

Aug. 25, 1959

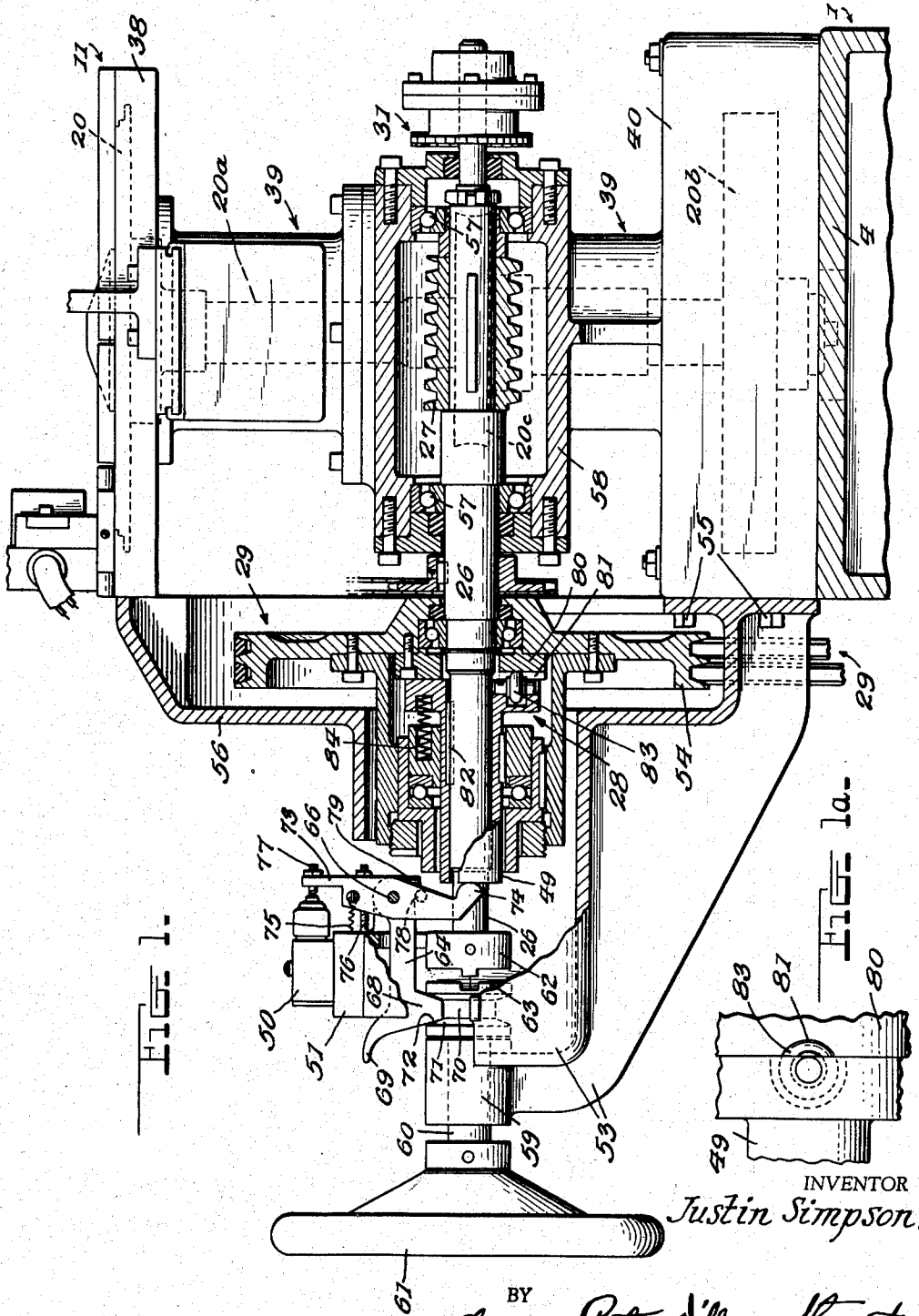
J. SIMPSON

2,900,842

OVERLOAD RELEASE DRIVE AND INCHING MEANS

Original Filed Aug. 3, 1955

