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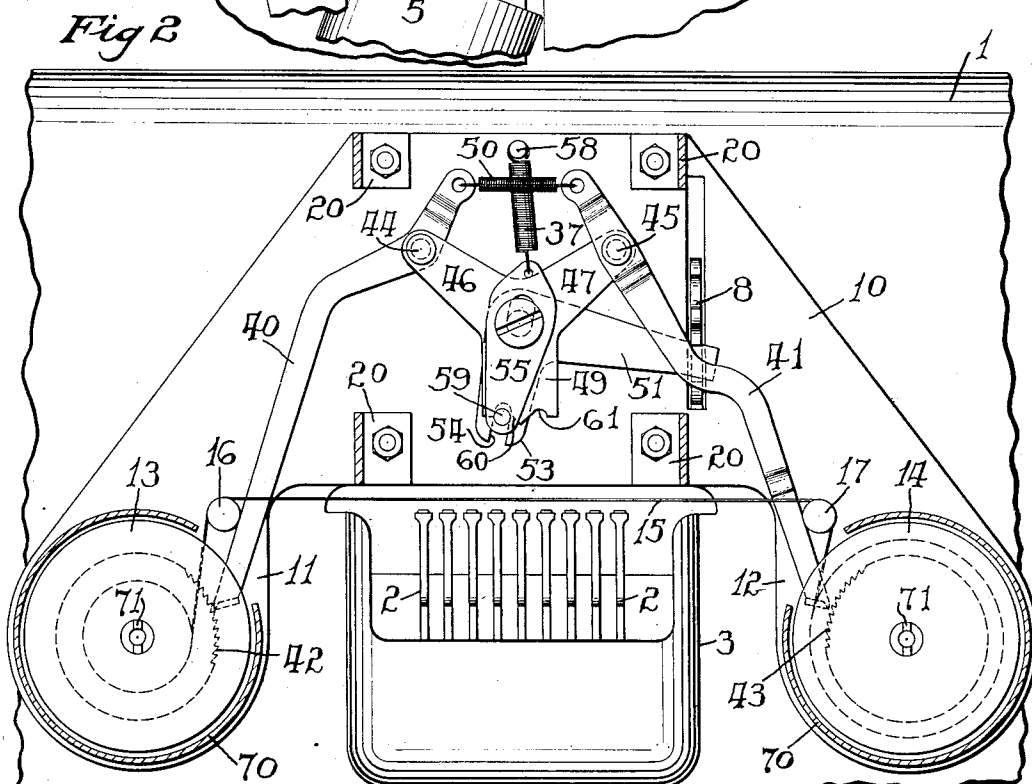
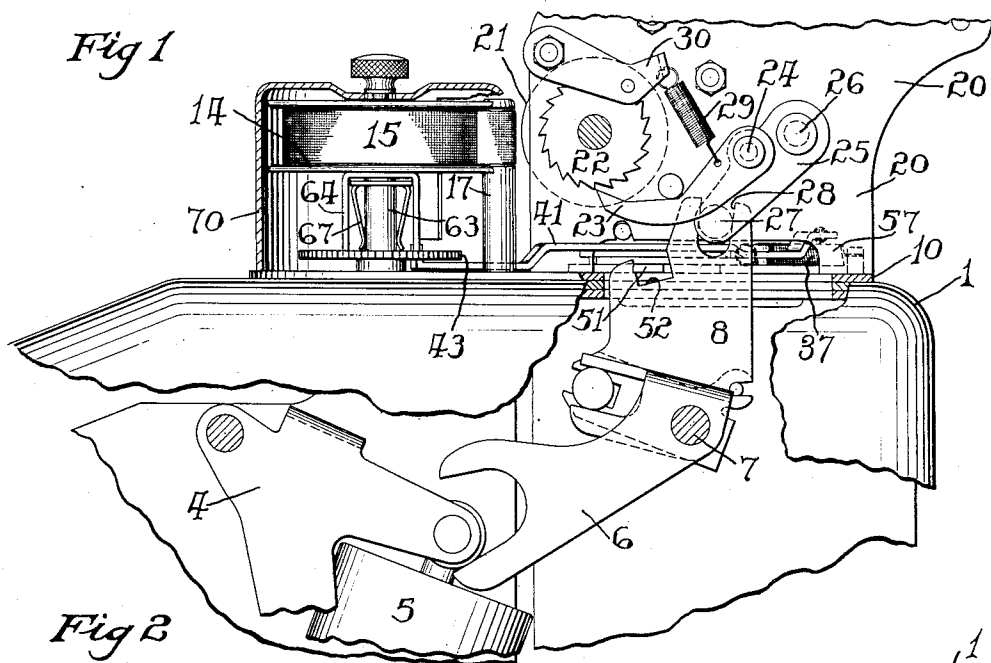
A. A. HORTON

