

May 5, 1925.

1,536,458

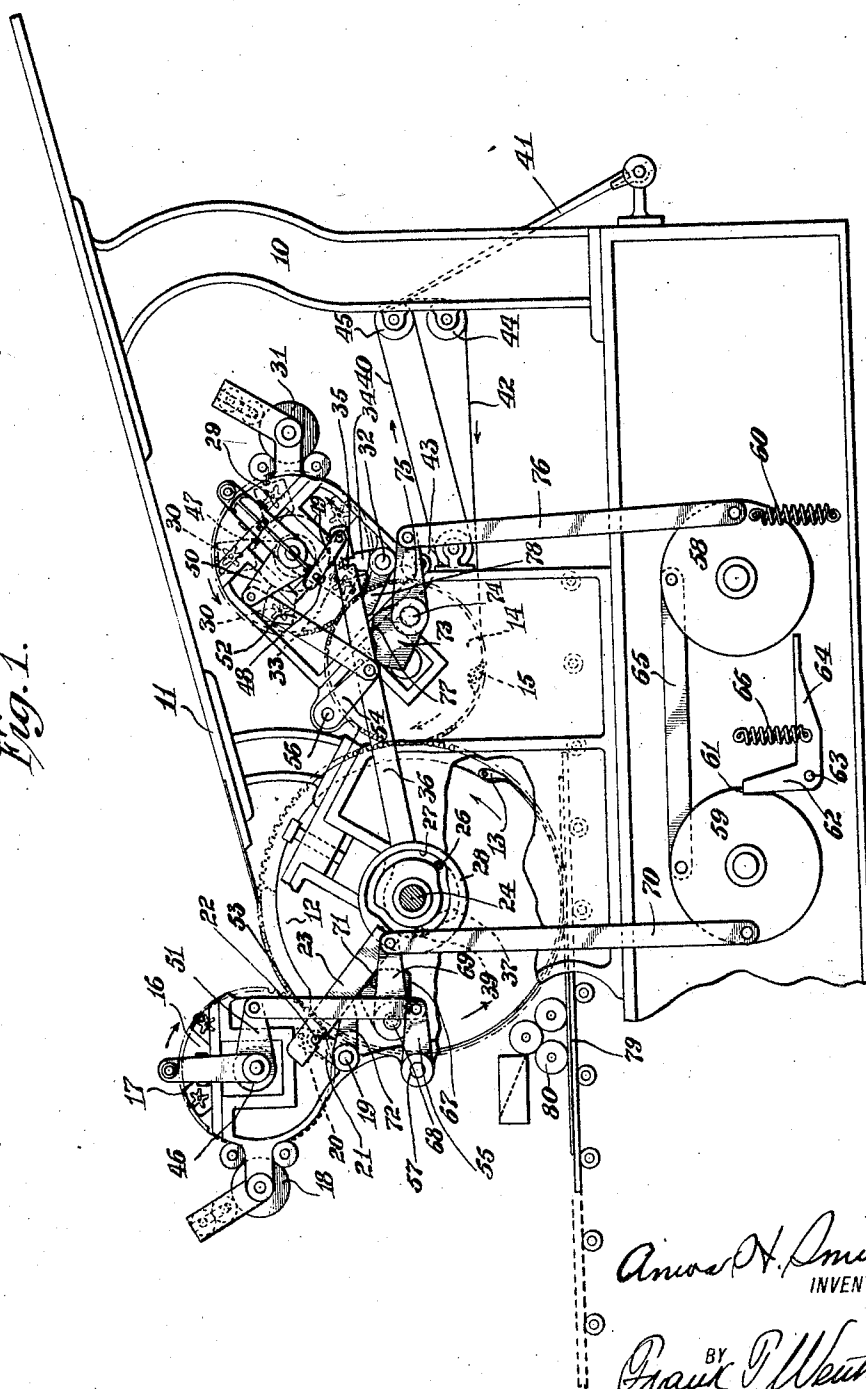
A. H. SMITH

NUMBERING MACHINE

Filed March 17, 1924

2 Sheets-Sheet 1

Fig. 1.



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2 Sheets-Sheet 2

Fig. 2.