3 Sheets-Sheet 1



Aug. 25, 1959

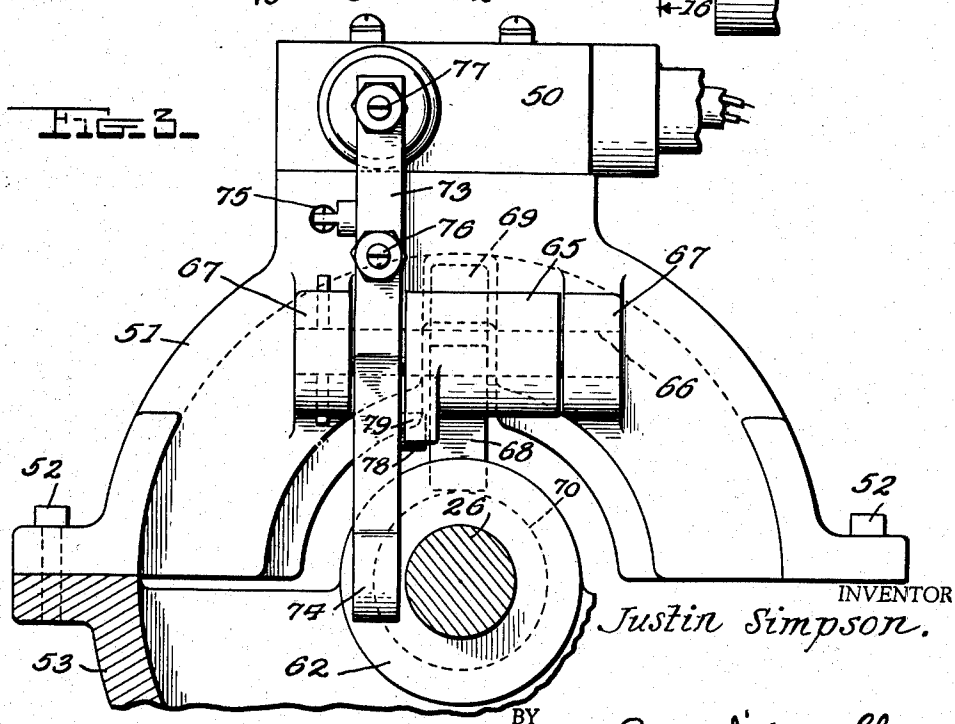
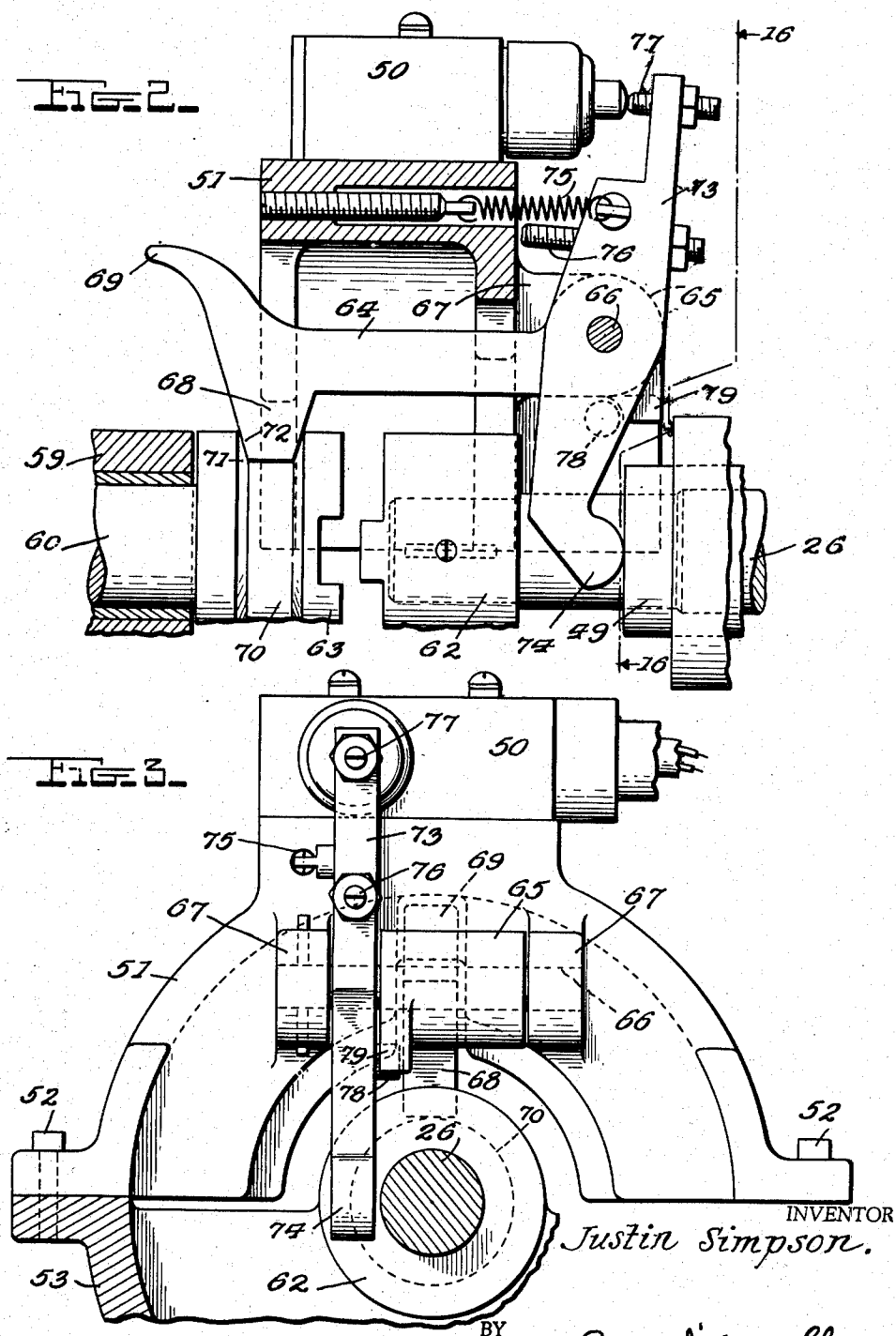
J. SIMPSON