1,690,487

ATTACHMENT FOR CALCULATING MACHINES

Filed Dec. 21, 1925

3 Sheets-Sheet 1



INVENTOR

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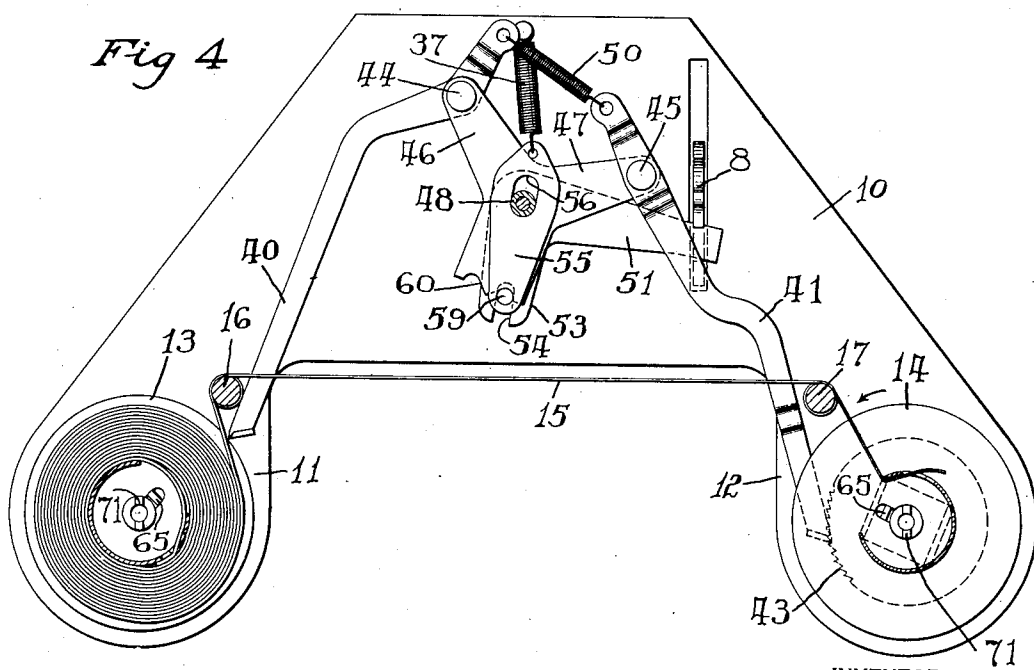
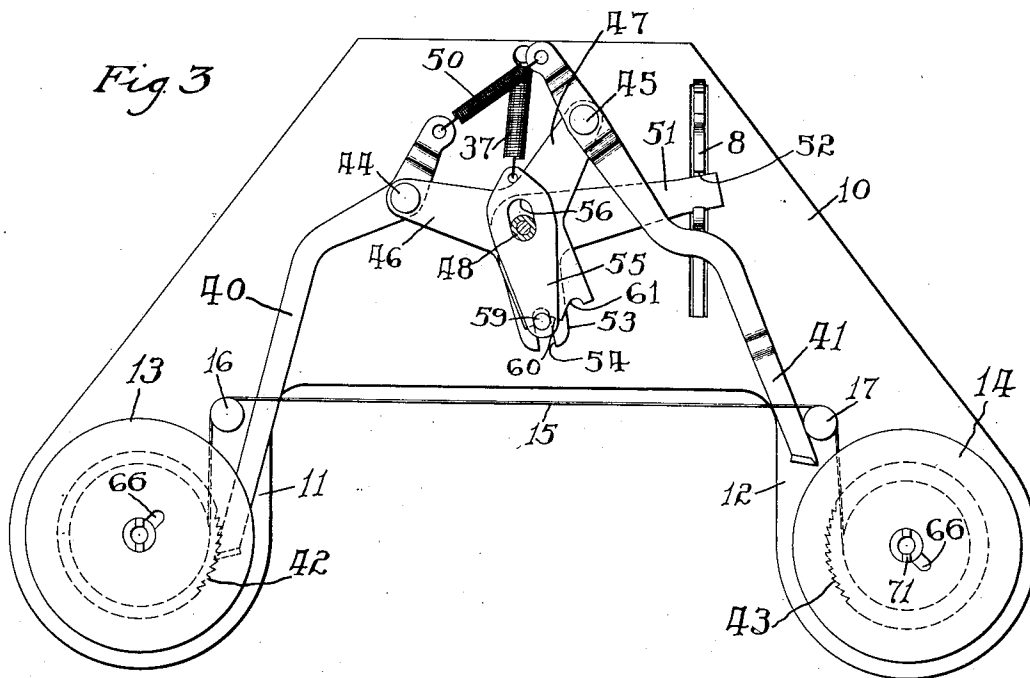
