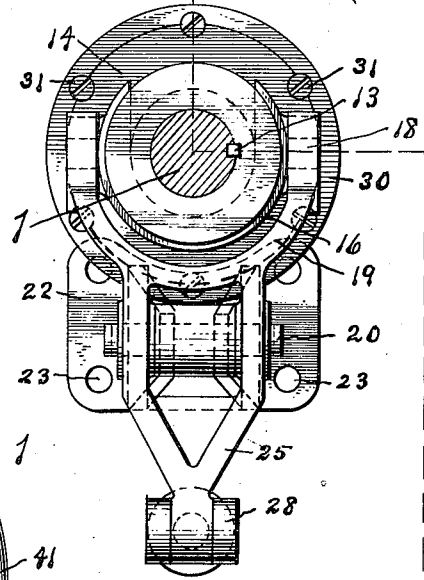


Fig. 2

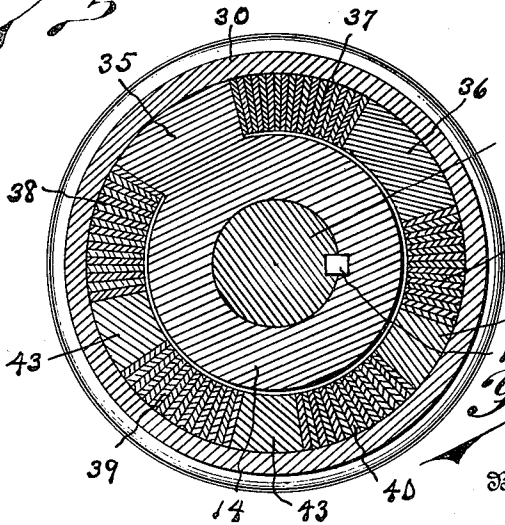


Fig. 3

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RESILIENT CLUTCH.

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To all whom it may concern:

Be it known that I, HENRY COLLIER SMITH, a citizen of the United States, and residing at St. Marys, in the county of Auglaize and State of Ohio, have invented a new and Improved Resilient Clutch, of which the following is a specification.

This invention relates to means for starting and stopping heavy power driven machines and its object is to provide simple, compact and effective means for cushioning the blow between the teeth of jaw clutches so as to effectively reduce the sudden stresses on the driving mechanism of such machines.

This invention consists in combination with the two members of a jaw clutch, of a cushioning device mounted in one of the members of the clutch and embodying a mass of resilient material, preferably leather, which will largely absorb the shocks incident to the engagement of the teeth of the jaw clutches. It also consists in forming one of said jaw-clutch members of two parts and in providing an annular chamber between them in which chamber layers of leather are placed and into which a jaw on each of said parts extends so that one may transmit stress to the other through the layers of leather. It also consists in the details of construction illustrated in the accompanying drawing and particularly pointed out in the claim.

In the accompanying drawings, Figure 1 is a view of this improved resilient clutch, the lower part in elevation and the upper part in section on the line 1—1 of Fig. 2. Fig. 2 is a section on the line 2—2 of Fig. 1 on a smaller scale. Fig. 3 is a section on the line 3—3 of Fig. 1.

Similar reference characters refer to like parts throughout the several views.

In many driving mechanisms for heavy machinery a constantly running shaft 1 extends from a bearing 2 on the frame of the machine and loosely mounted on it is a pinion 3. In the present case a bushing 4 of bronze or other suitable material is provided between the pinion and the shaft, a bearing ring 5 being provided between the collar 6 and the shoulder 7 on the pinion. This collar 6 may be secured in position by means of a pin 8 and its duty is to keep the pinion from moving longitudinally of the shaft under pull of the clutch teeth. This pinion is formed with jaw teeth 9 which

mesh with the jaw teeth 10 on an intermediate ring 11.

The shaft is preferably provided with a spline 13 and on the shaft and spline is slidable a collar 14 having a groove 15 to receive a stirrup 16 provided with pins 17 that fit between the jaws 18 of a shifter yoke 19 pivoted on a pin 20 carried at the outer ends of the arms 21 which are attached to a base 22. This base may be secured to any part of the frame of the machine in connection with which this clutch is used by means of bolts which may pass through the holes 23. The lower arm 25 of the shifter 19 connects to an operating rod 26 by means of a pin 27 and a fork 28.

A band 30 is secured to the collar 14 by means of screws 31 and has a flange 32 that fits back of a shoulder on the ring 11 in order to cause this ring to move longitudinally of the shaft with the collar. The collar 14 is provided with a hub 33, and between that and the band 30 and the ring 11 is an annular space, preferably substantially rectangular in cross section. Into this space extends a jaw 35 which is a part of the collar 14 and hub 33 and a second jaw 36 which is a part of the ring 11. Between these jaws 35 and 36 is a group of layers, preferably rectangular pieces 37, of leather and other groups 38, 39, 40 and 41 of the same material, these last named groups being preferably separated by means of segmental pieces 43 of metal, preferably cast iron. These layers of leather are preferably radially placed in the spaces between the jaws 35 and 36.

When it is desired to set in motion the pinion 7 and the gear 45, indicated in dotted lines in Fig. 1, the rotating collar 14 is moved toward the pinion 3 and the jaws 9 on the pinion and 10 on the ring 11 will immediately engage. Under normal conditions the shock of engagement is very great, especially where very heavy machinery such as rotary shears and heavy presses are to be operated. In the present case, however, the shock is absorbed by means of the groups 38 to 41 inclusive of layers of leather, the turning stress transmitted through them from the jaw 35 on the collar 14 to the jaw 36 on the ring 11 being greatly cushioned by the leather. If these layers of leather extended the entire distance from the jaw 35 around to the left to the jaw 36, they would be very liable to crumple and for that reason the segments 43 of cast iron or other

metal are interposed between the groups of leather squares in order to hold them flat. The group of squares 37 has for its object the cushioning of this mechanism against
5 backlash.

I have found that giving these jaws 9 and 10 an inclination of ten degrees to an axial plane is most desirable, as this angle seems to be the largest which can be employed
10 without danger of the jaws wedging themselves apart. The greater the angle the easier it is for these jaws to be disengaged when the work has been performed.

The proportions and details of this construction can all be changed without departing from the spirit of my invention as
15 set forth in the following claim.

I claim:—

A clutch comprising a pair of members one of which is formed with clutch jaws and 20 the other of which comprises an outer and inner part, the outer part being formed with an annular groove and a circular recess, a pair of shock absorbing pads in said recess, one of said pads being formed by groups 25 of layers of leather positioned transversely of the recess and blocks of metal between the groups, the inner part being positioned in said annular groove and having clutch jaws adapted to engage with the clutch jaws 30 of the first named member and also having a jaw extending between said resilient pads.

HENRY COLLIER SMITH.