2,900,842

OVERLOAD RELEASE DRIVE AND INCHING MEANS

Original Filed Aug. 3, 1955

3 Sheets-Sheet 2



Aug. 25, 1959

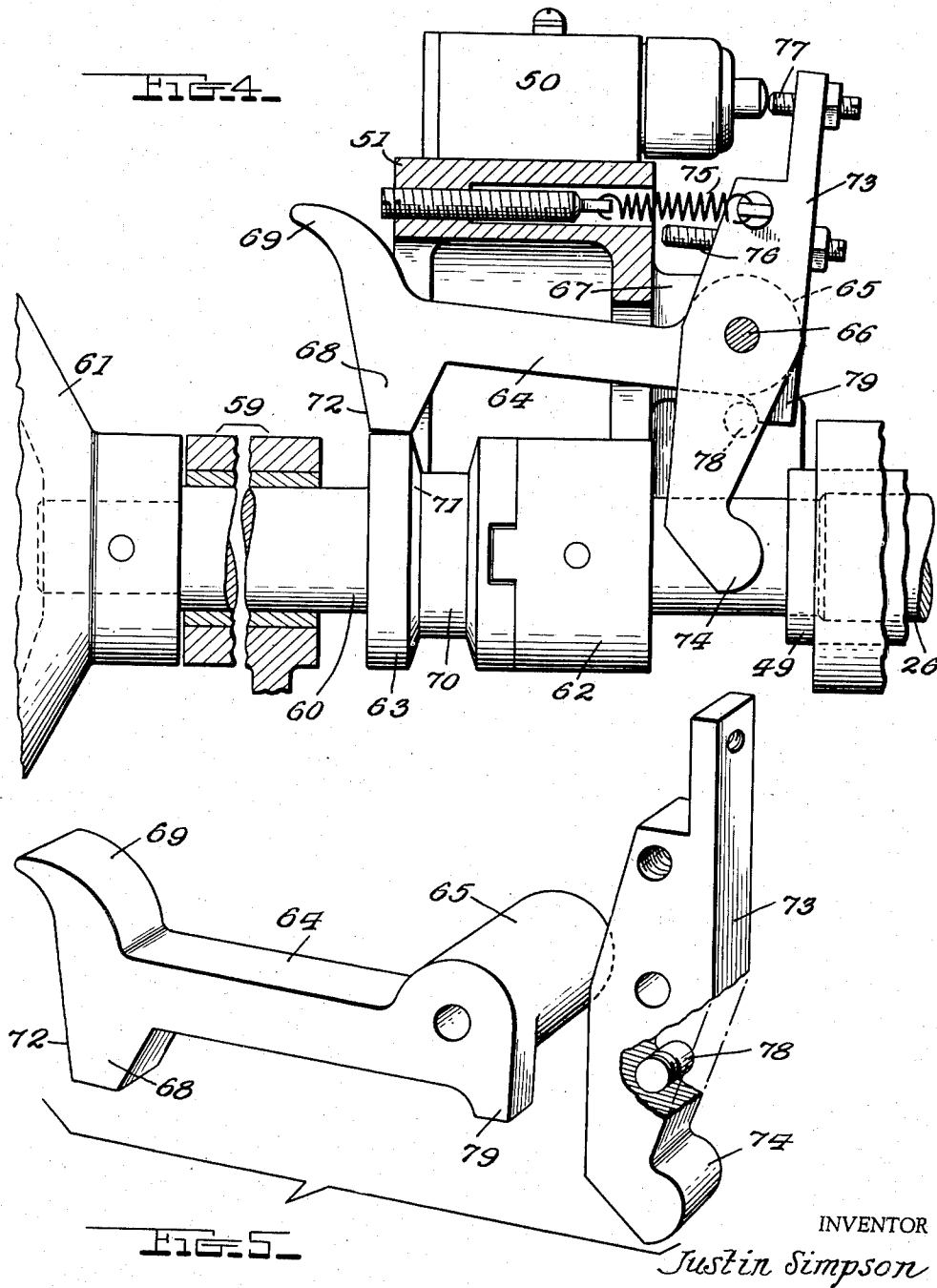
J. SIMPSON

2,900,842

OVERLOAD RELEASE DRIVE AND INCHING MEANS

Original Filed Aug. 3, 1955

3 Sheets-Sheet 3



BY
Maen, Porter, Miller & Stewart
ATTORNEYS

1

2,900,842

OVERLOAD RELEASE DRIVE AND
INCHING MEANS

Justin Simpson, Elmhurst, Ill., assignor to Continental
Can Company, Inc., New York, N.Y., a corporation of
New York

Original application August 3, 1955, Serial No. 526,197.
Divided and this application May 13, 1957, Serial No.
658,730

6 Claims. (Cl. 74—625)

This application is a division of my U.S. application, Ser. No. 526,197, filed August 3, 1955, and entitled "Crown Cap Lining Machine." While the present invention is intended primarily for use with such a machine, it is equally applicable to motor driven machines for other purposes.

The present invention has aimed to provide a novel assembly of elements including inching means for slowly operating the machine drive shaft by hand when testing or making adjustments, switch means for stopping the machine driving motor, and means prohibiting engagement of the inching means with the drive shaft until said switch means has been opened.

A further object has been to provide a novel assembly including an overload clutch for driving the drive shaft, a motor stopping switch so associated with an element of said clutch as to be opened when clutch disengagement occurs, manually releasable means for normally locking the inching means in idle position, and means for opening the aforesaid switch whenever said locking means is released.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings.

In the drawings:

