March 15, 1949. E. A. FORD 2,464,569

CARD FEEDING MECHANISM FOR ACCOUNTING MACHINES

Filed May 3, 1947 2 Sheets-Sheet 1

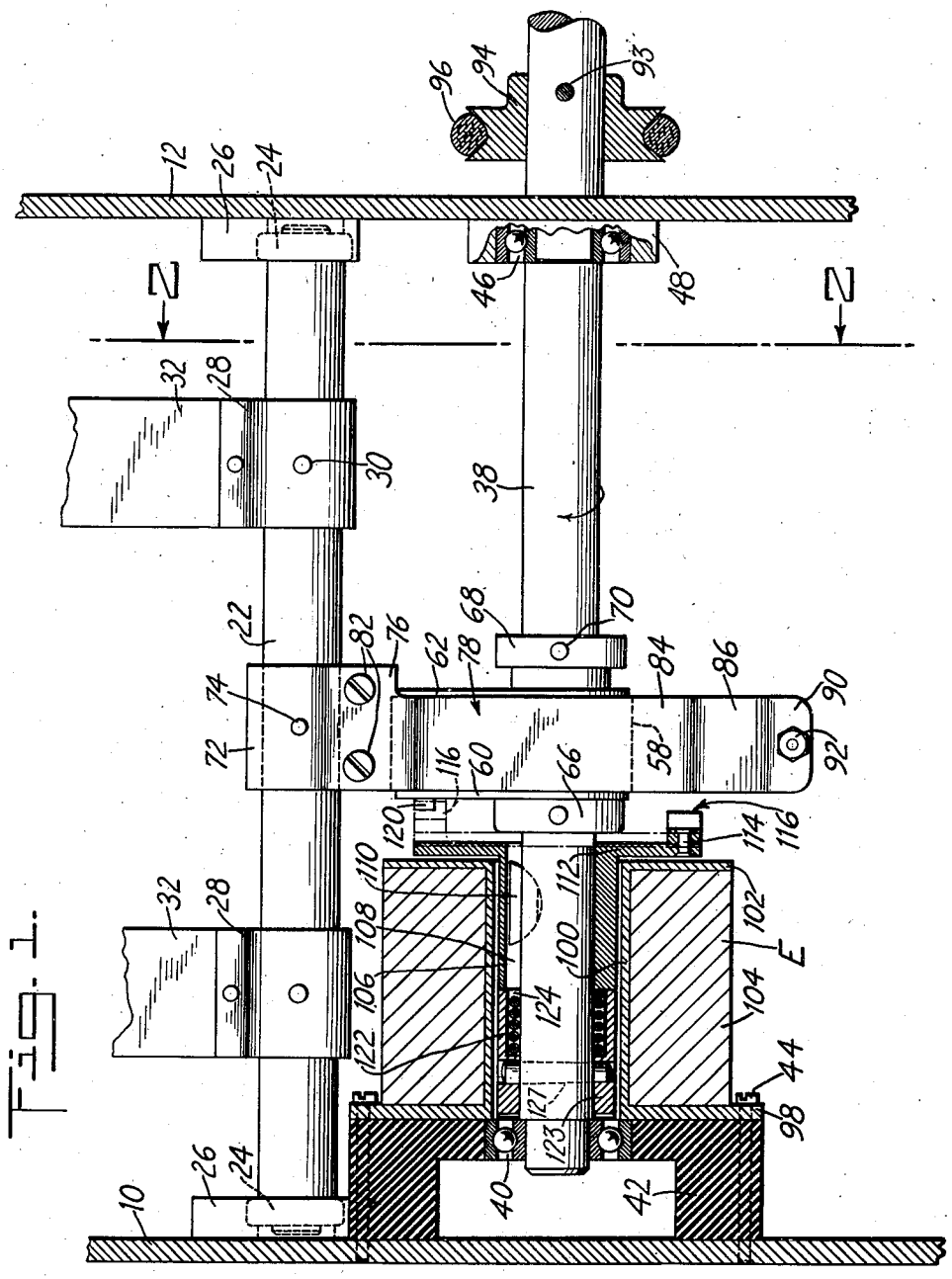


Fig. 1.

