Dec. 11, 1934. M. E. O'BRIEN 1,984,199

SPREAD SHEET CONTROL MACHINE

Filed Jan. 29, 1930 5 Sheets-Sheet 1

Fig. 2

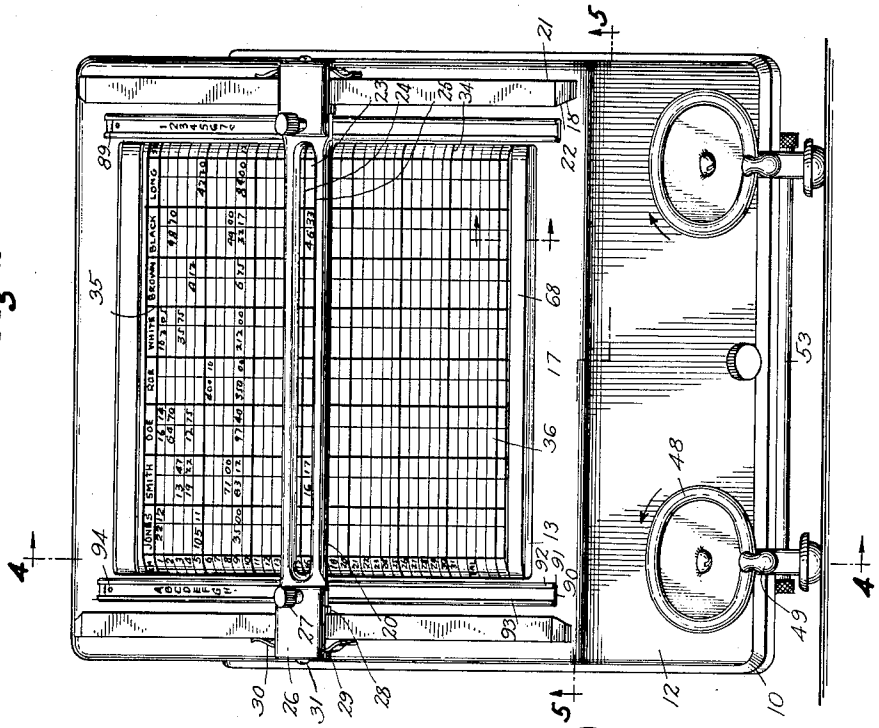
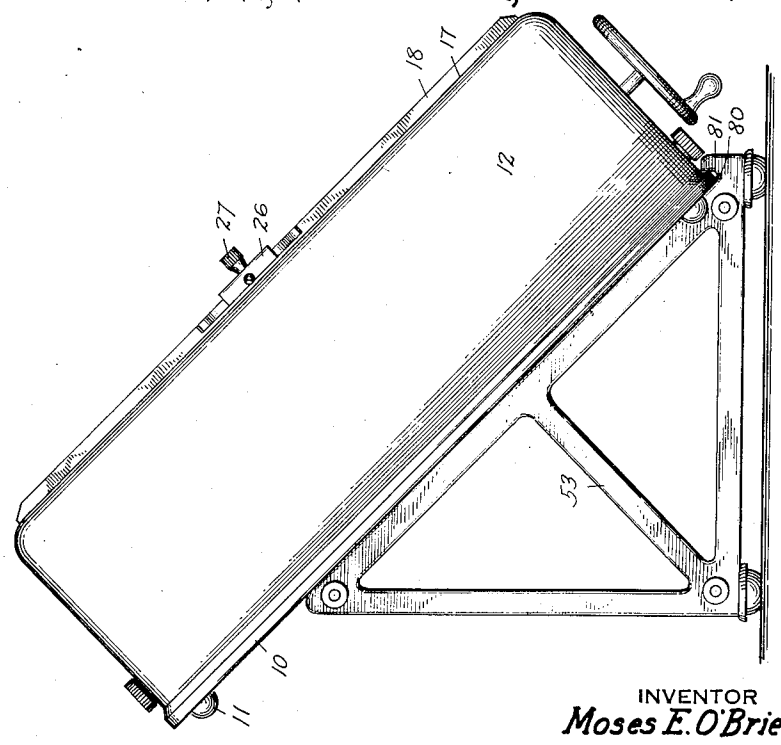


Fig. 1



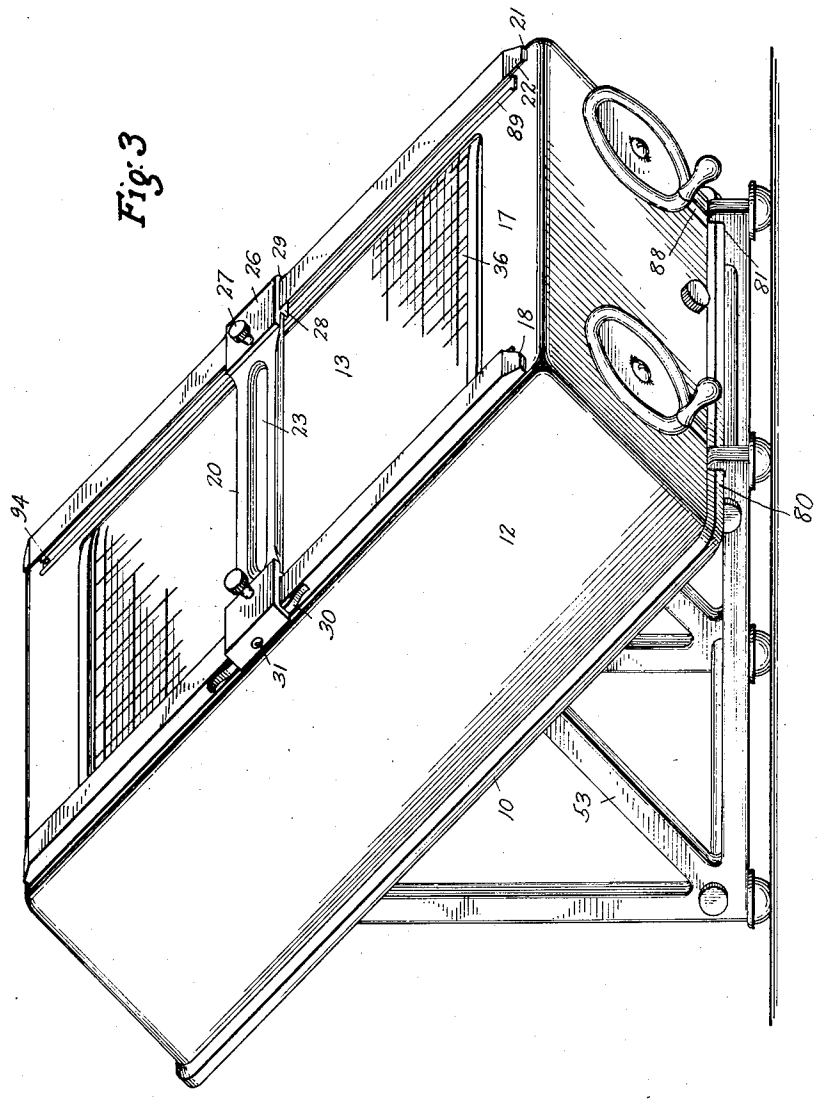
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SPREAD SHEET CONTROL MACHINE