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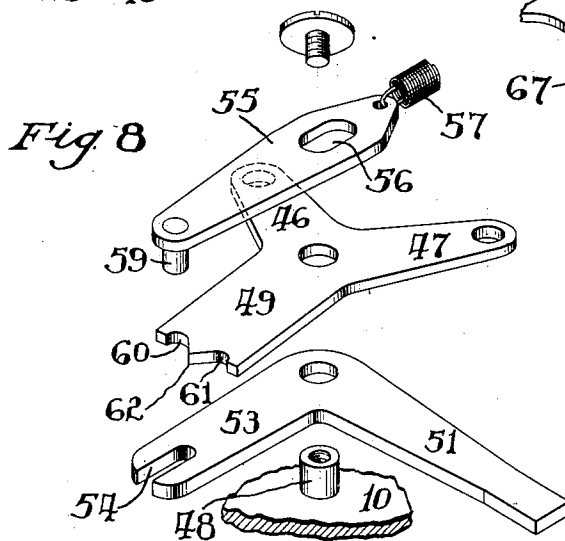
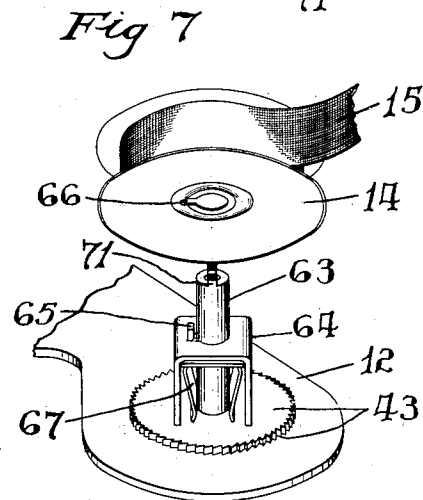
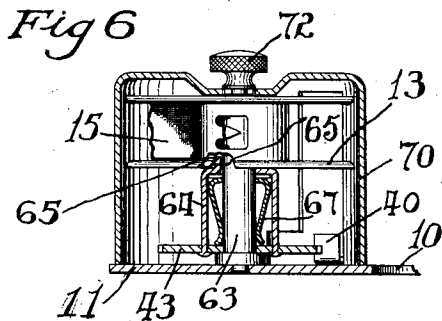
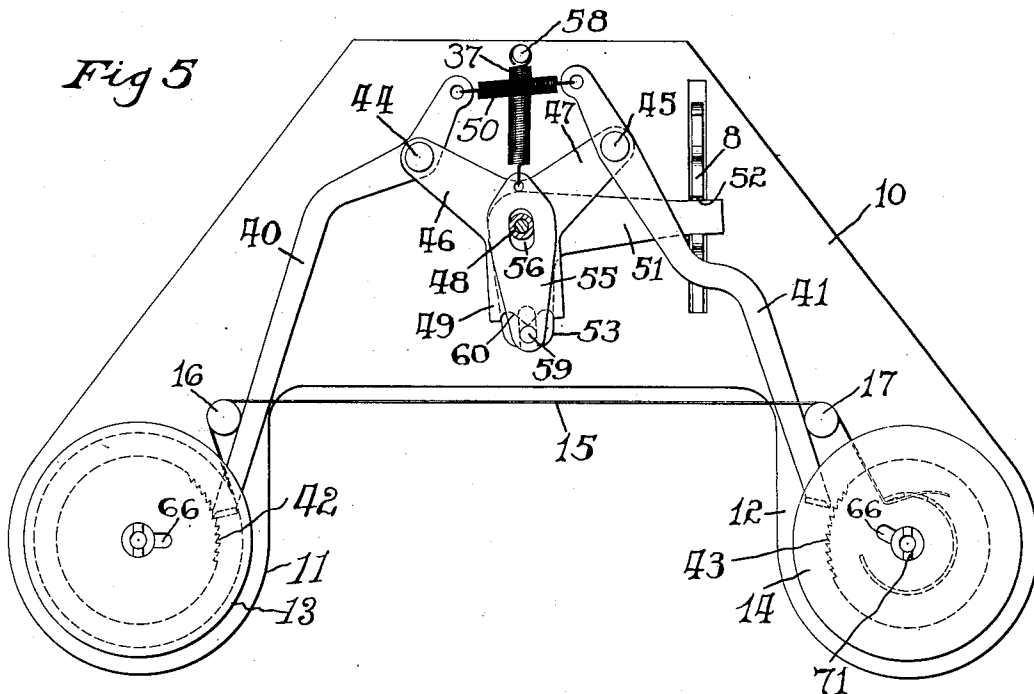
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