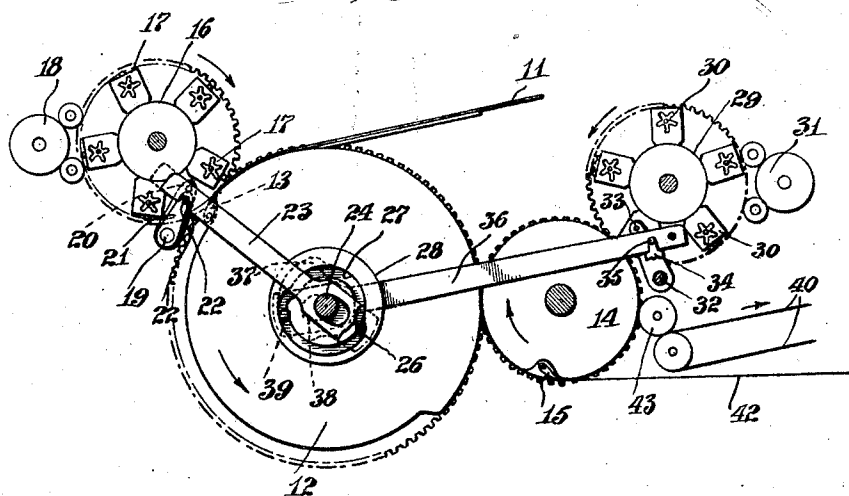


Fig. 3.

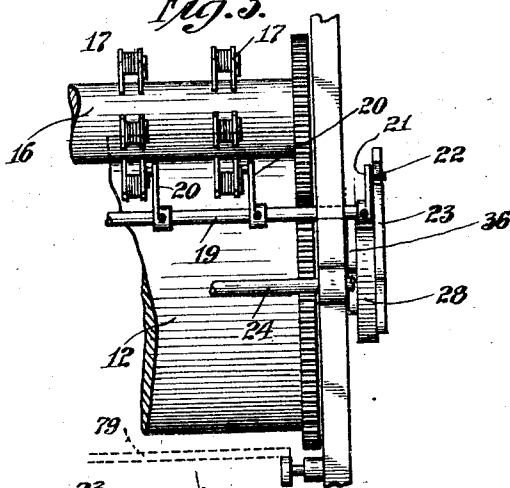


Fig. 5.

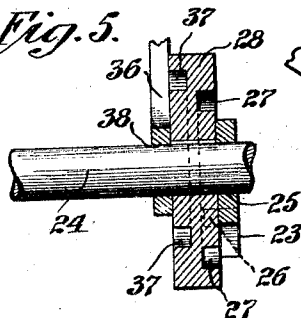
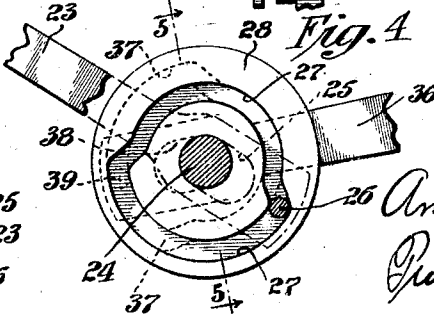


Fig. 4.



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UNITED STATES PATENT OFFICE.

AMOS H. SMITH, OF BROOKLYN, NEW YORK, ASSIGNOR TO AMERICAN BANK NOTE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

NUMBERING MACHINE.

Application filed March 17, 1924. Serial No. 699,765.

To all whom it may concern:

Be it known that I, AMOS H. SMITH, a citizen of the United States, residing at the borough of Brooklyn, in the city of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Numbering Machines, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to numbering machines and more particularly to a rotary machine of this type for numbering upon both sides of a previously printed sheet while permitting a double inking of the printing characters of the numbering heads upon the different numbering head cylinders.

In a machine embodying my invention, I employ two impression cylinders each cylinder having associated therewith a numbering head cylinder and means whereby the numbering heads upon each cylinder will have their digit wheels progressively advanced, the construction of the machine being such that each numbering head cylinder will receive two complete revolutions while each sheet is passing through the machine, one only of which revolutions will be effective in making an impression with the numbering heads, although the printing characters upon said numbering heads will receive ink during both revolutions. It is for this reason that the actuating means for progressively turning the digit wheels of the various numbering heads becomes operative only after each second revolution of the cylinder carrying said heads, or immediately following an impression by the first of a sequence of heads upon said cylinders.

