Dec. 5, 1939. J. M. MINKOW 2,182,733

CLUTCHING MECHANISM

Filed Sept. 20, 1938 2 Sheets-Sheet 1

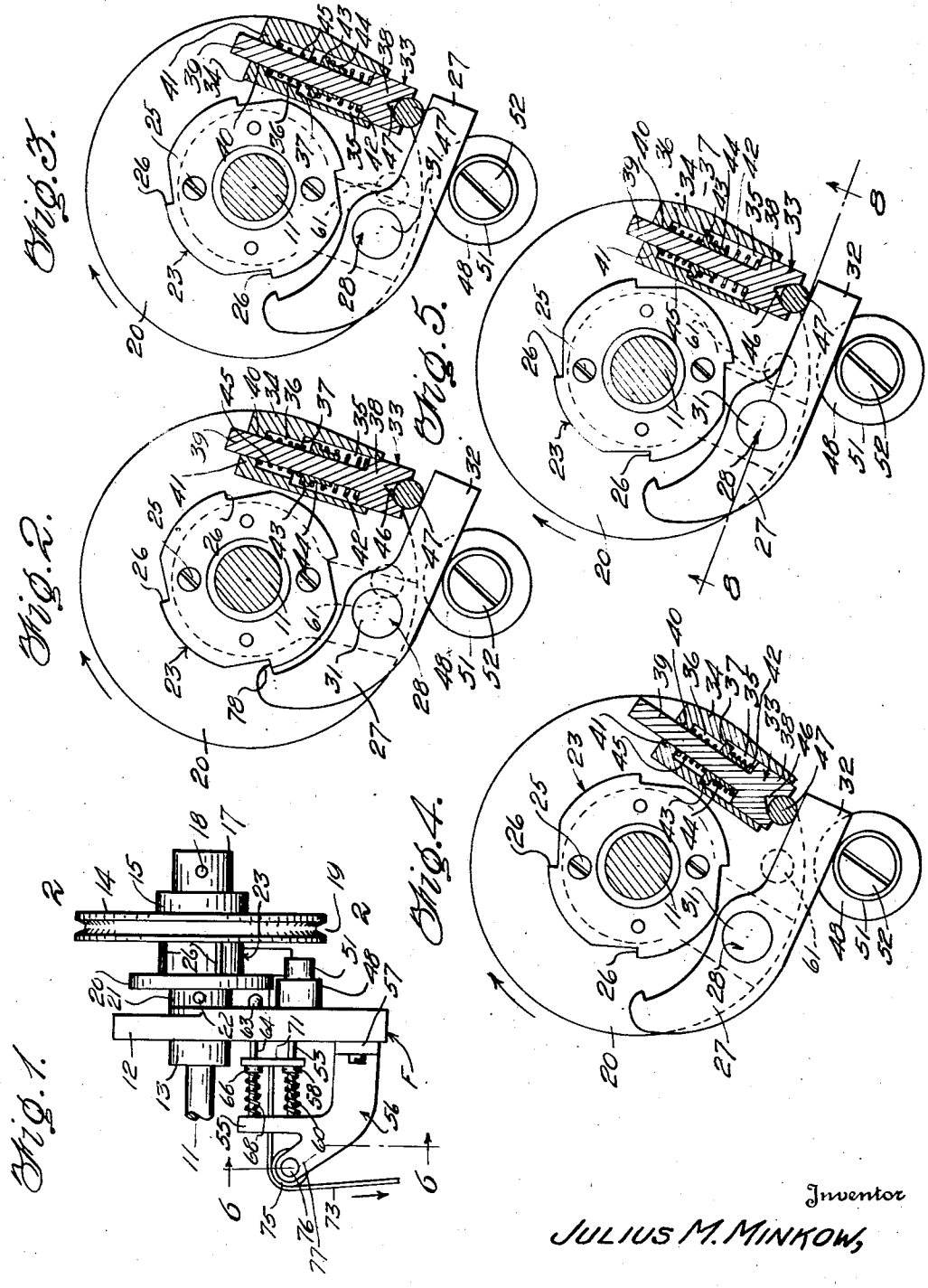


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Inventor
JULIUS M. MINKOW,