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Fig. 3



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SPREAD SHEET CONTROL MACHINE

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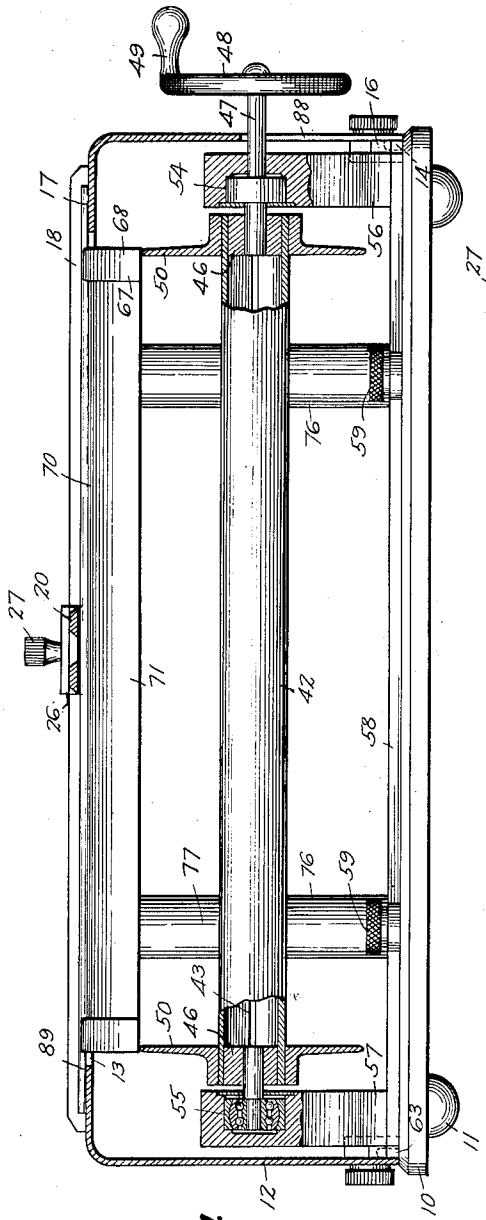


Fig. 4

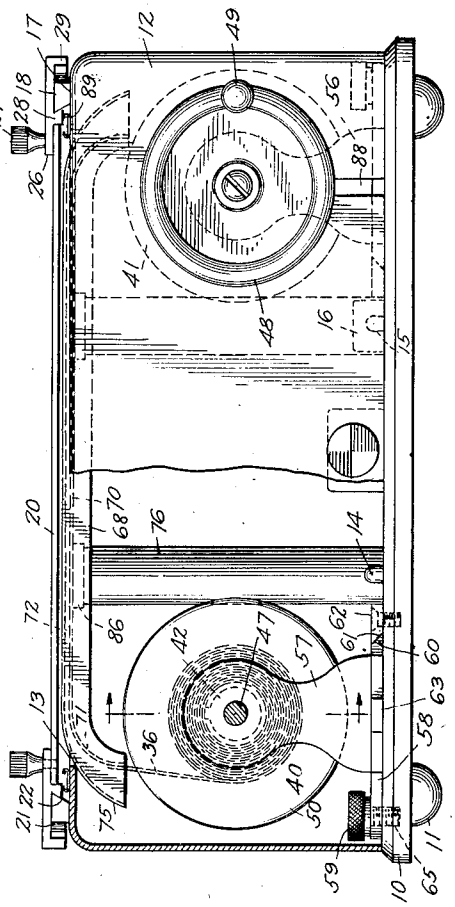


Fig. 5

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SPREAD SHEET CONTROL MACHINE