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Fig. 2.

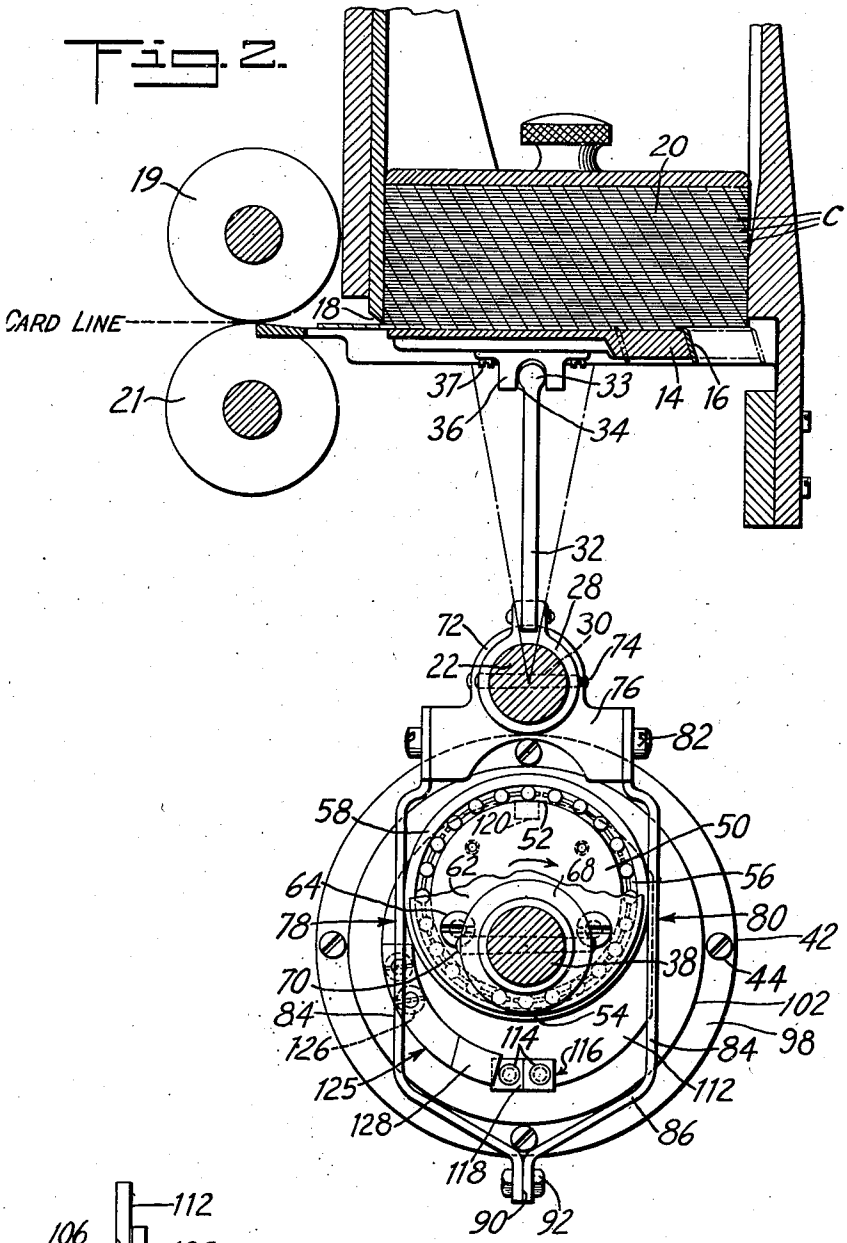
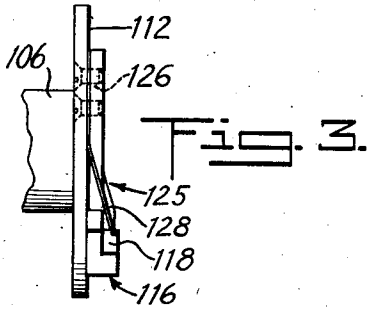


Fig. 3.