By Kimmel & Crowell,
Attorneys

Dec. 5, 1939. J. M. MINKOW 2,182,733

CLUTCHING MECHANISM

Filed Sept. 20, 1938 2 Sheets-Sheet 2

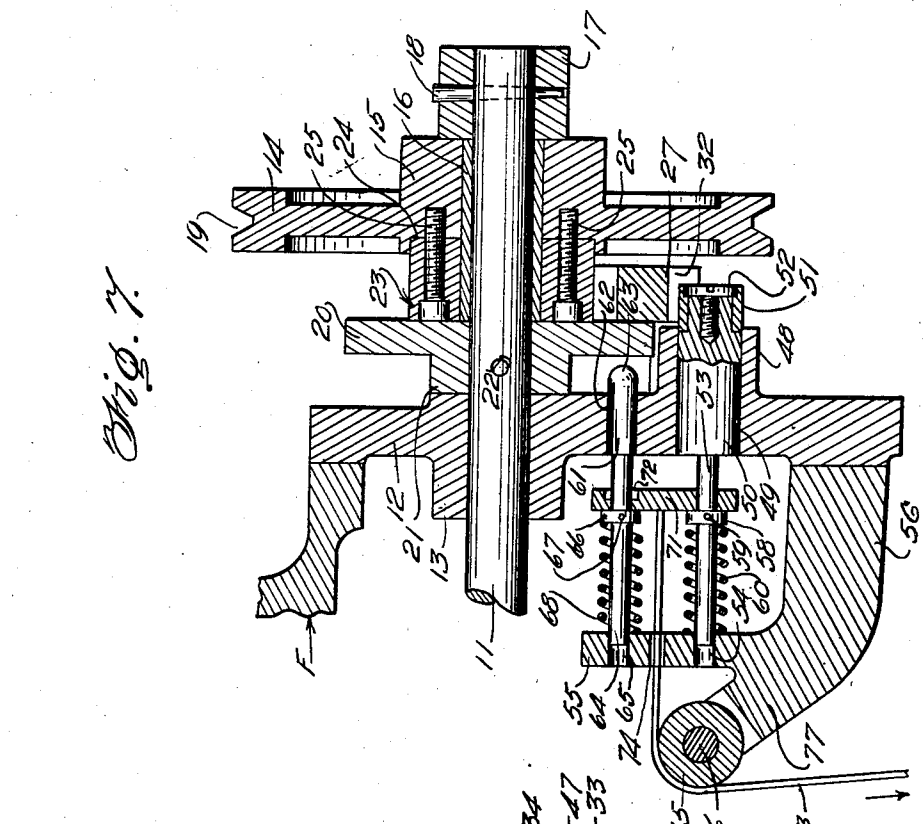


Fig. 7.

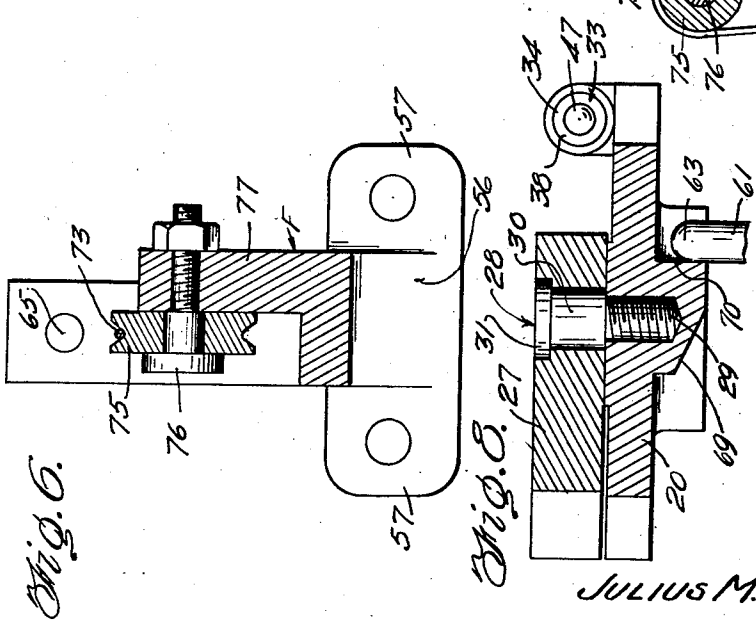


Fig. 8.

Fig. 6.