ALLEN A. HORTON, OF PLYMOUTH, MICHIGAN, ASSIGNOR TO BURROUGHS ADDING MACHINE COMPANY, A CORPORATION OF MICHIGAN.

ATTACHMENT FOR CALCULATING MACHINES.

Application filed December 21, 1925. Serial No. 76,912.

The invention relates to an attachment for calculating machines.

It relates particularly to an attachment to be applied to small portable adding machines, although it is not limited to this use.

The invention comprehends a unit which may be quickly attached to and detached from an adding machine or the like and which includes an improved ribbon feeding mechanism with an automatic reverse, together with a platen mechanism both of which are automatically operated by a common means.

The space available on adding machines of portable type is limited and the parts must be so constructed and coordinated that they occupy a minimum of space. At the same time, they must operate efficiently and not get out of order easily. It is also important that they be made simple and inexpensive and that the different parts be easily accessible and removable for assembly, replacement and repair.

The general object of the present invention is to provide an improved, compact, detachable unit for calculating machines or the like.

Another object is to provide an improved ribbon feeding mechanism that will automatically reverse itself.

Other objects and advantages of the invention will appear from the specification and drawings.

An embodiment of the invention is illustrated in the drawings in which:

Fig. 1, is a sectional side elevation showing the ribbon feeding mechanism, the platen mechanism, and the operating means therefor.

Fig. 2, is a plan view with the platen mechanism removed showing the ribbon feeding mechanism in normal position.

Fig. 3, is a plan view of the ribbon feeding mechanism showing the parts in the position they occupy at the end of the forward stroke of the operating lever of the machine.