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CARD FEEDING MECHANISM FOR ACCOUNTING MACHINES

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2 Claims. (Cl. 271—44)

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The improved card feeding mechanism comprising the present invention has been designed for use in the feeding of record cards from a stack to the card line of a sorting machine of the type shown and described in my prior Patent No. 1,633,937, dated June 28, 1927, for Card feeding apparatus. The invention, however, is capable of other uses and the card feeding mechanism may, if desired, be employed, with or without modification, in connection with a wide variety of accounting machines, as for example, card punching machines, tabulating machines and the like.

The invention specifically relates to a group of instrumentalities commonly referred to as a picker mechanism in which a picker slide, having associated therewith a picker blade, is caused to reciprocate beneath the bottom of a card stack in such a manner that upon each reciprocation thereof the picker blade engages the lowermost card in the stack and impels the same forwardly through a throat mechanism so that the card may proceed by means of the usual feed rollers along the card line.

In carrying out the principles of the present invention, the same briefly contemplates the provision of an oscillatable rock shaft upon which there are mounted a pair of oscillatable picker slide impelling arms, the free ends of which are operatively connected by a lost motion connection to the picker slide in such a manner that upon oscillation of the rock shaft and, consequently, of the arms, the slide will be caused to reciprocate laterally to withdraw the cards successively from beneath the stack and feed them through the throat opening to the card line. The rock shaft also has suspended therefrom a cage-like frame through which there passes a rotatable shaft. A circular eccentric cam mounted on the shaft operates upon rotation of the shaft to alternately engage the opposite sides of the cage-like frame and oscillate the same, thus also causing the rock shaft to be oscillated.

The principal object of the present invention is to provide a mechanism of this type in which means are provided for reducing friction between the cam oscillating means and the surrounding cage-like framework to a minimum.

Another object of the invention is to provide an arrangement of this character in which a balanced relationship exists between the cam oscillating means and the oscillatable frame, thus reducing vibrations to an absolute minimum.

Yet another object of the invention is to provide a novel type of clutch arrangement for initiating rotation of the cam-operating shaft or cam shaft and for terminating such rotation.

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Convenience of arrangement of parts, simplicity of construction, ruggedness and durability and low cost of manufacture are other desirable features that have been borne in mind in the production and development of the present invention.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a side elevational view, partly in section, of the improved picker mechanism per se.

Fig. 2 is a sectional view taken substantially along the line 2—2 of Fig. 1 in the direction indicated by the arrows.

Fig. 3 is a partial view showing the clutch.

Referring now to the drawings in detail wherein a full disclosure of the improved picker mechanism is disclosed, only those portions of the sorting machine to which the picker mechanism has been applied that pertain directly to the picker mechanism have been illustrated. These include the front and rear plates 10 and 12 of the sorting machine, a diagrammatic representation of the card line (so labeled), i. e., the horizontal plane along which the cards travel after being withdrawn from the card stack by the picker mechanism, the reciprocable picker plate 14, the picker knife 16 carried thereby, and the adjustable throat 18 through which the cards C contained in the stack 20 thereof are individually fed one at a time. The picker plate 14 is adapted to be reciprocated so as to move from a retracted position shown in dotted lines through the intermediate position shown in full lines to an advanced position shown in dotted lines and in so moving the picker knife 16 engages the rear edge of the lowermost card C in the stack 20 and impels the card forwardly through the adjustable throat 18 from whence it is picked up by suitable feed rolls 19, 21, and conducted through the machine.