A machine embodying my invention is particularly designed for use in finishing bank notes or similar commercial paper wherein it is the common practice to not only number all previously made imprints upon each printed sheet, but in some instances to impress a facsimile of a signature or a medallion of some kind upon one face of each such imprint. To meet this condition, the machine of my invention is so constructed that one of the impression cylinders will co-operate with the form upon a reciproca-

tory flat bed, thus adapting the machine to the making of impressions of the numbers or other matter upon one face of the sheet, while impressing numbers only upon the other face thereof.

It is apparent that in a machine embodying my invention the double inking of the various numbering heads will permit an increase in the speed at which the machine operates without likelihood of defective impressions. This is highly desirable since defective impressions made by numbering machines involve not only wastage of paper, but wastage of paper upon which considerable work has been done.

In addition to the automatic mechanism by which the digit wheels of the various numbering heads upon each numbering head cylinder are actuated during alternate revolutions of the cylinder only, I provide a throw-off mechanism acting to make both mechanisms for actuating the various numbering heads upon each cylinder simultaneously inoperative. I also provide a throw-off mechanism for moving the numbering head cylinders away from their respective impression cylinders to permit the machine to be operated without offsetting upon the blankets of the impression cylinders, and without turning the digit wheels, which condition is sometimes desirable when preparing for a run of the machine.

Since the machine includes a plurality of impression cylinders each having its own grippers, so arranged as to transfer a sheet from one cylinder to the other, it is apparent that the mechanism for actuating the various numbering heads upon each numbering head cylinder, must be so constructed and combined as to be timed with relation to the delivery of the sheet to the impression cylinder with which each numbering head cylinder co-operates, and also in relation to the main impression cylinder, it being preferable to actuate the mechanisms operative upon the numbering heads upon both numbering head cylinders, by an actuating mechanism operating in synchronism with said main impression cylinder.

The invention consists primarily in a numbering machine embodying therein a main

impression cylinder, a secondary impression cylinder adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, a striker mechanism associated with each numbering head cylinder, means operative upon each of said striker mechanisms, whereby it will be made operative during one revolution of its numbering head cylinder, and will be made inoperative during the succeeding revolution thereof, and an actuating mechanism operative upon said last named means whereby the actuation of each of said striker mechanisms is timed in relation to the delivery of a sheet to the impression cylinder with which it is associated; and in such other novel features of construction and combination of parts as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawings,

Fig. 1 is a side view of a numbering machine embodying my invention;

Fig. 2 is a diagrammatic view illustrating the two impression cylinders, the numbering cylinders associated therewith and their appurtenances, and the actuating mechanism for the striker members associated with each;

Fig. 3 is a view from the right of the mechanisms shown in Fig. 2 as to one side of the machine only;

Fig. 4 is an enlarged side view of the actuating cam for the means for operating the striker members; and

Fig. 5 is a section on the line 5—5 of Fig. 4.

Like numerals refer to like parts throughout the several views.

In the embodiment of my invention shown in the drawings, 10 indicates the main frame of the machine, supporting a feed shelf 11 in operative relation to the main impression cylinder 12. The blanket upon this impression cylinder 12 extends through approximately 180° of the circumference of the cylinder so as to leave a depressed portion for substantially the same length in arc, which, as will more fully appear hereinafter, permits the free rotation of the numbering head cylinder co-operating with the cylinder 12 during the second inking revolution of said numbering head cylinder during one cycle of its operation. In this manner offsetting upon the blanket of the cylinder 12 is prevented, and an effective inking is secured.

The cylinder 12 has a gripper mechanism 13 adapted to receive a sheet from the shelf 11 and to transfer it to a secondary impression cylinder 14 provided with a gripper mechanism 15. The construction and operation of the gripper mechanisms 13 and 15 is old and well known in the printing art,

and no detailed description thereof is, therefore, necessary.

Associated with the impression cylinder 12 is a numbering head cylinder 16 having grouped about same, a sequence of numbering heads 17 of the usual construction. Associated with the cylinder 16 is an inking mechanism 18.

This cylinder 16 has associated therewith a shaft 19 carrying a sequence of striker members 20 adapted, by engagement with the actuating mechanisms of the various numbering heads 17, to progressively advance the digit wheels of these numbering heads in a manner which will be determined by a mechanism operative upon the shaft 19 and the striker members 20 so as to engage said striker members with the mechanisms of the numbering head operative upon the digit wheels during the printing revolution of the cylinder 16, and to move them out of engagement with said mechanism during the following revolution of each cycle of said cylinder 16, which cycle includes two full revolutions of the cylinder.