Filed Jan. 29, 1930 5 Sheets-Sheet 4

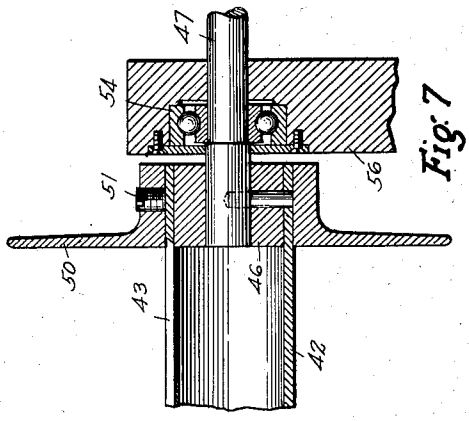


Fig. 7

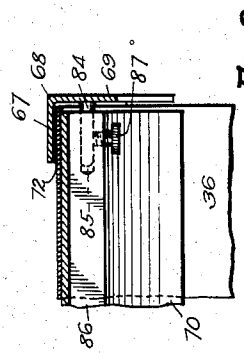


Fig. 8

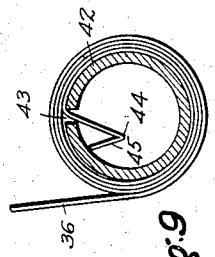


Fig. 9

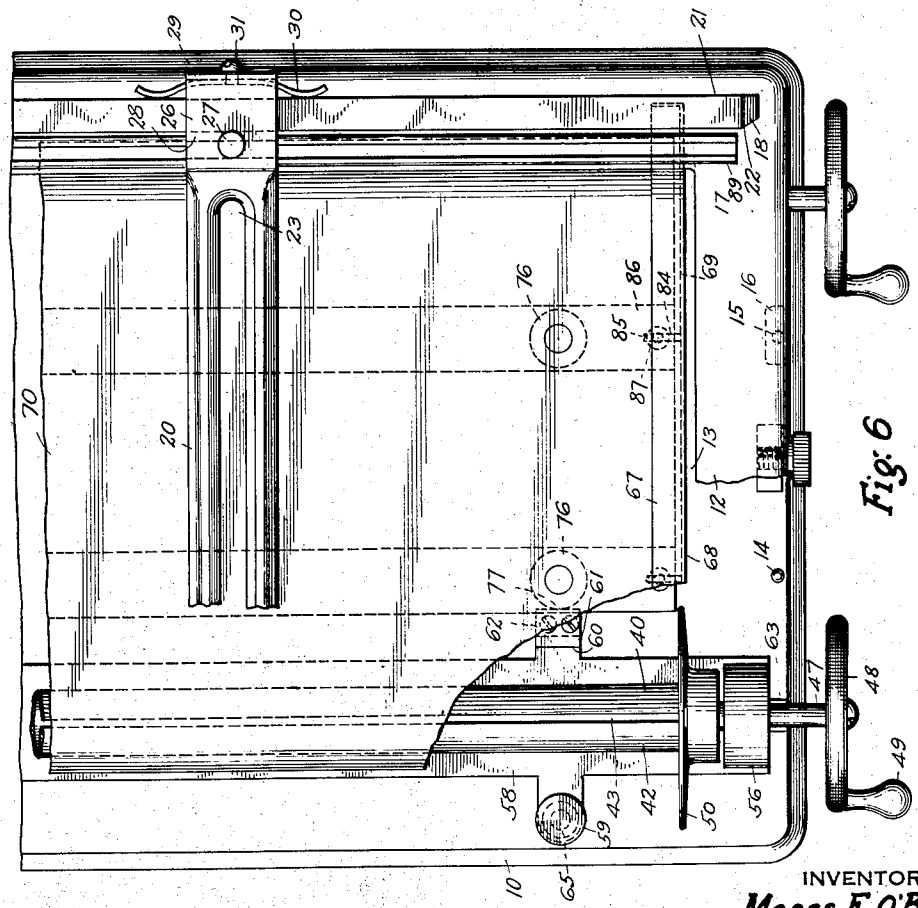


Fig. 6

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SPREAD SHEET CONTROL MACHINE

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Fig. 10

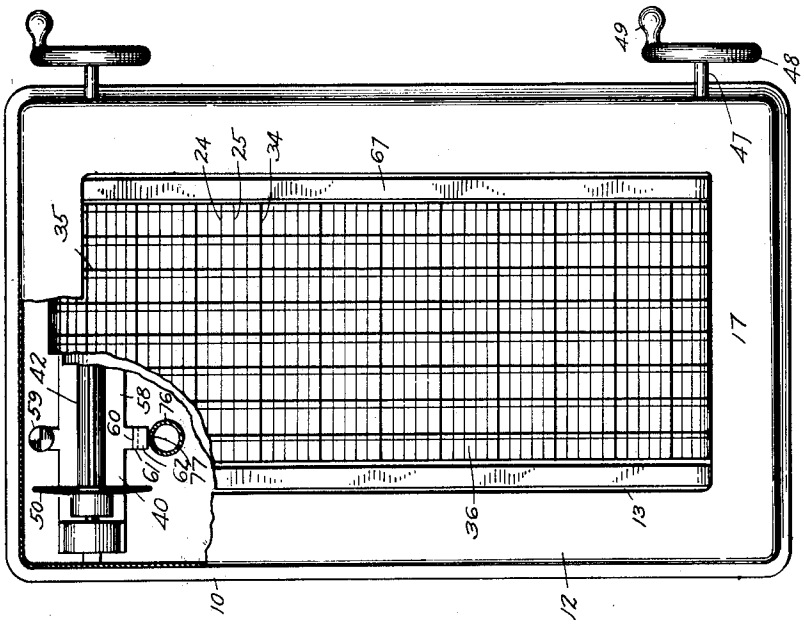
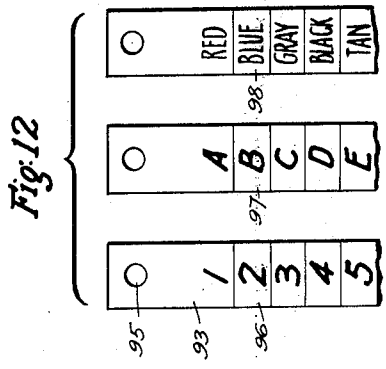


Fig. 12



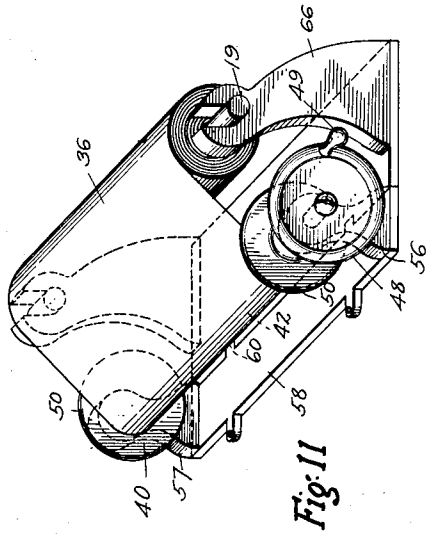


Fig. 11

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UNITED STATES PATENT OFFICE

1,984,199

SPREAD SHEET CONTROL MACHINE

Moses E. O'Brien, Brooklyn, N. Y.