Inventor

JULIUS M. MINKOW,

By Kimmel & Crowell,

Attorneys

Patented Dec. 5, 1939

2,182,733

UNITED STATES PATENT OFFICE

2,182,733

CLUTCHING MECHANISM

Julius M. Minkow, New York, N. Y., assignor to Robert Minkow, Richmond Hill, N. Y.

Application September 20, 1938, Serial No. 230,859

8 Claims. (Cl. 192—149)

This invention relates to clutching mechanisms and is an improvement over the co-pending application of Arnold F. Fischer, Serial No. 189,460, filed February 8, 1938.

An object of this invention is to provide a clutching mechanism which is adapted to connect or couple a drive with a driven member so that when the coupling or clutching mechanism is released, the driven member will at all times assume a predetermined position.

Another object of this invention is to provide a clutching mechanism which is designed particularly for use with a stapling machine which is so constructed that when the clutching mechanism is in a de-clutching position, the stapling head of the machine will be in a position to receive an article to be stapled.

A further object of this invention is to provide a clutching mechanism of this kind which is adapted to be actuated for the purpose of providing a single rotation of the driven member in order to prevent the wasting of staples of the stapling head.

A further object of this invention is to provide a clutching mechanism of this kind which is manually operated for the purpose of clutching a drive member with a driven member but which operates automatically to de-clutch the drive member relative to the driven member after the driven member has made a single rotation.

A still further object of this invention is to provide a clutching mechanism of this kind which will not only prevent rotation of the driven member for more than a single rotation, but which will move the driven member backwards in the event the driven member has sufficient momentum to make slightly more than a single complete turn so that the operating structure connected to the driven member will always be positioned in a predetermined operating or receiving position.

A further object of this invention is to provide in a device of this kind a yieldable abutment which operates in the form of a brake so as to resist turning of the driven member beyond a single complete turn in order that the driven member may be stopped from rotation without being subjected to an abrupt stop or jarring of the driven member.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and as are illustrated in the accompanying drawings herein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Figure 1 is a detail side elevation of a clutching mechanism constructed according to an embodiment of this invention,

Figure 2 is an enlarged sectional view taken on the line 2—2 of Figure 1 showing the clutching mechanism in a position whereby the mechanism is at the point of release,

Figure 3 is a view similar to Figure 2, but showing the clutching mechanism in released position with the driven member still in rotation,

Figure 4 is a view similar to Figure 2 showing the clutching mechanism in releasing position with the driven member rotated slightly more than a single turn,

Figure 5 is a view similar to Figure 2 showing the driven member in the normal released position,

Figure 6 is an enlarged sectional view taken on the line 6—6 of Figure 1,

Figure 7 is an enlarged longitudinal section taken substantially through the center of Figure 1 and showing the device applied to the frame structure, and

Figure 8 is an enlarged fragmentary sectional view taken on the line 8—8 of Figure 5.

Referring to the drawings, the character F designates generally a frame structure which in the present instance is part of the frame of a stapling machine. It will be understood however, that this frame structure F may be formed as part of different types of machine, the stapling machine being only one type of machine with which the hereinafter described invention may be combined.

A driven shaft 11 is journaled in a bearing 13 carried by a plate 12 which is secured to the frame F, and this shaft 11 projects outwardly of the plate 12 and has rotatably mounted thereon a drive member 14. The drive member 14 is provided with a hub 15 and a bearing sleeve 16 is disposed within the hub 15 and rotatably engages the shaft 11. A collar 17 is mounted on the outer end of the driven shaft 11 being secured thereto by means of a pin 18 or other fastening means, and the outer end of the hub 15 abuts against the inner end of the collar 17. The driven member 14 in the present instance is constructed in the form of a pulley having a peripheral groove 19 to receive a belt or the like which is adapted to be connected to a suitable source of power supply.

A plate or disc member 20 provided with a hub 21 is fixed as by securing means 22 in the form of a pin to the shaft 11 and the inner end of the hub 21 abuts against the outer side of the bearing 13. The sleeve 16 projects inwardly of the drive member 14 and a ratchet member 23 is disposed about the sleeve 15 and at its outer end seats in an annular seat 24 provided in the inner end of hub portion 15. The ratchet member 23 is fixedly secured to the hub 15 in the seat 24 by means of fastening members 25 in the form of bolts, pins or the like so that ratchet member 23 will rotate with the drive member 14. The ratchet member 23 in the present instance is provided with four teeth 26 which are circumferentially spaced apart about the periphery of the ratchet member 23.