The shaft 19 is provided with a crank 21 carrying a pin 22 adapted to be engaged by a connecting rod 23 actuated from the shaft 24 of the main impression cylinder 12. The rod 23 has a socket therein as shown, adapted to slip over and engage the pin 22, thus permitting the disengagement of said rod with said pin in the event that it is desired to operate the machine with the striker members out of the operative relation to the various numbering heads upon the cylinder 16.

The rod 23 is provided with a slot at 25 straddling the shaft 24, and carries a cam stud or roller 26 entering a cam slot 27 in a cam 28 carried by said shaft 24. The cam slot 27 has a rise and a fall substantially 180° apart in arc, the high part of the cam extending between said rise and fall and the low part extending between said fall and rise, being concentric with the shaft 24 so that the connecting rod 23 will receive one short reciprocatory movement in each direction during each full rotation of the cylinder 12, and will be held against movement between such reciprocations. The cam 28 is so set that the stud or roller 26 will pass upon the rise of the cam substantially simultaneously with, or immediately following the delivery of each sheet of paper to the grippers 13 upon said cylinder 12, since it is necessary to actuate the various numbering heads immediately following the making of each impression in order to secure the desired double inking of the printing elements of these heads.

The type of numbering head shown in the drawings includes a star wheel adapted to be engaged by the various striker mem-

bers 20 which will permit the striker members, by a movement toward the axis of the cylinder 16, to move out of engaging relation with said star wheel. If, however, a different type of numbering head is used, the setting of the cam 28 will of necessity be such as to impart the desired direction of movement to said striker members to conform to the actuating mechanisms for the numbering heads.

Associated with the secondary impression cylinder 14 is a numbering head cylinder 29 carrying numbering heads 30 and having associated therewith an inking mechanism 31. These parts correspond in their construction with the numbering head cylinder 16 and parts appurtenant thereto, and the cylinder 29 also has associated therewith a shaft 32 carrying the striker members 33 and having the crank 34 by means of which the shaft 32 may be oscillated through the medium of the pin 35 and the connecting rod 36. These various mechanisms are the same as the corresponding parts co-operating with the cylinder 16, and the connecting rod 36 is actuated to impart the desired oscillatory movement to the crank 32 by means of the same, or a similar, mechanism to that heretofore described in connection with the connecting rod 23.

In the form of the invention shown, I have illustrated the cam 28 as having a second cam groove 37 upon the face thereof opposite the cam groove 27, this cam groove, however, having its rise and its fall set differently from the cam groove 27 owing to the fact that the timing of the actuation of the shafts 19 and 32 is entirely different one from the other, owing to the conditions arising from the fact that the actuation of the striker members 20 and 33 is determined by the making of the initial impression upon each sheet by the numbering heads 17 and 30 upon the cylinders 16 and 29 respectively, which bears a different relation, as between the cylinders 14 and 29, than does the initial printing interval between the cylinders 12 and 16.

The rod 36 is provided with a slot 38 straddling the shaft 24 and is provided with a pin or roller 39 entering the cam slot 37. The two cams 27 and 37 may, however, be formed in cam wheels entirely separate one from the other instead of in the same cam wheel and in fact, if desired, may be secured to the shaft 24 upon opposite sides of the machine. By making them in one cam wheel, however, the desired relation of the rises and falls in the cam slots 27 and 37 is preserved, and the construction is such that this mechanism does not require adjustment even to take up wear, since there is always sufficient latitude in the functioning of the striker members 20 and 33 to prevent

a failure in the desired timely actuation of the shafts 19 and 32 in the event of wear.

Adjacent the secondary impression cylinder 14 are ordinary delivery tapes 40 having associated therewith the ordinary fliers 41, and the usual tapes 42 are also provided, said tapes passing about the cylinder 14, about the guide wheels 43 and about both of the guide wheels 44 and 45 for the tapes 40. This delivery mechanism is old and well known in the art, however.