Figure 1 is an enlarged vertical section partly in elevation, showing primarily the drive shaft, the overload clutch for driving said drive shaft, the inching means, and the switch and lock associated with said clutch and said inching means.

Figure 1a is a fragmentary edge view showing the driving and kick out roller of the clutch and associated elements of Figure 1.

Figure 2 is an enlarged fragmentary side elevation, partly in section, showing the switch and lock associated with the inching shaft and an element of the overload clutch, the switch actuator being in switch open position and the lock in operative position.

Figure 3 is an end elevation of Figure 2 with the drive shaft in section, as indicated by line 16—16 of Figure 2.

Figure 4 is a view similar to Figure 2 but showing the lock released and the switch actuator again in switch open position.

Figure 5 is a perspective view of the inching shaft lock and the coasting switch actuator.

While the construction of the machine with which the present invention has been disclosed, is fully illustrated in the parent application above mentioned, sufficient illustration of that construction has been included in Fig. 1 to disclose the preferred application of the invention.

Upon a portion 4 of a base 1, a housing 39 is secured. At the upper end of this housing is a feed turret 20 carried by the upper end of a shaft 20a which is rotatably mounted in said housing. The shaft 20a is provided with a spur gear 20b for driving the machine; and said shaft is provided also with a worm gear 20c. A drive shaft

2

26, for the entire machine, has a worm 27 meshing with the worm gear 20c, said drive shaft being mounted in bearings 57 at the ends of a housing 58 carried by the housing 39. An overload release clutch 28 and a belt and pulley drive 29 are provided for transmitting motion from an electric motor (not shown) to the drive shaft 26.