Fig. 4, is a plan view similar to Fig. 3, showing the parts in the position they occupy after the ribbon feeding mechanism has

been automatically reversed from the position of Fig. 3.

Fig. 5, is a plan view of the ribbon mechanism showing the parts in the position they occupy at the time the mechanism is being automatically reversed.

Fig. 6, is a vertical section through one of the ribbon spools, showing the manner in which it is driven and the resilient means for preventing it from moving backward.

Fig. 7, is a perspective view showing one of the ribbon spools and its mounting.

Fig. 8, is a separated perspective view of the parts which operate the pawls of the ribbon feeding mechanism.

The attachment is illustrated as applied to the rear top side of the casing 1, of a portable adding machine. The adding machine mechanism includes a plurality of type bars 2, illustrated in Fig. 2, that project above the main body of the machine and are enclosed in a rectangular projecting portion 3 of the casing. The rear end of this projecting part of the casing is open and the type ribbon passes across this opening in front of the faces of the type bars. The machine also includes a lever 4 which is moved up and down in response to movements of the main operating handle (not shown). Movement of the lever 4 is regulated in one direction by a dash pot 5, and the lever has a pin and slot connection with an arm 6 attached to the shaft 7, which in turn carries on arm 8, for operating the mechanisms of the attachment. The arm 8, projects upward through a slot in the casing 1, and cooperates with the attachment in a manner which will be later described.

The attachment is carried by a sheet metal base plate 10, having forwardly extending arms 11 and 12, spaced apart so that the base plate may be fitted around the casing projection that encloses the type bars. The arms 11 and 12, carry, respectively, the ribbon spools or reels 13 and 14 which are thus positioned at the sides of the projecting portion of the casing. A ribbon 15 is wound on one spool, from where it passes around a

guiding post 16 carried by the base 10, past the face of the type bars, around another guiding post 17, and around the second spool. This construction enables the ribbon to be properly positioned relative to the type bars and it places the spools well forward leaving space at the rear of the attachment for the other mechanisms.

The base plate 10 carries two vertical side frame members 20 in which are journaled a platen 21 and its associated paper holder and guides the latter not having been illustrated. A ratchet 22, is fixed to the same shaft that carries the platen and an operating pawl 23, cooperates with the ratchet. This pawl is pivoted at 24, to the arm 25 which, in turn, is pivoted at one end on the stud 26 and carries on its other end a roller 27 cooperating with the slot 28 in the lever 8. A spring 29 connects the pawl 23 with an overthrow preventing pawl 30 that is associated with the ratchet 22. As the lever 8 is rocked back and forth, the arm 25 and pawl 23 advance the platen around one tooth at a time. The platen is thus operated in response to movements of the main operating lever of the adding machine. The fact that the ribbon spools are located forwardly and to the side of the projecting portion 3 of the casing leaves ample room for the platen to be located close to the type bars and enables the construction to be made neat and compact.

The ribbon feeding mechanism has been constructed of a minimum number of parts that have been combined and coordinated so that it is very compact. It may, accordingly, be placed in a small space under the platen mechanism with appropriate connections to the ribbon spools which are forward and to the sides of the attachment.

The ribbon feeding mechanism includes two pawl arms 40 and 41 operating ratchet wheels 42 and 43 connected respectively to the ribbon spools 13 and 14. These pawl arms are pivoted at 44 and 45 to the arms 46 and 47 of a Y-shaped member pivoted on the stud 48 on the base plate and having a third arm 49 extending forwardly. The rear ends of the pawl arms are connected by a coil spring 50 which serves to urge their outer ends outwardly into engagement with the posts 16 and 17 which thus serve the double purpose of guiding the ribbon 15 and the pawls 40 and 41.

Pivoted on the stud 48 is a bell crank lever, one arm 51 of which extends toward the side of the attachment and fits into a notch 52 in the operating lever 8. The other arm 53 of the bell crank lever extends forward adjacent the third arm 49 of the Y shaped member and its outer end is provided with a slot 54 as illustrated in Fig. 8.