The numbering head cylinders 16 and 29 are mounted upon eccentric bushings 46 and 47 so as to permit movement of the cylinders 16 and 29 respectively toward and from the impression cylinders 12 or 14, for the purpose of bringing the surfaces of the numbering heads 17 or 30 into or out of the printing relation to blankets upon said cylinders. The fact that the blanket upon the cylinder 12 extends only for approximately 180° in arc, above said cylinder, makes it unnecessary to move the cylinder 16 except when it is desired to throw the press out of the printing position, but the cylinder 29 must have such movement during every alternate revolution, in order to prevent offsetting upon the blanket upon the cylinder 14. For this reason, I have provided the bushing 47 with a crank 48 connected with the rod 36 by means of a pivoted link 49 so that movement of said connecting rod 36 to move the striker members 33 into or out of actuating relation to the numbering heads 30 will simultaneously move the cylinder to bring the numbering heads into or out of the printing relation to the impression cylinder 14.

The necessity for moving the cylinder 30 into and out of printing relation to the impression cylinder 14, arises from the fact that, in the form of the invention shown, the cylinder 14 is one-half of the diameter of the cylinder 12, so that this cylinder bears the same relation to the cylinder 12 that the cylinders 16 and 29 bear to said cylinder. With this condition, the blanket upon the cylinder 14 extends throughout almost the entire circumference thereof and double inking of the numbering heads 30 would be impossible without this movement of the cylinder 29. If the cylinder 14 were of the same diameter and of the same construction as the cylinder 12, the movement of the cylinder 29 toward and from the cylinder 14 would not be required.

All of the cylinders 12, 14, 16 and 29 are driven by a gear train, the gears of which are carried by said cylinders respectively, but this arrangement is common in various types of printing machines.

Each of the bushings 46 and 47 is provided with a hand crank or other manually operative means, said hand cranks in addition to actuating one of said bushings, hav-

ing a crank 50 or 51 connected by a link 52 or 53 with a crank 54 or 55 on a shaft 56 or 57 extending across the machine and connected by a similar mechanism with the bushing at the other end of each of the cylinders 16 and 29. This arrangement is also well known, however.

It is desirable, under some conditions, to make the striker members co-operating with the numbering heads upon both cylinders 16 and 29, simultaneously inoperative to progressively advance the digit wheels of the numbering heads, and to maintain said striker members out of the operative relation to said numbering heads. To permit this operation of the machine, I provide two crank wheels 58 and 59, one of which, as 58, is acted upon by a spring 60 having a normal tendency to impart a partial rotation to said crank wheel, and one of which, as 59, is provided with a stop mechanism consisting of a tooth 61 formed upon said wheel and co-operating with a dog 62 mounted upon a stud 63 and having formed integrally therewith a pedal 64 by means of which the dog may be disengaged from the latch tooth.

The two wheels 58 and 59 are connected by the link 65 so as to ensure similar, simultaneous movement of both crank wheels under the control of the spring 60.

The pedal 64 is acted upon by a spring 66 having a normal tendency to engage the dog 62 with the latch tooth 61.

Mounted adjacent the connecting rod 23 is a cam 67, the shaft 68 of which is provided with a crank 69 connected by the link 70 with the crank wheel 59 at a point of said wheel which will cause the rotation of the wheel by the link 65 to oscillate said cam 67 in a manner to raise the connecting rod 23 out of its engaging relation with the stud 22. This cam 67 has a cut-out portion indicated at 71, and is so projected beyond this cut-out portion that with the oscillatory movement of said cam for raising the rod 23, the cam will engage the crank 72 carried by the shaft 19 and thus oscillate said shaft 19 in a manner to ensure a completion of the movement of the striker members to make them inoperative with relation to the various numbering heads 17 irrespective of the timing of the disengagement of the connecting rod 23 with the stud 22.

The cut-out portion 71 is so formed and so located that, if desired, after the actuation of the cam, the shaft 19 may be restored to its position where the striker members will engage the various numbering heads 17 so that if desired said striker members will be operative to progressively advance the digit wheels of said numbering heads upon each revolution of the cylinder 16, instead of upon alternate revolutions, as described. This condition is sometimes desired when inking the numbering heads

preparatory to a run of the machine, and before the heads are set for printing purposes.

Associated with the connecting rod 36 is a cam 73 mounted upon a pivot 74 and carrying a crank 75 which is connected with the crank wheel 58 by a link 76. The cam 73 has a recess 77 therein corresponding with the recess 71 of the cam 67, the cam being extended beyond this recess so as to engage a crank 78 carried by the shaft 32.