A dog or pawl 27 is rockably or pivotally mounted in proximity to its inner end on a pivot member which is in the form of a headed pin 28 secured to the plate 14, the pin 28 being in the form of a bolt having a threaded inner portion 29 and a cylindrical portion 30 terminating in a head 31. The dog 27 encompasses the said cylindrical portion 30 and the head 31 is preferably countersunk in the adjacent face of the pawl 27.

An arm 32, at one end thereof is integral with the said end of the pawl 27 and projects with relation to the pivot member 28 in a direction opposite from that in which the pawl 27 extends and constitutes a lever for shifting the pawl on its pivot in opposite directions for a purpose as will be hereinafter described.

A plunger 33 is slidable in a cylinder which is fixed or formed integral with the plate 14 and the cylinder 34 is provided with an outer relatively large bore 35 and an inner relatively small bore 36 forming a shoulder 37 between the adjacent ends of the two bores 35 and 36. The head 38 of the plunger 33 is slidable in the bore 35 and the plunger 33 is provided with a stem or reduced portion 39 which is slidable in an opening 40 provided in the inner end wall 41 of the cylinder member 34. A spring 42 is disposed in the bore 35 and at one end bears against the inner end of the plunger head 38. The opposite end of the spring 42 bears against an annular flange 43 carried by a sleeve 44 which is slidable on the stem 39 in the bore 35.

A second spring 45 is disposed in the bore 36 and at its outer end bears against the inner end of the flange 43 while the outer end thereof bears against the inner side of the end wall 41. The head 38 is provided with a socket 46 in which a ball 47 is positioned. The ball 47 is adapted to contact with the adjacent side of the arm or lever 32 and provides a substantially anti-friction connection between the plunger 33 and the arm or lever 32. The two springs 42 and 45 constantly urge the plunger 43 outwardly of the cylinder 34 so as to rock the pawl member 27 inwardly toward the ratchet member 23.

The plate member 12 is provided with a boss 48 on the outer side thereof having a bore 49 therethrough in which a pawl releasing member 50 is slidable. The pawl releasing member 50 includes a sleeve 51 which is secured to the outer end of the member 50 by means of a bolt or screw 52 as shown in Figure 7. The sleeve 51 may be hardened to the desired degree so that the contact of the lever or arm 32 therewith will not unduly wear this sleeve 51. A relatively small or reduced stem 53 is formed integral with the releasing member 50 and extends rearwardly thereof being slidable in an opening 54 provided in an upstanding arm 55 carried by a bracket 56. The bracket 56 is provided with oppositely extending ears 57 shown in Figure 6 which are adapted to be secured to the inner side of the plate 12.

A collar or link 58 is fastened as by a pin 59 to the shaft or reduced portion 53 of the releasing member 50 and a spring 60 engages about the shaft or reduced portion 53 and at one end bears against the collar 58 while the other end bears against the outer side of the upright member 55. In this manner the releasing member 50 is constantly urged to an operative position in the path of the arm 32 as this arm rotates with the rotation of the plate 20.

A stop member 61 is slidable in an opening 62 provided in the plate 12 between the releasing member 50 and the shaft 11 as shown in Figure 7. The stop member 61 is provided with a rounded or cam shaped outer end or nose 63 and the stop member 61 is also provided with a reduced stem or shaft 64 which has the inner end thereof slidable in an opening 65 provided in the extension 55. A collar 66 is fixed as by a pin or fastening member 69 to the stem 64 and a spring 68 bears at its outer end against the collar 67 and at its inner end against the extension 55 so as to constantly urge the stop member 61 to an operative position.

The plate 20 on its inner side is provided with a cam member 69 having an abrupt face 70 and upon rotation of the plate 20 with the stop member 61 in operative position, the rounded nose 63 is adapted to ride over the cam member 69 and then drop behind the abrupt side 70 thereof. When the momentum of the plate 20 carries the plate to a point where the stop member 61 will not bear against the abrupt face 70 of the cam member 69 the plunger 33 will rock the lever 32 with the sleeve 51 as a fulcrum and thus reversely rotate the plate 20 until the abrupt side 70 of the cam member 69 contacts with the stop member 61. At this position the operating parts connected to the driven shaft 11 will be in the receiving position for receiving articles to be worked upon.