Application January 29, 1930, Serial No. 424,432

16 Claims. (Cl. 281—7)

This invention relates to controlling and manipulating machines for a single long sheet, and contemplates the provision of means for advancing, retracting, winding and unwinding an otherwise unwieldy sheet in either direction, at all practicable speeds, and in accurate alignment, without danger of wrinkling, creasing, folding, tearing or otherwise mutilating or damaging the sheet, even though the machine is used by an unskilled operator.

My invention further contemplates the provision of simple and efficient means for maintaining the ends and the remainder of a spread sheet in operative position at all times irrespective of the speed of its movement or of the variations in said speed or of the force exerted upon the sheet moving mechanism.

My invention further contemplates the provision of means for permitting the quick and easy insertion of the sheet in the form of a roll into the machine, the quick and easy threading of the leading edge of the sheet into place ready for the feeding operation without the necessity for skill on the part of the operator, and the provision of durable, "fool-proof" mechanism designed for rapid assembly and disassembly, and permitting the insertion and removal of the sheet into and from the machine with a minimum expenditure of time, effort and skill.

As has been indicated, my machine is particularly applicable for use in connection with "spread" sheets, by which I mean sheets of sufficient size to permit the entry thereon of a number of items of information in tabular form and therefore preferably ruled vertically and horizontally. Such sheets have many advantages in tabulation, distribution and selection systems and operations, but where the items involved are greatly multiplied or excessively numerous, the unit system, such as is exemplified by punched cards, has heretofore been largely preferred. Unit systems, however, cannot be used economically for the selection of widely scattered items. In systems involving an excessive number of items, a single, extremely large and unwieldy spread sheet would be required, or a multiplicity of sheets must be used. No adequate means, insofar as I am aware, has heretofore been provided for manipulating the unwieldy single sheet which would otherwise be well suited for many systems, but which has the disadvantage of unnecessarily occupying an unduly large area when spread out and consequently making it necessary for the operator to move between comparatively widely separated points for posting, selecting and totalling, which results in an uneconomical loss of time.

By means of my invention, however, the operator may remain at one point and the sheet is moved past the operator, who may make all entries on and selections from a single sheet which is under full control for movement past the operator in either direction and at practically any desired speed. All of the advantages of the single and heretofore unwieldy spread sheet are thereby retained, together with many of the advantages inherent in the unit or card system such as for example, selectivity, and the disadvantages of the single opened out spread sheet, such as above mentioned, are eliminated.

My invention also makes it possible to cross-add numerous items even though widely scattered, with remarkable rapidity and accuracy, in a manner impractical with unit systems. It provides for easily making a permanent record for quick and easy reference and maintains the sheet in compact form. The various objects of my invention will be clear from the description which follows, and from the drawings, in which,

Fig. 1 is a side elevation of my new machine as it appears mounted in position on a stand ready for operation.

Fig. 2 is a front elevation of the same. Fig. 3 is a perspective view thereof. Fig. 4 is a vertical section of my new machine, taken on the line 4—4 of Fig. 2. Fig. 5 is a transverse section of the same, taken on the line 5—5 of Fig. 2. Fig. 6 is a fragmentary top plan view of the same, certain of the parts being broken away to show the underlying structure. Fig. 7 is a section of the bearing at the lower end of the roll support, and of the surrounding parts. Fig. 8 is a cross-sectional view of the adjustable guide for the edge of the paper sheet, and of the means for securing the guide in place. Fig. 9 is a cross-sectional view of the supporting drum for the sheet, showing how the edge of the sheet is removably secured in place. Fig. 10 is a top plan view of a modified form of my new machine. Fig. 11 is a perspective view of the winding reel removed from the machine and of a standard for initially winding the paper roll on the reel, and Fig. 12 is an elevational view of a series of typical indicated strips for use with my machine.

In that practical embodiment of my invention which I have illustrated by way of example, and which is to be understood as merely illustrative of my invention and by no means the only structure by which it may be carried out, I prefer to provide a base as 10 serving as a support for

the remaining parts. Said base may be provided with suitable protective or cushioning guards or legs 11 of soft, resilient material, useful when for example, my machine is to be supported on a desk or other piece of furniture to avoid scratching or marring of the surface on which the machine rests. The cover or casing 12 is provided with a preferably central opening as 13. The sheet to be manipulated has an area of the desired extent exposed to view and to easy access in said opening. The casing 12 is designed to be accurately assembled with the base 10 and for that purpose, I have provided suitable cooperating registering devices on the base and on the casing. As illustrated, said devices take the form of pins as 14 secured to and upstanding from the base 10 and adapted to enter into and register with corresponding holes as 15 made in suitable lugs as 16 extending inwardly from the inner face of the casing. On the upper face 17 of the casing and at both sides of the opening 13, I prefer to arrange suitable rails as 18 in parallel relation to each other for slidably supporting a sight bar or rule as 20 across the opening 13. The outer edge 21 of each of the rails 18 may be made vertical while the inner edge 22 is inclined downwardly and outwardly to form a dove-tail.

The sight bar 20 is preferably mounted for bodily sliding movement upwardly and downwardly across the opening 13 and is retained frictionally in place to expose any desired horizontal space on the sheet, being provided with a window or sighting opening 23. Since various types of work may be done on my improved machine, the window 23 may take a number of different forms which need not be described in detail. As shown, said window is made sufficiently wide to segregate from the remainder of the sheet and to direct attention to a horizontal space slightly greater than the width between any two horizontal lines as 24 and 25 of the ruled sheet 36, the window being substantially as long as the width of the opening 13 as measured from left to right. It will be understood, however, that the window may be made of less length than the opening 13 and that it may be made of greater width than that between the lines 24 and 25 or that a series of such openings of any desired length and width and arranged in vertically or horizontal spaced relation or both, as may be desired, may be formed in the sight bar 20 to meet any particular condition under which the machine is to be used. In order to provide for the replacement of the sight bar 20 with any other similar bar having differently arranged or spaced windows, or windows of different dimensions, said bar 20 is removably secured in place to the clamps 26 as by means of the set screws 27.