The mechanism last described has the same operative effect as the corresponding parts used in connection with the connecting rod 23 and the numbering head cylinder 16.

Mounted and actuated in any desired manner, is a reciprocatory flat bed 79 adapted to co-operate with the cylinder 12, the plate upon said bed receiving a double inking from the inking mechanism, shown conventionally at 80. Any desired manner of actuating the bed 79 may be employed, the extension of the blanket about only 180° of the cylinder 12 permitting a return reciprocatory movement of the bed 79 after the making of each impression by the plate thereon upon a sheet carried by said cylinder 12.

The operation of the herein described mechanism is substantially as follows:—

Under normal working conditions, as each sheet having imprints previously made thereon, is fed from the shelf 11 to the grippers 13 upon the cylinder 12, it is brought by said cylinder into the operative relation to the numbering heads 17 upon the cylinder 16 and will have impressed thereon by said numbering heads 17, certain identifying numbers. After an impression is made by each numbering head 17, the actuating means for said numbering heads will be engaged by a striker member 20 and the digit wheels will be turned so as to advance the number for which the head is set by one. During the continued movement of the cylinder 12 with the sheet, the various numbering heads 17 of each sequence upon the cylinder 16 will be thus actuated immediately following the making of an impression therewith so that each head will be properly set with relation to the next impression interval, prior to its reaching the inking mechanism 18.

With the completion of the numbering of the sheet, the cylinder 12 will continue to rotate, as will the cylinder 16, said cylinder 16, however, receiving two full revolutions to one full revolution of the cylinder 12.

When the cylinder 12 has turned approximately 180°, after the making of the initial impression during the printing revolution of the cylinder 16, the fall of the cam groove 27 will act upon the stud or roller 26 to move the connecting rod 23 in a manner to rock the shaft 19 and the various striker members 20 thereon to a position where they will not

engage the actuating mechanism for the numbering heads 17, the low concentric portion of said cam groove maintaining this position during substantially one entire revolution of the cylinder 16, which will coincide with the following 180° of movement of the cylinder 12. At the termination of the final 180° of movement of said cylinder 12, the riser of the cam groove 27 will impart a return movement to the rod 23, and also to the shaft 19, and thus restore the striker members 20 to a position where, during the succeeding revolution of the cylinder 16, they will be operative upon the actuating mechanisms for the respective numbering heads 17. Hence, the striker members 20 will be operative upon each numbering head upon the cylinder 16 during every second revolution of said cylinder only, following the making of the impression and prior to the inking of the printing characters upon said numbering heads, so that each of said printing characters will receive two inkings prior to each impression.

As each sheet is brought by the cylinder 12 into printing relation with the flat bed 79, the same face of the sheet which has just been numbered by the numbering heads 17, will receive impressions from the form upon said bed, which form also will have been twice inked before the making of such impressions. It will be readily understood that if it is not desired to make an impression by means of the bed 79, the omission of the form from this bed is all that is necessary.

As the grippers 13 approach the cylinder 14, the timing of said cylinders is such that the grippers 15 upon said last named cylinder will receive and close upon the sheet of paper, thus transferring this sheet from the cylinder 12 to the cylinder 14, and incidentally reversing the sheet. Since the cylinder 14 is only one-half the diameter of the cylinder 12, it is apparent that prior to receiving this sheet, and until the grippers 15 approach the printing line of the numbering heads 30 upon the cylinder 29, the cylinder 29 must be out of the printing relation to the impression cylinder 14, and the various striker members 33 must be so positioned as to be out of the operative relation to the actuating mechanisms of the various numbering heads 30 upon the cylinder 29. Hence, the timing of the actuation of the connecting rod 36 must be with regard to the impression interval of the cylinders 14 and 29, and will be synchronized with the actuation of the cylinder 12, the movements of which control the time of delivery of the sheet to the cylinder 14. It is for this reason that the cam grooves 27 and 37 are both upon a wheel carried by and rotatable with the shaft 24, the difference in timing of the movements of the rods 23 and 36 being controlled by the set of these cams. In view of the fact that the making

of an impression by the various numbering heads 30 begins only after the completion of the printing revolution of the cylinder 16, it is apparent that the timing of the actuation of the rods 23 and 36 is entirely dissimilar.