A third member 55 pivoted on the stud 48 has a sliding movement relative to the stud 48 which is determined by the length of the slot

56. The member 55 is normally biased rearwardly to the position shown in Figs. 2, 3 and 4 by a spring 57 connected to the rear end of the member 55 and to a pin 58 on the base plate 10. The front end of the member 55 carries a pin 59 which extends into the slot 54 of the arm 53 of the bell crank lever. This pin also cooperates with two notches 60 and 61 in the end of the arm 49 of the Y shaped member. The two notches 60 and 61 are separated by a cam faced projection 62 illustrated most clearly in Fig. 8.

The above described mechanism serves to wind the ribbon from one spool to the other step by step during the operation of the machine and to alternately automatically reverse itself when the end of the ribbon on either spool has been reached. It operates as follows:

The normal position of parts is that shown in Fig. 2. The lever 8 is in the normal forward position it occupies when the main operating lever of the adding machine is in its normal position. When the main operating lever is pulled forward, the lever 8 moves rearwardly and carries with it the arm 51. This moves the arm 53 in a counter clockwise direction and the arm moves the pin 59 carried by the member 55. As illustrated in Fig. 2, this pin is normally in the notch 60 of the arm 49 of the Y shaped member to which the pawls 40 and 41 are pivoted. The Y shaped member is moved in a counter clockwise direction along with the pin and this moves the pawl 40 into contact with the teeth of ratchet 42. The pawl 41 is withdrawn further from the ratchet 43 and remains idle. The position of the parts after this movement has taken place is illustrated in Fig. 3. The forward movement of pawl arm 40 is sufficient to move the ratchet wheel four teeth.

When the lever 8 returns to its forward position on the return stroke of the handle, that is, the position shown in Fig. 2, the parts return to their normal position and the above operation is repeated as often as the operating lever 8 is moved backward and forward. The arc of oscillation of the Y-shaped member, combined with the guiding action of the stud 17, is such that the return movement does not cause the pawl arm 41 to operatively engage the ratchet 43. It just falls short of such operation, as shown in Fig. 2.

When the end of the ribbon is reached on spool 43, it is necessary to reverse and wind the ribbon back on to spool 43 from spool 42. The reversal takes place automatically as follows:

Assume that the end of the ribbon on spool 43 is reached as illustrated in Fig. 5. As the arm 8 moves to the rear, it tends to move the parts as heretofore described but the pawl 40 is retarded and prevented from moving by the ribbon 15 which will no longer unwind

from spool 43. The connection between the pawl 40 and its operating means is through the pin 59 which is held in the notch 60 by the tension of the spring 57. When the pawl 40 is prevented from moving, the continued movement of the arm 53 in a counter clockwise direction causes the pin 59 to ride up over the cam surface 62 against the tension of spring 57 as illustrated in Fig. 5. After the pin passes the top of the cam the tension of spring 57 pulls it into the notch 61. The connection between the Y-shaped member and its operating means is thus changed and this changes the position of the arc of the movement of the Y-shaped member sufficiently to cause the pawl 41 to become active and the pawl arm 40 to become idle. The back and forward motion of the lever 8 then operates the pawl 41 to move the ratchet 43 around to wind the ribbon on the spool 14 in the direction of the arrow, shown in Fig. 4. In this position of the parts the pawl arm 41 is moved forwardly on the return stroke of lever 8 rather than the forward stroke which pushes the pawl 40 forward when that pawl is active. The pawl 41 continues to wind the ribbon on reel 14 until the end of the ribbon on spool 13 is reached, in which event, the mechanism reverses itself in the other direction and the pawl 40 becomes active while pawl 41 is rendered idle.