Each of said clamps is provided with a dove-tailed lug as 28 designed to engage and slide upon the edge 22 of the rail 18, and is further provided with a depending end as 29 spaced outwardly from the lug 28 a distance greater than the width of the rail and arranged outside of the outer edge 21 of the rail. A suitable spring as 30 is secured to the end 29 of the clamp as by means of the rivet 31, and by its engagement with the edge 21 of the rail, draws the lug 28 into slidable contact with the rail edge 22 and thereby maintains the sight bar frictionally in proper position while allowing ready parallel movement thereof to another position. Movement of the sight bar together with the clamps 26 along the rails 18 will therefore be bodily movement, the edges of the bar being maintained in parallel relation in their various positions, and parallel to any of the horizontal ruled lines 24 and 25 of the sheet.

It will be understood that the sheet 36, as it would be ordinarily used, is of great length compared to its width. Provision is therefore made to roll up the ends of the sheet in such a manner that the portion of the sheet exposed in the opening 13 is maintained substantially flat and may have records posted thereon or taken therefrom, or information inscribed thereupon conveniently and rapidly. As illustrated, the sheet may be ruled to provide a series of vertical columns of predetermined width separated by heavy vertical lines as 35 and may also be provided with a series of horizontal spaces by means of such horizontal lines as 24 and 25, certain of said horizontal lines as 34 being heavier than the others. A predetermined number of vertical columns may be exposed in the opening at any time as will be clear from the above.

It will be understood that since the sheet 36 is of comparatively great length, it is desirable that it may be moved rapidly in either direction past the opening 13 and that it may be stopped accurately at any desired point. It will further be understood that the speed of movement of the sheet should be under the full control of the operator, that the sheet should be movable with a minimum amount of effort and without material strain, stress or friction thereon, and that because of its great length, the sheet should be fed accurately to the winding means and from the unwinding means therefor.

It is further desirable that the sheet be subjected to as little stress and wear as possible, since it may be necessary to feed it back and forth a great number of times and any undue wear or friction thereon would result in damage thereto. It is further desirable that the feeding means be of such nature that it may be awkwardly manipulated by unskilled persons without danger of damage, wrinkling, creasing, folding, wearing out or tearing the sheet.

Toward these ends, I have provided certain feeding means and guiding means which will now be described.

As shown in Fig. 5, I have provided a removable reel as 40 adapted to be secured and aligned accurately in position, and upon which one end of the sheet may be wound, and a similar removable reel as 41 spaced from the reel 40 preferably a distance less than the width of the opening 13 and having its axis parallel thereto. Since both of said reels are substantially identical, a description of one will suffice for both, it being understood that one or both of said reels may be made removable, as desired. It will also be understood that the sheet 36 is fed to the outermost parts of the reel (Fig. 5) to permit the casing to be made as narrow as possible without decreasing the width of the opening 13.

The reel 40 consists of a revoluble hollow drum 42 in which a suitable slot as 43 having a length at least as great as the width of the sheet, is made, the interior of the drum being entirely unobstructed. The end of the paper sheet 36, after being folded as at 44, (Fig. 9), is inserted through the slot 43 and due to the tendency of the folded end 45 of the sheet to unfold, and thereby expand inside of the drum, the end of the sheet can be retracted through the slot 43 and thereby be disengaged from the drum only by a radial pull, and then only provided that no turns of the sheet have been taken around the

drum. A plug as 46 is secured in and may close the end of the drum, and carries a comparatively short shaft as 47, at the outer end of which and at a point outside of the casing is mounted the hand wheel 48 provided with an operating handle or knob as 49. The revoluble parts just described are preferably accurately balanced for free rotation with a minimum effort, but the knob 49 is of sufficient weight to prevent unintentional over-rotation of the wheel 48, and tends to operate as a pendulum to move into its lowermost position when free.

It will be seen that rotation of the hand wheel 48 and consequently, of the shaft 47 and the drum 42 may be accomplished manually, but that the hand wheel may be replaced by a suitable motor for rotating the shaft 47 as will be obvious and therefore need not be shown or described in detail. For accurately winding up the end of the sheet upon the drum 42 and thereby aiding to align the sheet during its movement past the opening 13, and for confining the edges of the sheet in place to insure accurate winding and freedom from wear, I prefer to provide end plates as 50 mounted on the drum 42 and spaced apart a distance only slightly greater than the width of the sheet, and insufficient to allow transverse play of the sheet between the plates. Said plates 50 may be secured to the drum 42 for rotation therewith in any suitable manner but as illustrated, (Fig. 7), each of the plates is adjustably secured to the drum by means of a set screw 51. The end plates 50 may thereby be accurately adjusted to receive paper sheets of different widths between them.

Suitable anti-friction bearings are provided at each end of the drum for the shafts 47 to allow rotation of the drum with the utmost freedom. Since, however, the machine is preferably mounted for use in an inclined position upon a stand or easel 53, as illustrated in Figs. 1 and 3, I prefer to provide a rigid anti-friction bearing as 54 to receive the thrust at the lower end or nearer end of the machine. At the other end, a self-aligning anti-friction bearing 55 of any suitable type is provided for the corresponding shaft 47. Said bearings are inserted in and supported by suitable standards as 56 and 57 secured to or upstanding from the auxiliary reel carrying plate 58. The plate 58 together with the bearings, standards, and the reel mounted thereon may be removed from the base plate as 10 as a unit, being secured thereto by suitable hand screws as 59 passing through the plate 58 and into suitable threaded holes 65 in the base 10. For accurately aligning the reel in its proper operative position, the inner edge 60 of the plate 58 is bevelled at a predetermined angle and designed to engage and contact with the correspondingly bevelled edge 61 of the stop 62 secured to the base 10, whereby the axis of the reel becomes definitely aligned in its proper position parallel to the axis of the other reel, and perpendicular to the ends of the opening 13, when the edges 60 and 61 are in firm contact. For aligning the reel longitudinally to bring the end plates 50 into position, I prefer to provide a pair of end stops 63 secured to the base and adapted to engage the ends of the plate 58 and to guide said plate together with the reel thereon into its operative position.

After the reel has been thus accurately positioned, it may be removably maintained in place for operation by means of the hand screws 59.