A link or bar 71 is slidable on the two extensions 53 and 64 between the collars 58, 66 and the inner side of the plate 12. The link 71 on its outer side is provided with a recess 72 in which the inner end of the stop member 61 is adapted to engage when the stop member 61 is being moved inwardly by the cam 69. A flexible operator 73 is connected at one end to a median point of the link or bar 71 and then extends through an opennig 74 provided in the upright member 50. The flexible member 73 is trained over a roller or pulley 75 which is rotatably mounted on a shaft or pin 76 engaging an upwardly extending part 77 formed with the bracket member 66.

The opposite end of the operator or flexible member 73 is adapted to be connected to a pedal or the like so that the pulling of the link 71 rearwardly or inwardly of the frame F will pull both the releasing member 50 and the stop member 61 to a released or disengaged position.

In the use and operation of this device, the drive member 14 is adapted to be constantly rotated and the ratchet member 23 rotates constantly with the drive member 14. The driven shaft 11 is adapted to be connected to a suitable working part of the machine which it is desired to periodically or intermittently operate, and

in the present instance the driven member 11 is operatively connected to a stapling head which at each movement thereof is adapted to drive a staple into the desired article.

Normally the releasing member 50 and the stop member 61 are in the positions shown in Figures 1 and 7. When it is desired to rotate the shaft 11 so as to operate the part connected therewith, the operating member 73 is pulled downwardly as shown by the arrow in Figures 1 and 7, which pulls the bar or link 71 to the left and simultaneously moves the releasing member 50 and the stop member 61 to a released or inoperative position out of the path of the arm 32 and the cam 69 respectively. When the releasing member 50 is moved to a disengaged position, the spring pressed plunger 33 will rock the pawl member 27 in the direction of the ratchet 23 so that the bill 78 of the pawl member 27 will engage a tooth 26. The driven shaft 11 will then rotate with the drive member 14.

The operator 73 is immediately released so that the spring 60 will move the releasing member 50 to an operative position and at the same time the spring 68 will move the stop member 61 to an operative position. Upon rotation of the plate 20 substantially a complete turn, the arm 32 will strike the sleeve 51 carried by the releasing member 50 so that continued rotation of the plate 20 will cause the arm or lever 32 to be locked inwardly of the plate 20 and thus swing the pawl member 27 to a released position. At the same time that the arm or lever 32 contacts with the releasing member 50, the stop member 61 will contact with the cam member 69 and be forced inwardly thereby until the trailing end 70 of the cam passes the stop member 61 whereupon the spring 68 will force the stop member 61 inwardly to the position shown in Figures 1 and 7

The plate 20 will be prevented from rotating sufficiently so that the arm or lever 32 will ride off of the releasing member 50 by reason of the head 38 of the plunger moving inwardly and contacting with the sleeve 44 which at this time will be at its innermost position with the flange 43 contacting with the shoulder 37. In Figure 2 the plate 20 is in a position where the lever or arm 32 has rocked the pawl 27 substantially off of a tooth 26 and at this time the stop member 61 has not yet passed the trailing end 70 of the cam member 69. In Figure 3 the momentum of the plate 20 has rotated this plate to the position where the lever 32 has rocked the pawl 27 to a completely released position, the direction of rotation being shown by the arrow on the periphery of the plate 20 in both Figures 2 and 3.

In Figure 4 the plate 20 has overriden the normal stopping position thereof and the stop member 61 is slightly spaced from the trailing end 70 of the cam member 69. The momentum at this point of the plate 20 has not been sufficient to bring the head 38 of the plunger into contact with the sleeve 44, although this sleeve 44 is at its innermost position. In the event the momentum of the plate 20 is sufficient to move the plunger head 38 inwardly to contact with the outer end of the sleeve 44 the lever 32 will be locked between the ball 47 and the releasing member 50. Where the plate 20 overrides the normal stopping position thereof as shown in Figure 4 the tension of the plunger 33 is sufficient to force the plate 20 to rotate in a reverse direction as shown by the outermost arrow in Figure 4 while at the same time the ratchet member 23 will rotate in the direction shown by the innermost arrow.