The picker slide actuating mechanism includes a transverse rock shaft 22 journaled in antifriction bearings 24 carried in blocks 26 suitably secured to the inside of the front and rear plates 10 and 12. A pair of collars 28 are pinned as at 30 to the rock shaft 22 in spaced relationship and each collar carries an upwardly extending oscillatable picker arm 32. The free ends of the

arms 32 are provided with rounded portions 33 which project into a slot 34 formed in an elongated transverse bracket 36 secured by means of screws 37 to the underneath side of the picker plate 14. The guide means for the picker plate has not been shown in the present instance, but it will be understood that the same is suitably guided for reciprocation in a horizontal plane in any suitable manner, as for example, in the manner shown in my above mentioned patent. The rock shaft 22 is capable of limited oscillation about its axis throughout the extent indicated by the dot and dash axial lines representing the amplitude of oscillation of the shaft 22.

In order to oscillate the rock shaft 22 throughout the amplitude indicated above at predetermined times to feed the card C from the stack 20, a driven shaft 38 has its extreme rear end journaled in anti-friction bearings 40 carried centrally of a cup-shaped block member 42 secured by means of a series of bolts 44 to the front plate 10 of the sorting machine. The rear end of the shaft 38 projects completely through the rear plate 12 and is supported in anti-friction bearings 46 carried in a block 48 mounted on the rear plate 12. The shaft 38 has loosely mounted thereon a circular eccentric member 50 having a region 52 of high eccentricity and a region 54 of low eccentricity. A series of anti-friction cage and bearing members 56, of which there are four in number, are disposed around the periphery of the circular eccentric member 50 and they in turn are surrounded or enclosed by an anti-friction ring 58. A pair of circular retaining plates 60 and 62 are disposed on each side of the eccentric member 50 and a series of through-bolts 64 pass through the retaining plates and members 60, 50, 62, and retain the ball bearing cage members 56 in position between the outer periphery of the eccentric member 50 and the inner periphery of the ring 58. A pair of collars 66 and 68 are disposed on opposite sides of the eccentric ball bearing assembly just described and are pinned to the shaft 38 as at 70.

A collar 72 is pinned as at 74 to the shaft 22 intermediate the two collars 28 and is formed with an enlarged or block portion 76. A pair of cage sections 78 and 80 are secured by means of studs 82 adjacent their upper ends to the opposite sides of the block portion 76 of the collar 72 and these cage sections are provided with outwardly bowed portions 84 which converge inwardly as at 86 to a point 90 of juncture where the two sections are secured together by means of a nut and bolt assembly 92. The cage structure afforded by the two sections 78 and 80 surround the eccentric ball bearing structure above described with the inner surfaces of the cage sections 78 and 80 bearing lightly against or just clearing the periphery of the anti-friction ring 58.

Referring now to Fig. 1, that portion of the shaft 38 which is disposed outside of the rear plate 12 of the sorting machine has mounted thereon and pinned thereto as at 93 a pulley 94 which is adapted to be driven from a belt 96 and the latter in turn is adapted to be continually driven at a constant rate of speed from the electric motor, not shown, which controls the sorting machine operations. It will be noted that inasmuch as the eccentric member 50 is loosely disposed upon the continuously rotating shaft 38 motion of the latter will not normally be transmitted to the former to cause oscillation of the rock shaft 22 and consequent reciprocation of the picker plate 14. Such oscillation of the rock shaft 22 is adapted to be selectively controlled by means of a suitable electromagnetically operated clutch mechanism, the details of which are best illustrated in Fig. 1.

Referring now to Fig. 1, the through-bolts 44 which pass through the block member 42 also pass through the inner flange 98 of a spool member designated in its entirety at 100. The spool member 100 is provided with an outer flange 102 and a coil 104 forming a part of an electromagnet designated in its entirety at E is disposed between the inner and outer flanges 98 and 102 respectively. The electromagnet E is provided with a shiftable core 106 which is slotted as at 108 internally, this slotted portion 108 cooperating with a key 110 to maintain the core member 106 slidable upon but rotatable with the shaft 38. The core 106 is provided with an annular flange 112 (see also Fig. 2) which forms a part of the clutch assembly per se. The flange 112 has riveted thereto as at 114 a block or tooth member 116 having a recess or cut-away portion 118 and the block 116 forms one element of the clutch and is designed for cooperation with a tooth 120 which constitutes the other element of the clutch and which is secured to the circular retaining plate 60 of the eccentric assembly.