The reels and the supporting means therefor are preferably made removable for the purpose of inserting the sheet 36 into the machine preparatory to the manipulation of the sheet. To do this, the casing 12 is first removed, the screws 59 then loosened, and the reel together with the support may then be withdrawn from the machine. The reel (Fig. 11) is then aligned with its axis parallel to the axis of the supporting bar 19 mounted on a separate standard 66 and carrying the roll of paper 36, the end of the roll then folded and inserted into the slot 43, after which the hand wheel 48 is rotated in the proper direction to wind the sheet upon the reel. The reel may then be replaced in position into the machine and secured in place by the screws 59 after which the end of the sheet 36 is threaded into the guiding and supporting means therefor and inserted into the slot 43 of the other reel. Said guiding and supporting means may consist of a stationary platen 70 having edges as 71 curved downwardly toward the drum to feed the sheet thereto with a minimum of friction. The platen serves as a backing for the sheet to permit writing thereon. At each end of the platen, means are provided for forming a narrow adjustable groove as 72 for the reception of portions of the edges of sheets of different widths. As illustrated in Fig. 8, the groove 72 may be formed by means of the flange 67 of the edge guide 68. Said edge guide is preferably L-shaped in cross-section. The flange 69 thereof is provided with extending pins 84 adapted to enter holes as 85 in the lugs or bracing bars 86 arranged on the under face of the platen 70. The flange 67 of the edge guides is thereby brought to a position slightly above the upper face of the platen, the groove being of sufficient depth to allow free and easy movement of the sheet therethrough without material friction or wear, but being insufficiently deep to allow appreciable vertical play of the sheet. The most efficient depth of the groove would be a dimension slightly greater than the thickness of the sheet. The substantially vertical flanges 69 of the guides 68 are adjustable to sheets of different widths by merely adjusting the pins 84 to the proper positions and then tightening the set screws 87 which hold the guides in place to the bars 86.

The final adjusted distance between the flanges 67 of the edge guides 68 is slightly greater than the width of the sheet, or substantially equal to the distance between the end plates 50 of the reel. This arrangement provides a slight clearance at the edges of the sheet so as not to bind the sheet during its movement, while compensating for slight irregularities in the width of the sheet and for slight inaccuracies in the alignment or feed thereof. The sheet, however, is not permitted to move appreciably in a transverse direction, as for example, when entries are made thereon.

The guiding flanges 67 may be exposed in the opening 13, if desired, as indicated in Fig. 2, and are curved at their ends 75 similarly to, but preferably at a different radius from, the edges 71 of the platen, so as to feed the sheet in the proper direction on to and off the drums 42 with a minimum of wear on the paper. The grooves 72 are thereby widened at their ends, (Fig. 5), to compensate for increase or decrease of the diameters of the rolls wound upon the reels. The platen 70 together with the edge guides 68 thereon, are supported above the reels 40 and 41 and in proper spaced relation to the base 10 as by means of suitable posts 76. The posts are secured at their lower ends to the base and at their

upper ends, to the under face of the platen, as at the bars 86. Said posts 76 serve a double function. Not only do they support the stationary platen, but they are so spaced respectively, relatively to the axes of the reels 40 and 41, as to limit the diameter of the paper roll wound upon the reel to less than the diameter of the plates 50, as indicated in Fig. 5. The outermost element 77 of each of the posts 76 is therefore arranged so that the distance thereof from the axis of the adjacent drum 42 is less than the radius of the plate 50.

Should the hand wheel 48 therefore be turned in the wrong direction, or in the direction to unwind the roll from its drum, as by a jerk or sudden force upon the operated reel transmitted through the paper to the other reel, or by the inertia due to rapid rotation of the operated reel and consequent rapid free rotation of the other reel unless braked, or by reason of the unintentional rotation of the reel in sheet unwinding direction through inadvertence or lack of skill on the part of the operator, the roll mounted upon the drum and thus unwound without forward movement, tends to increase in diameter due to the release of the tension thereon. It is nevertheless so confined by the post 76 and the end plates 50, that it never reaches a diameter sufficient to cause the edge of the sheet to creep longitudinally of the reel beyond the circumference of the plate 50 or to allow the sheet to expand into a position wherein it might become damaged.

In order to provide means for identifying the various spaces or columns on the sheet without turning it backward or forward, holders for indicator strips are provided at the edges of the opening 13 of the casing. Said holders 89 may consist of sheet metal strips, each having a back 90, sides 91 and top flanges 92 spaced from the back a distance sufficient to allow the insertion therebetween of indicator strips 93 (Fig. 12). The holders may be screwed, riveted or otherwise secured to the upper face of the casing. A pin as 94 may project from the back 90 to engage a hole as 95 in the indicator strip to align it with the sheet. The strips may indicate numbered spaces as 96, lettered spaces as 97 or named spaces as 98, depending on how the spread sheet is used. Being removable, any suitable indicator strip may readily be inserted into place to identify the spaces. To permit the lower edge of the casing to pass the projecting shafts 47, when the machine is re-assembled, the ends of the casing are provided with suitable slots 88 extending upwardly from its lower edge and of substantially the width of the shafts 47.

In Fig. 10, I have shown a modified form of my machine, wherein the machine is arranged to feed the sheet 36 toward and away from the operator instead of from left to right. The machine is therefore made comparatively narrow and long. The construction, however, does not differ materially from the form shown in the remaining figures. The rails 18 and the sight bar 20 may be omitted, if desired. The reels 40 and 41 in this form of my new machine, are much shorter, and are arranged respectively at the upper and lower ends of the machine, respectively, instead of at the left and right. Such an arrangement is useful in special cases, such as for example, where the number of vertical columns required is limited or constant in number. It will be understood that while the hand wheels are shown at the right in Fig. 10, said wheels may be arranged at the left of the machine, if desired, so that the operator may operate the machine with the left hand while operating a calculating machine with the right hand. Totals may be made and entered at suitable intervals, in conformity with the requirements of the particular case, and new sets of entries made, as required.