The above mentioned clutch 28 for driving the drive shaft 26, is of a type which will automatically "kick-out" or disengage upon overload and said clutch includes a sleeve 49 surrounding said drive shaft 26 and shiftable toward the outer end of the latter when clutch disengagement occurs. This shifting is utilized to open a motor stopping switch 50 for the driving motor. This switch 50 is mounted upon an arched bracket 51 which is secured at 52 to a longitudinally channeled bracket arm 53, said arm 53 underlying the outer end portion of the drive shaft 26 and uppermost pulley 54 of the belt and pulley drive 29. The inner end of the arm 53 is rigidly secured at 55 to the base 40 of the feed turret supporting housing 39, and said inner end of said arm 53 is provided with a housing 56 for the pulley 54 and the clutch 28 of the drive shaft 26.

Some clarifying statements with regard to the clutch 28 may be made before proceeding further. This clutch embodies a drive plate 80 secured to the pulley 54 and having a radial groove 81 facing the sleeve 49. This sleeve 49 is splined or slidably keyed at 82 to the drive shaft 26 and carries a driving and kick out roller 83 which is normally held in the groove 81 of the drive plate 80 by spring means 84 which presses said sleeve 49 toward said drive plate 80. In case of overload, the roller 83 is forced from the groove 81, thereby sliding the sleeve 49 to cause opening of the motor stopping switch 50 as above explained. As the other elements of the clutch 28 have obvious functions, further explanation is unnecessary.

The outer end of the bracket arm 53 is provided with a bearing 59 spaced from and axially aligned with the outer end of the drive shaft 26. An inching shaft 60 having a hand wheel 61 is rotatable and slidable in the bearing 59. The adjacent ends of the two shafts 26 and 60 have cooperable clutch elements 62 and 63 for connecting the inching shaft 60 with the drive shaft 26, as seen in Figure 4, when said drive shaft is to be turned slowly by hand in setting the machine, making adjustments, etc. In order to engage the clutch element 63 of the inching shaft with the element 62 of the drive shaft 26, it is necessary to slide the former shaft toward the latter (compare Figures 2 and 4). A lock is provided, however, for prohibiting this sliding while the switch 50 is in closed position, thereby overcoming any possibility of the machine being accidentally driven by power while using the inching means.

The inching means lock is shown in the form of an arm 64 seen best in Figures 2 to 5 although appearing also in Figure 1. This arm 64 underlies the arched bracket 51 and extends longitudinally over the clutch elements 62 and 63. One end of this arm 64 has a hub 65 which is pivotally mounted on a pin 66 carried by lugs 67 of the bracket 51. The other end of the arm 64 has a locking nose 68 and a releasing handle 69. The clutch element 63 of the inching shaft 60 has a peripheral groove 70 which receives the nose 68 to lock the inching shaft 60 in idle position, said groove and nose having shoulder portions 71 and 72 which then abut each other as seen in Figures 1 and 2. The locking arm 64 must be swung upwardly in order to release the inching shaft 60 for engagement with the drive shaft 26. This upward swinging opens the switch 50 due to construction now to be described.

A vertical actuating lever 73 is provided for the switch 50, said lever being fulcrumed between its ends on the pin 66 at one side of the locking arm 64. The lower

3

end 74 of the lever 73 is biased toward the outer end of the sleeve 49 of the clutch 23 by means of a spring 75 which connects said lever 73 with the bracket 51, and a stop screw 76 limits the movement of said lever 73 under the influences of said spring 75. The upper end of the lever 73 carries a switch operating screw 77 which normally holds the switch 50 in closed position. If the clutch 23 disengages under the influence of overload, the sleeve 49 rocks the lever 73 from the position of Figure 1 to that of Figure 2, allowing the switch 50 to open and stop the motor.

The lever 73 and locking arm 64 are provided with cooperating abutments 78 and 79 which transmit movement from said arm 64 to said lever 73 (Figure 4) to cause opening of the switch 50 when said arm 64 is swung to released position to allow engagement of the inching shaft 60 with the drive shaft 26. As long as the inching shaft is connected with the drive shaft 26, the locking arm 64 rests on the clutch element 63 as shown in Figure 4. The abutments 78 and 79 then hold the lever 73 in its switch open position. The machine motor cannot therefore be inadvertently operated while the inching means is engaged with the drive shaft 26. The lever carried abutment 78 merely moves away from the arm carried abutment 79 (Figure 2) when the lever 73 is operated by the sleeve 49 of the clutch 23, and the locking arm 64 therefore remains in locking position.