The core 106 of the electromagnet E is movable from a retracted position wherein the tooth 120 is out of the circular path of movement of the block or tooth member 116 to an advanced position wherein these two teeth members cooperate by direct contact with each other to cause revolution of the eccentric assembly about the axis of the shaft 38. The core 106 is normally urged to its advanced position by means of a compression spring 122 which is disposed within a sleeve 123 pinned as at 127 to the shaft 38. The core is thus normally maintained in its advanced position and is adapted to become retracted when the coil 104 of the electromagnet E becomes energized.

In order to prevent rebound on impact of the tooth 116 against the tooth 120, an arcuate spring 125 is riveted as at 126 to the outer face of the flange 112 and is provided with an outwardly inclined portion 128 which terminates just short of the upstanding face of the recess 118 provided in the block or tooth member 116 leaving just sufficient clearance for positioning of the tooth 120 between this face and the end of the spring 125, 128. Thus it will be seen that upon initial deenergization of the electromagnet E the core 106 thereof will be moved to its advanced position and the inclined portion 128 of the spring 125 will ride over the tooth 120, thus pressing or flattening the spring 125 until such time as the tooth 120 has passed over the end of the spring, at which time the outwardly inclined portion 128 of the spring 125 will spring outwardly and confine the tooth 120 between the block 116 and the end of the spring so that thereafter the two parts of the clutch assembly will rotate in unison without lost motion.

Upon such rotation of the two parts of the clutch assembly, the eccentric member 50 will revolve about the axis of the shaft 38 and in so doing the cage assembly 78, 80 will be moved from side to side with the inner surfaces thereof bearing against the freely movable anti-friction ring 58. Such oscillation of the cage assembly 78, 80 will transmit oscillatory movement to the rock shaft 22, whereupon the two picker arms 32 will oscillate in such a manner as to cause reciprocation of the picker plate 14.

It will be noted from an inspection of Fig. 2 that as the moment of inertia of the mass of the eccentric member 50 shifts upwardly and in a clockwise direction, as indicated by the arrow, a force is exerted on the shaft 38 which tends to push the sorting machine which is associated with the picker mechanism to the right. Sorting machines of this character are ordinarily mounted on casters and consequently in such an instance the sorting machine would be responsive to this thrust by the shaft 38. However, during the same interval, the picker knife 16 and its slide 14 are moved in the opposite direction to that of the eccentric member, thereby applying a force on the shaft 22 tending to push the machine to the left. These forces, in a large measure, counter-balance each other and the resultant vibration is reduced to a minimum.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the apparatus illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. Card feeding mechanism for record cards including a reciprocable card picker slide member, a rock shaft mounted for oscillation about an axis beneath said slide member, a cage member suspended from said rock shaft and having opposed inner side surfaces, a circular cam member disposed within said cage member and of a diameter substantially equal to the distance between said inner surfaces whereby said surfaces are in substantial contact with diametrically opposed points on the periphery of said cam member, a continuously rotatable shaft loosely extending through said circular cam member, the axes of said shaft and cam member being spaced apart whereby the cam member is eccentrically disposed on said shaft, and means for continuously rotating said shaft.

2. Card feeding mechanism for record cards including a reciprocable card picker slide member, a rock shaft mounted for oscillation about an axis beneath said slide member, a cage member suspended from said rock shaft and having opposed inner side surfaces, a continuously rotatable shaft projecting through said cage member, a circular disc-like member loosely mounted upon said continuously rotatable shaft and eccentrically disposed thereon, an anti-friction ring surrounding said disc-like member, a series of anti-friction members disposed between said ring and disc-like member, the outer periphery of said ring being of a diameter substantially equal to the distance between the inner side surfaces of said cage member whereby said surfaces are in substantial contact with the outer periphery of said ring, and means for continuously rotating said shaft.

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