The operation of my improved machine is as follows:

It being assumed that a roll of paper is to be inserted into the machine and threaded into place either for posting entries thereon or for reference, totalling or any other purpose, the casing is first removed from the machine by loosening the screws 78, and then lifting the casing off the base 12, thereby removing the pins 14 from the lugs 16. The screws 59 for one of the reels may then be removed or loosened and one of the reels removed from the machine. The roll of paper having then been wound on the reel, said reel is replaced in the machine, being guided into place by the end stops 63 and the edges 60 and 61. The screw 59 is then replaced, and the end of the sheet passed through the grooves 72 across the platen 71 and the folded end thereof inserted through the slot 43 of the other reel.

The partial unfolding of the folded end of the paper and the resiliency or spring action thereof maintains the end of the sheet in operative engagement with the drum. The casing 12 is then replaced, being guided into proper position by the pins 14 coacting with the holes 15. The screws 78 are then replaced and the machine mounted upon the stand 53, the lowermost edge 80 of the base being received in a suitable notch or depression 81 of the stand. A few turns of the hand wheel of the reel into which the end of the sheet is inserted may now be taken to insure full control of the sheet, or said turns may have been taken before the cover 12 is replaced. The machine is now ready for use.

If the sheet inserted into the machine is one upon which entries have already been made, the sight bar 20 is moved along the rails 18 to the desired horizontal space. The operator may then rotate the proper hand wheel to advance or retract the sheet across the opening 13 for the purpose, for example, of totalling the scattered entries visible through the window 23. It will be seen that the forwarding operation may be accomplished with one hand, for example, the left hand of the operator, while the other hand of the operator is used in operating the calculating machine to cross-add the scattered items.

It will also be seen that by the use of my new machine, the difficulties of cross-addition are substantially eliminated, and that scattered items may be recorded and totalled with far greater ease and less loss of time than is necessary in unit or card systems.

Similarly, items may quickly and easily be posted on the sheet. For example, the operator may manipulate a stack of bills or other records with one hand and may, previously to addition of the selected items, post the entries therefrom with the other hand on that portion of the sheet arranged in the opening, the proper column or space on the sheet being quickly and easily brought into posting view in the opening 13 by the rapid or slow manipulation of the proper hand wheel in the proper direction, as required, depending on how widely spaced are the required columns. For rapid movement of the sheet in either direction, the operator will use one hand to

brake or retard the rotation of the free reel to prevent over-rotation thereof, and consequent undue unwinding of the sheet, as the selected column is approached. For comparatively short movements of the sheet, the number of columns of the sheet advanced for each turn of the hand wheel may be determined, and the hand wheel rotated accordingly. The weight of the knob 49 also tends to prevent over-rotation, particularly, at slow speeds.

Any particular entry may also be quickly and easily found since the proper hand wheel may be rotated to move the sheet as rapidly as may be desired under the eye of the operator in the required direction until the desired entry is located, a much more rapid method than is possible in selecting scattered items from card systems.

It will be seen that as one of the hand wheels is rotated to wind the sheet on the corresponding reel, the other reel is rotated in the same direction to unwind the sheet therefrom due to the force transmitted through the sheet to the free reel, so that only one of the hand wheels need be operated at a time, one for forwarding the sheet in one direction and the other for retracting the sheet in the opposite direction. It will further be seen that many other operations are made possible by my new machine other than those above described, and that I have provided simple, "fool-proof", and efficient mechanism for the purpose intended and designed to meet the severe requirements of practical use.

While I have shown and described a specific embodiment of my invention, I do not wish to be understood as limiting myself thereto since I intend to claim my invention as broadly as may be permitted by the state of the prior art and the terms of the appended claims.

I claim:

1. In a machine of the character described, a casing having an opening therein through which part of a sheet is exposed, a platen in the opening and independent of the casing for supporting the exposed part of the sheet, guides having grooves therein for the reception of the edges of the sheet at the ends of said platen, curved ends on said guides for directing the sheet toward the interior of the casing, and revoluble anti-friction means within the casing for carrying the ends of the sheet in roll form, and for moving the sheet in either direction across the opening.

2. In a machine of the character described, a pair of parallel spaced reels each including end plates, a platen between said reels, and means for supporting said platen and for limiting the diameter of a paper roll wound upon a reel in either direction comprising a post secured to the platen and having at least one of its elements spaced from the axis of the reel a distance less than the radius of said plates.

3. The combination with a machine of the character described, of a stand for supporting the machine at a convenient writing angle, said stand having an inclined upper edge engaging the bottom face of the machine and having a groove at the front for the reception of the front edge of the machine, said machine including a casing having an opening therein, a base, a pair of spaced reels mounted on the base and within the casing for rotation in either direction, and adapted to engage a paper sheet for moving the sheet in either direction across the opening, and means outside of the casing and adjacent the lower end of the stand for rotating the reels.

4. In a machine of the character described, a rail, a sight bar having an opening therein, and means for removably supporting said bar for movement along the rail including a clamping member having a pair of lugs spaced apart a distance greater than the width of the rail, a spring interposed between the outer lug and the outer edge of the rail, and movably maintaining the lugs in position and a set screw passing through the member and into the end of the bar.

5. In a machine of the character described, a base, a casing having an opening therein removably secured to the base, cooperating means on the base and casing for determining the position of the casing relatively to the base, a pair of spaced parallel reels within the casing, each removably secured to the base and comprising a slotted hollow drum, end plates on the drum, an anti-friction bearing for one end of the reel, and an anti-friction and thrust bearing for the other end of the reel, and a hand wheel outside of the casing mounted coaxially of and operatively connected to each of the reels, a platen arranged at said opening, guides for the edges of a paper roll near the ends of the platen, curved ends on said guides for directing the roll into position for winding thereof upon the reel with a minimum of friction and wear, and posts interposed between the platen and the base for supporting the platen and arranged adjacent said end plates and spaced from the axis of the adjacent reel a distance less than the radius of an end plate for limiting the diameter to which the roll on the reel may expand.