In order that the ribbon spools will not move backward as the pawls are withdrawn over the ratchets and also in order that there will be no slack in the unwinding ribbon, a novel mounting and friction brake has been provided. The mounting for each of the spools is the same and therefore only one will be described. The ratchet 43 is journaled loosely on a shaft 63 fixed to the arm 12 of the base plate 10. Attached to the ratchet is a U-shaped sheet metal stamping 64. The arms of the U-shaped member are riveted to the face of the ratchet wheel and its base has an opening for the reception of the shaft 63. Bent up from the base of the U is a lug 65 that cooperates with the notch 66 in the ribbon spool 14. The ribbon spool fits over the end of the stationary shaft 63 and rests on the U shaped member with which it has a driving connection through the medium of the projection 65 and the slot 66. Fitted within the U-shaped member 64 is an inverted U-shaped friction spring 67 the base of which has an opening for the reception of shaft 63 and the arms of which are bent inwardly to frictionally engage the shaft 63. The base of this spring is substantially the same shape and size as the interior of the base of the U-shaped member 64. Accordingly, when the member 64 is related with the ratchet 42, the spring 67 is moved with it. The frictional engagement of the arms of the spring with the shaft is sufficient to prevent the ratchets from moving backward but it does not inter-

fere with the action of the pawl in moving the ratchet forward. In the forward movement of the ratchet, the spring 67 prevents overthrow of the ribbon spool in the feeding operation. Both springs combine and act to prevent slack in the ribbon. The necessary breaking action is thus procured without interfering with the operation of the mechanism. The construction is simple, inexpensive, easy to assemble and has proved very efficient.

The spool and ratchet are enclosed by a casing 70 having notches for engagement with projections 71 on the end of the shaft 63. A nut 72 is threaded into the end of the shaft 80 to hold the casing in position.

The entire attachment forms a compact unit that may be quickly attached to and detached from an adding machine. The ribbon feed and reverse and the platen mechanism 85 have their operating mechanisms constructed so as to be easily connectible to one lever which is controlled from the main operating lever of the machine. The mechanisms are so constructed and coordinated that they occupy a minimum space and yet accomplish their requisite functions efficiently. The location of the ribbon spools enables the platen mechanism to be positioned close to the type bars. The construction of the ribbon feeding mechanism enables it to be located under the platen mechanism and to be operated by the same lever which operates the platen feeding mechanism. The parts are all carried by one base which is attached to the casing by a few screws or other suitable fastener means. The entire attachment can be quickly removed for repair or replacement without taking apart any other portions of the adding machine.

It is to be understood that the construction shown is for purposes of illustration only and that variations may be made in it without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. In combination, a calculating machine having an enclosing casing, an operating means including a member projecting through the casing, a printing mechanism including type bars positioned to move to printing position through an opening in the casing, and an independent self-contained paper and ribbon unit detachably secured to the outside of the casing, said unit including a platen operatively positioned relative to the type bars, operating means for the platen, ribbon spools supporting a type ribbon, and an operating means for the ribbon spools, said operating means for the platen and ribbon spools having portions which are operatively positioned relative to the member projecting through the casing when the paper and ribbon unit is mounted on the casing.

2. The combination with a calculating ma-

chine having an enclosing casing with an oscillating member projecting therethrough of a paper and ribbon unit attachable to and detachable from the outside of said casing, said unit comprising a platen, operating mechanism therefor, ribbon spools, and an operating mechanism for the ribbon spools, said operating mechanisms for the platen and ribbon spools having members which, when the unit is placed on the outside of the casing cooperate with the oscillating member projecting through the casing whereby the operating mechanisms are actuated by said member.

3. The combination with a calculating machine having a casing with printing type bars projecting through the top thereof, a paper and ribbon unit detachably connected on top of the casing with the ribbon spools thereof on opposite sides of said type bars, operating mechanism for said ribbon spools, a platen to the rear of said type bars, and mechanism for operating the platen, said operating mechanisms for the ribbon spools and the platen having connections with the main operating mechanism of the calculating machine.

4. A paper and ribbon attachment adapted to be attached as a unit to and detached from a calculating machine comprising a base plate having forwardly projecting spaced arms on which ribbon spools are mounted, mechanism for operating said spools mounted on said base plate, a pair of spaced vertical side plates carried by the base plate, a platen mounted in said side plates, and operating means for the platen carried by one of said side plates.