The plunger 33 will rotate the plate 20 reversely until the trailing edge 70 of the cam 69 abuts against the projecting stop member 61 as shown in Figure 5.

The spring 45 bearing against the sleeve 44 constitutes a pawl operating spring so as to rock the pawl 27 to an engaging position, and this spring 45 is lighter or weaker than spring 42 in the bore 35. The spring 42 acts as a shock absorbing spring so as to take up the shock of the arm or lever 32 striking the projecting stop member 50. By reason of the construction, the spring 42 will also act as a resilient braking means so as to apply the desired tension to the stop member 50 through the lever 32 so as to cause the lever 32 to drag over the stop member 50 and thus retard the rotation of the plate 20 and the driven shaft 11.

By coupling the stop and release member 50 with the positioning member 61 when it is desired to have the driven shaft make more than one complete rotation the positioning member 61 will not click over the cam member 69 as would be the case where the positioning member 61 is not operated simultaneously with the releasing member 50. In certain instances it is desirable to have the driven shaft make more than one complete rotation and in the present instance this may be effected by holding the releasing member 50 in disengaged position so that the driven shaft 11 may be rotated the desired number of times. When this is done, the positioning member 61 will also be held in disengaged position so that there will not be any wear on this member when the releasing member 50 is in disengaged position due to the fact that the positioning member 61 is also simultaneously held in disengaged position.

This clutching mechanism may be readily mounted on the present structure of a stapling machine and as hereinbefore described this clutching mechanism will prevent rotation of driven member or shaft more than one complete turn. This clutching mechanism is relatively simple in construction and the combined stop and releasing structure thereof is manually moved to a released position so that the clutching pawl may be automatically moved to an operative position. With the use of this clutching mechanism, the machine connected therewith will be prevented from working at undesired times, so that economy will be effected by reason of the fact that an excess of staples will not be either punched into the article or be clinched when the article has been withdrawn and before a new article has been inserted in the proper place.

What I claim is:

1. A clutching mechanism comprising a rotatable driven shaft, a drive member rotatably mounted on said shaft, a ratchet fixed to said drive member, a plate fixed to said shaft, a pawl rockably carried by said plate and pivotally mounted at one end, a lever integral at one end with the pivoted end of, extended from and bodily carried by said pawl, a spring-pressed plunger carried by said plate, engageable with said lever to urge said pawl toward said ratchet, a stationary frame part, a spring-pressed pawl releasing member slidable in said frame part and movable into the path of movement of said lever for contact therewith to thereby swing said pawl to released position, a cam fixed to said plate, a spring-pressed stop member slidably carried by

said frame part and engageable with said cam to hold said plate against rotation in one direction, and means engageable with said pawl releasing member and said spring-pressed stop member for holding said members in disengaged position.

2. A clutching mechanism comprising a rotatable driven shaft, a drive member rotatably mounted on said shaft, a ratchet fixed to said drive member, a plate fixed to said shaft, a pawl rockably carried by said plate and pivotally mounted at one end, a lever integral at one end with the pivoted end of, extended from and bodily carried by said pawl, a spring-pressed plunger carried by said plate, engageable with said lever to urge said pawl toward said ratchet, means limiting the movement of said plunger in one direction, a stationary frame part, a spring-pressed pawl releasing member slidable in said frame part and movable into the path of movement of said lever for contact therewith to thereby swing said pawl to released position, a cam fixed to said plate, a spring-pressed stop member slidably carried by said frame part and engageable with said cam to hold said plate against rotation in one direction, and means engageable with said pawl releasing member and said spring-pressed stop member for holding said members in disengaged position.

3. A clutching means for clutching a drive member and a driven member comprising a ratchet fixed to and rotatable with one of said members, a pawl supported for rotation with the other of said members and engageable with said ratchet, said pawl being pivotally mounted at one end on the said other member, a lever fixed at one end to the pivoted end of, extended from and bodily carried by said pawl, means on the said other member engaging said lever constantly urging said pawl to engaging position, spring-pressed pawl releasing means normally disposed in the path of movement of said lever, a cam carried by said other member having an abrupt trailing end portion, a spring-pressed cam engaging member, a link connecting said pawl releasing means and said cam engaging member together, and means connected to said link for manually holding said pawl releasing means and said cam engaging member in released position.