6. In a machine of the character described, a base, a casing separable from the base and having an opening therein removably secured to the base, cooperating registering means on the casing and the base for locating the casing in proper position on the base, a pair of parallel spaced reels within the casing, each of said reels having a flat base, means for removably securing at least one of said reels in aligned position to the base, cooperating aligning means on the flat base of the removable reel and on the base of the machine for guiding said reel into aligned position relatively to the base, and a pair of members each connected to one of the reels and outside of the casing for rotating either of the reels in either direction continuously or intermittently and at variable controlled speeds.

7. In a machine of the character described, a reel including a drum on which a sheet of paper may be wound and unwound, an adjustable end plate on the reel, a stationary platen in spaced relation to the reel and an adjustable guide member cooperating with said platen for forming a groove into which the edge of the sheet may be inserted, the outermost part of said groove being in substantial alignment with said end plate.

8. In a machine of the character described, a base, a reel, a plate adapted to be arranged on the base, standards upstanding from the plate and carrying the reel in parallel relation to the base and the plate, detachable means for removably securing the plate to the base, and guide means on the base for engaging and aligning the plate in predetermined operative position relatively to the base.

9. In a machine for moving at high speed a paper sheet in the form of a roll, having a plurality of parallel, spaced, longitudinal lines thereon for the reception of entries therebetween, and having a plurality of spaced parallel transverse lines thereon perpendicular to the longitudinal lines, of means for moving said sheet in

either direction, a casing for the winding means, and a sight bar, having an opening therein, slidably mounted on the casing for exposing to view in the opening thereof, a space between said longitudinal lines and the entry in said space to permit rapid cross-addition of scattered but aligned entries exposed in said sight bar on movement of the sheet.

10. In a machine of the character described wherein a sheet is moved at high speed to permit the exposure or entry of items at widely scattered points of the sheet, a casing having an opening therein in which that portion of the sheet to be operated on is adapted to be arranged for presenting said portion to view, means for moving the sheet in either direction continuously and intermittently at high speed across said opening and for winding up the leading portion of the sheet in the form of a roll, means including a pair of spaced reels mounted for high speed rotation in either direction and each holding one end of the sheet whereby said reels rotate simultaneously in the same direction on the rotation of one of the reels to wind the sheet on one roll and to unwind it from the other independent of the casing for supporting the exposed portion of the sheet in said opening, and edge guides independent of the casing and cooperating with the supporting means for receiving and guiding the edges of the sheet during its movement past the opening.

11. In a machine of the character described, a base, a casing having an opening therein removably secured to the base, a pair of reels mounted for high speed rotation in either direction within and free of and independent of the casing and removably secured to the base for winding a sheet across the opening in either direction, each of said reels having a flat base provided with a straight side edge, a cooperating straight edge on the first-mentioned base for aligning the reel relatively to the base and the casing, each of the reels holding one end of the sheet and being operatively connected thereby for simultaneous rotation at high speed on the rotation of one of the reels and thereby to permit rapid exposure of scattered items on the sheet, means for aligning the casing and the base, manually operable means outside of the casing for operating the reels at high speed or for braking said reels, and a sight bar slidably supported by the casing across the opening and adapted to direct the eye of the user to a selected part of the sheet, said sight bar having an opening therein for the purpose mentioned.

12. In a machine of the character described, a casing having an opening therein, anti-friction means within the casing and controlled from without the casing for moving a sheet continuously and intermittently across said opening in either direction at high speed to expose widely scattered portions of the sheet in quick succession, a sighting bar having an opening therein intermediate its edges of substantially the length of the casing opening, said bar being arranged across the opening for bringing longitudinally aligned scattered items on the sheet into plain view and concentrating attention thereto and thereby permitting rapid cross addition of said items during the movement of the sheet, and means for slidably supporting the bar comprising a pair of parallel rails on the casing parallel to the ends of the casing opening, spring means for maintaining the bar in position on said rails and means for adjustably securing the bar to the rails.

13. In a machine of the character described, the combination with a sheet of greater length than that of the machine, of removable means including a pair of spaced reels operatively connected by the sheet and movable simultaneously on the movement of one reel, for moving said sheet across the machine in either direction continuously and intermittently, means for guiding the sheet during its movement, a casing completely open at its bottom for removably enclosing said sheet moving means and having an opening in its top for exposing an area of said sheet of predetermined extent, and a sight bar having a window opening therein slidably mounted on the enclosing means for segregating into plain view longitudinally aligned scattered items on the sheet, the opening in said bar being substantially of the length of the opening in the top of the casing.

14. In a machine of the character described, a pair of spaced revoluble reels each having a slot therein into which the folded end of a sheet of paper may be inserted, anti-friction means for supporting the reels for high speed rotation, adjustable guides arranged substantially perpendicularly to the axis of said reel, for supporting the sheet and for feeding the sheet in the proper direction to be wound upon either reel and unwound from the other, comprising a stationary platen and a flanged guide member adjustably secured to said platen and providing an adjustable groove therebetween, and posts for supporting the platen, said posts being spaced from the axis of an adjacent reel a distance less than the radius of an end plate for limiting the diameter to which the roll on the reel may expand.

15. In a machine of the character described, a casing, a base, a reel in the casing, a removable support for the reel comprising a bottom plate resting removably on the base, a pair of spaced upstanding standards arranged near the respective ends of said plate, a removable roller bearing in each standard, a cylinder arranged between the standards and provided with end projections revolubly supported by said bearings, one of said projections passing through one of the standards, a hand wheel on the last-mentioned projection for rotating and braking said cylinder, and means for removably securing the plate to the base, and means for aligning the plate.

16. In a machine of the character described, a pair of parallel, spaced, hollow, slotted reels, each adapted to receive the folded end of a paper sheet to operatively connect said reels for simultaneous rotation in either direction to wind said sheet on one reel and to unwind it from the other on the rotation of either reel, end plates on said reels for confining the sheet therebetween, a bottom plate on each reel, a casing enclosing the reels and having an opening in the top thereof for exposing part of the sheet, a base adapted to receive the casing, means on the casing cooperating with the bottom plate of the reel for aligning the reel on the base, a coaxially mounted hand wheel outside of the casing for rotating each of the reels, and a platen arranged at the opening intermediate the reels, and free of the sides and open top of the casing.

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