5. A paper and ribbon attachment adapted to be attached as a unit to and detached from a calculating machine, comprising a base having spaced arms at its forward end, a ribbon spool on each arm, a platen mechanism at the rear of the base, and a ribbon spool operating mechanism under the platen mechanism, said spool operating mechanism and said platen mechanism having actuating members which are positioned in operative relation to a moving member on an accounting machine when the unit is positioned on a machine.

6. A paper and ribbon attachment adapted to be attached as a unit to and detached from a calculating machine, comprising a base having spaced forwardly projecting arms, a ribbon spool rotatably mounted on each arm, a platen mechanism carried by the base to the rear of the forwardly projecting arms, and a ribbon spool operating mechanism positioned beneath the platen mechanism and having operating connections extending forward to the spools on the arms.

7. The combination in a calculating machine of a series of type bars projecting above the main body of the machine at its rear, a ribbon spool on each side of the series of type bars, a type ribbon carried by said spools and

passing in front of the faces of the type bars, a platen mechanism located to the rear of the type bars, and mechanism positioned to the rear of the type bars and under the platen mechanism for automatically moving said spools in response to movements of the calculating machine mechanism to wind the ribbon from one spool to the other.

8. In a ribbon feeding mechanism, a pair of ribbon spools each having a ratchet associated therewith, a pawl for each ratchet, said pawls being pivoted to the respective arms of a Y-shaped member, a pair of notches in the third arm of the Y-shaped member, said notches being joined by a raised cam surface, a bell crank lever having a slot in the end of one of its arms adjacent the third arm of the Y-shaped member, and a connecting member carrying a pin engaging in said slot and in one of the notches in the Y-shaped member, said connecting member being movable to permit the pin to ride over the cam surface from one notch to the other but being normally biased to keep the pin in the bottom of the notch in which it is engaged.

9. In a ribbon feeding mechanism, a pair of ribbon spools each having a ratchet associated therewith, a pawl for each ratchet, said pawls being pivoted to the respective arms of a Y-shaped member, a spring connecting the rear ends of said pawls, said Y-shaped member having a third arm provided with a pair of notches joined by a cam surface, a bell crank operating lever having an arm adjacent to the third arm of the Y-shaped member, said operating lever arm being provided with a slot in its end, and a connecting member carrying a pin engaging in the slot in the operating lever arm and in one of the notches in the Y-shaped member, said connecting member being movable to permit the pin to ride over the cam surface from one notch to the other but being normally biased to keep the pin in the bottom of the notch in which it is engaged.

10. The combination in a ribbon feeding mechanism of a pair of rotatably mounted ribbon spools, a pair of guide posts for guiding a type ribbon from one spool to the other, and an operating mechanism including pawl arms for rotating the spools, said ribbon guide posts also serving as guides for the pawl arms.

11. The combination in a ribbon feeding mechanism of a stationary shaft, a ribbon spool, and a U-shaped spring connected to the spool having its arms bent inwardly to frictionally engage the shaft to retard rotation of the spool.

12. The combination in a ribbon feeding mechanism of a stationary shaft, a spool rotatably mounted on the shaft, a rectangular frame-like portion connected to said spool, and a U-shaped spring positioned within the rectangular portion so as to rotate therewith,

the arms of the U-shaped spring being bent inwardly to engage the shaft to retard rotation of the spool.

13. The combination in a ribbon feeding
5 mechanism of a spool, a stationary shaft, a ratchet carrying a U-shaped member having an opening for the shaft, a projection on the U-shaped member engaging a slot in the spool

and a U-shaped spring positioned within the U-shaped member to rotate therewith, the 10 arms of said U-shaped spring being bent inwardly to frictionally engage the shaft to retard motion of the ratchet.

In testimony whereof, I have subscribed my name.

ALLEN A. HORTON.