4. A clutching mechanism for clutching a drive member and a driven member comprising a ratchet fixed to and rotatable with one of said members, a plate fixed to and rotatable with the other of said members, a pawl pivotally mounted at one end on and bodily carried with said plate, a spring-pressed lever integral at one end with the pivoted end of, extended from and bodily carried by said pawl, a spring-pressed pawl releasing member normally disposed in the path of said lever, a cam fixed to said plate provided with an abrupt trailing edge, a spring-pressed positioning member engageable with said cam trailing edge to hold said plate against rotation in one direction, and means connected to said releasing member and said positioning member for holding said members in disengaged position.

5. In a machine including a drive member and a driven member, a clutching mechanism for clutching said drive member with said driven member, comprising a ratchet fixed to and rotatable with one of said members, a plate fixed to and rotatable with the other of said members, a pawl carried by said plate, an arm fixed to said pawl, a spring-pressed plunger carried by said plate, engaging said arm to normally urge said pawl to a ratchet engaging position, means engaging said plunger and said plate limiting the movement of said plunger in one direction, a spring-pressed pawl releasing member slidably carried by the frame of the machine and disposed in the path of rotation of said arm, a cam fixed to said plate provided with an abrupt trailing edge, a spring-pressed stop member carried by the machine frame engageable with said cam trailing edge to hold said plate against rotation in one direction, and means connected to said releasing member and said stop member for holding said members in disengaged position.

6. In a machine including a frame, a drive member, and a driven member, a clutching mechanism for clutching said drive member with said driven member whereby to hold said driven member against rotation in excess of one complete turn, comprising a ratchet fixed to and rotatable with one of said members, a plate fixed to and rotatable with the other of said members, a pawl rockably carried by said plate, an arm fixed to said pawl, a spring-pressed plunger carried by said plate engageable with said arm to normally urge said pawl to a ratchet engaging position, a sleeve engaging said plunger to limit the movement of said plunger in one direction, a spring-pressed pawl releasing member slidably carried by the machine frame and disposed in the path of rotation of said arm, a spring-pressed plate stopping member, a cam fixed to said plate engageable with said stopping member whereby to hold said plate against rotation in one direction, a link connecting said stop member with said pawl releasing member, and an operator connected to said link to move said releasing member and said stop member to disengaged position.

7. In a machine including a frame, a drive member, and a driven member, a clutching mechanism for clutching said drive member with said driven member whereby to hold said driven member against rotation in excess of one complete turn, comprising a ratchet fixed to and rotatable with one of said members, a plate fixed to and rotatable with the other of said members, a pawl rockably carried by said plate, an arm fixed to said pawl, a cylinder fixed to said plate, a plunger sildable in said cylinder, a reduced stem carried by said plunger in said cylinder, a spring about said stem constantly urging said plunger outwardly into contact with said arm whereby to swing said pawl to a ratchet engaging position, a sleeve about said stem engageable with said plunger to limit the inward movement thereof, a spring-pressed pawl releasing member carried by the machine frame disposed in the path of said arm, manually operable means engaging said releasing member to hold said releasing member in disengaged position, and coacting means carried by said plate and the frame of the machine to hold said plate against rotation in one direction while maintaining said plate in a predetermined position.

8. In a machine including a frame, a drive member, and a driven member, a clutching mechanism for clutching said drive member with said driven member whereby to hold said driven member against rotation in excess of one complete turn, comprising a ratchet fixed to and rotatable with one of said members, a plate fixed to and rotatable with the other of said members, a pawl rockably carried by said plate, an arm fixed to said pawl, a cylinder fixed to said plate, a plunger slidable in said cylinder, a reduced stem carried by said plunger within said cylinder, a spring about said stem constantly urging said plunger

outwardly into arm engaging position to thereby swing said pawl to a ratchet engaging position, means in said cylinder engageable with said plunger to limit the inward movement thereof, spring-pressed pawl releasing means carried by the machine frame and disposed in the path of rotation of said arm to rock said pawl to a released position upon engagement of said arm with said releasing member, said releasing member being so positioned relative to said arm whereby said arm will be held against rotation past said releasing member when said releasing member is in engaging position, and manually operable means engaging with said releasing member to move said releasing member to a disengaged position.

JULIUS M. MINKOW.