It will be seen from the foregoing explanation that the inching shaft 60 cannot be connected with the drive shaft 26 while the motor switch 50 is in closed position and that an important safety factor is thus provided.

I claim:

1. In a motor driven machine having (1) a drive shaft, (2) a clutch for driving said drive shaft, said clutch being constructed to automatically disengage upon overload, and (3) inching means manually connectable with said drive shaft for rotating the latter by hand when desired; a normally closed machine-stopping switch operatively associated with an element of said clutch and operable to be opened thereby upon clutch disengagement, manually releasable locking means normally preventing connection of said inching means with said drive shaft, and means permitting closing of said machine-stopping switch and normal clutch operation when said drive shaft is power driven and operable by release of said locking means for opening said machine stopping switch to permit only manual rotation of said drive shaft by said inching means.

2. In a motor driven machine having (1) a drive shaft, (2) a driving clutch for driving said drive shaft, said clutch being of overload release type and having a shiftable element which automatically receives movement when clutch release occurs, and (3) normally idle hand operable means manually connectable with said drive shaft for rotating the latter by hand when desired; a normally closed machine stopping switch having actuating means operatively associated with said shiftable element to be moved by the latter to switch open position and permit normal clutch operation, normally applied manually releasable locking means for said hand operable means, and connecting means between said switch actuating means and said locking means to permit independent and combined operation of the same, this connecting means being constructed to move said switch actuating means to switch opening position when said locking means is released by hand and permitting only manual rotation of said drive shaft by said inching means.

4

3. A structure as specified in claim 2, said switch actuating means comprising a lever having one end in the path of said shiftable element to be moved to switch open position by the latter, said locking means comprising an arm pivotally mounted near said lever, said connecting means comprising coacting abutments on said lever and arm, said abutments cooperating to swing said lever to switch open position when said arm is swung to released position.

4. A structure as specified in claim 2; said switch actuating means comprising a lever having one end in the path of said shiftable element to be moved to switch open position by the latter, said locking means comprising an arm pivotally mounted coaxially with said lever and near the latter, said connecting means comprising coacting abutments on said lever and arm to swing said lever to switch open position when said arm is swung to released position.

5. A structure as specified in claim 2; said switch actuating means comprising a lever having one end in the path of said shiftable element to be moved to switch open position by the latter, said locking means comprising an arm pivotally mounted coaxially with said lever and near the latter, said connecting means comprising coacting abutments on said lever and arm to swing said lever to switch open position when said arm is swung to released position, said lever being substantially perpendicular to said drive shaft, said arm being substantially unidirectional with said drive shaft.

6. In a motor driven machine having (1) a drive shaft, (2) a driving clutch for said drive shaft, said clutch being of overload release type and having a shiftable element which automatically receives movement when clutch release occurs, and (3) a manually rotatable and axially shiftable inching shaft coaxial with one end of said drive shaft for rotating the latter by hand when desired, said shafts having coacting clutch elements interengageable by inward shifting of said inching shaft; a fixed support near said clutch elements, a normally closed machine stopping switch mounted on said support, a lever fulcrumed between its ends on said support and having one end co-operatively related with said shiftable element to be moved by the latter, the other end of said lever being cooperatively related with said switch to open the latter when said lever is moved by said shiftable element, a locking arm pivoted to said support coaxially with the fulcrum of said lever, said locking arm having a shoulder normally abutting the clutch element of said inching shaft and holding the same separated from the clutch element of said drive shaft, and coacting abutments on said lever and locking arm for moving said lever to switch open position when said locking arm is swung to free said shoulder from said clutch element of said inching shaft, this clutch element and said locking arm having coacting portions which hold said locking arm in its switch open position when this same element is engaged with the clutch element of the drive shaft.

References Cited in the file of this patent

UNITED STATES PATENTS

1,932,362	Halvorsen	Oct. 24, 1933
2,151,493	Acker	Mar. 21, 1939
2,391,418	Hodgson et al.	Dec. 25, 1945