After the grippers 15 have received a sheet from the cylinder 12, said cylinder 14 has a movement of approximately 135° in arc before the sheet thus transferred reaches the printing position in relation to the numbering heads 30 upon the cylinder 29. Hence, during this interval the stud or roller 39 will be in the low concentric portion of the cam groove 37 so as to maintain the striker members 33 out of the operative relation to the actuating mechanisms for the various numbering heads 30. At the same time the connecting rod 36 through the link 49 will remain stationary with the eccentric bushing 47 in a position which will hold the numbering heads 30 out of the printing relation to the cylinder 14.

Upon the continued movement of the cylinders 12 and 14 and of the cam wheel 23 in a degree which will bring the sheet upon the cylinder 14 in the printing position in relation to the cylinder 29 and the numbering heads thereon, the rise of the cam slot 37 will come into the operative relation to the stud 39 so as to draw the connecting rod 36 toward the shaft 24, and thus move the shaft 32 and the striker members 33 to an extent to bring the latter into the operative relation to the actuating means for the various numbering heads 30. At the same time this movement of the connecting rod 36 will, through the link 49, actuate the eccentric bushings 47 in a manner to bring the various numbering heads upon the cylinder 29 into the printing relation with the blanket upon the cylinder 14.

The sheet after leaving the printing line between the cylinders 14 and 29 follows the tapes 42 and is conveyed thereby, and by the tapes 40, to about the roller 45 and upon the flier 41.

The effect of the actuation of the connecting rod 36 upon the various striker members and therethrough, upon the various numbering heads, is the same as the operative effect of the connecting rod 23 with relation to the numbering head actuating means and striker members associated with the cylinder 16.

The high concentric portion of the cam slot 37 will maintain the striker members 33 in their operative relation to the various numbering heads 30 during approximately 180° of movement of the cylinder 12, and approximately one full revolution of the cylinder 14. After this lapsed interval, the fall of the cam slot becomes operative to again move the striker members 33 out of the operative relation to the actuating mechanism for the various numbering heads 30,

and at the same time move the cylinder 29 in its entirety away from the cylinder 14, so as to permit a second inking of the printing characters upon the various numbering heads 30 during the revolution of the shaft 29 following the printing revolution above referred to. This condition is necessary not only to prevent offsetting upon the blanket of the cylinder 14, but to permit double inking of these numbering heads.

It will be noted that while the cylinders 14 and 29 are of the same diameter, and consequently have the same R. P. M., that the control of the striker members 33 from the shaft 24 of the cylinder 12, permits accuracy in the timing of the movement of these striker members, and the non-printing revolution of the cylinder 29, not only with relation to the printing interval between the cylinders 14 and 29, but with relation to the travel of the sheet through the machine from the time it is fed to the cylinder 12 and delivered to the tapes 42.

If it is desired at any time to impart movement to the striker members 20 or 33 to bring them out of the engaging relation to the actuating mechanisms for the various numbering heads 17 or 30, it is merely necessary for the operator to press the pedal 64, thus disengaging the dog 62 from the holding tooth 61 upon the disk 59. This release of the holding means operative upon said disks, the use of the link 65 permitting the locking means operative upon either of these disks to act upon both, will result in the rotation of both disks by the spring 60. The movement of these disks will result in a downward movement of the link 76 and an upward movement of the link 70, thus causing the cams 67 and 73 to have simultaneous movement toward the connecting rods 23 and 36 respectively, and also toward the cranks 72 and 78. The initial movement of each of these cams will have the effect of raising the rods 23 and 36, thus disengaging them from the pins 22 and 35 irrespective of the position of the cranks 21 and 34. This will instantly stop the automatic actuation of the striker members. It is for this reason that the cams 67 and 73 are provided with the extensions for engagement with the cranks 72 and 78, this engagement causing such a movement of the shafts 19 and 32 as will ensure the striker members 20 and 33 being moved out of the operative relation to the actuating mechanisms for the numbering heads 17 or 30. Hence, the effect of the release of the holding dog 62 will be to simultaneously position the striker members 20 and 33 so as to prevent the subsequent actuation of the numbering heads by these striker members as a result of the continued operation of the machine.

If it be desired thereafter to bring said

striker members into the operative relation, the recesses 71 and 77 will permit a return movement of the cranks 72 and 78 notwithstanding that the cam is still in a position to disconnect the connecting rods 23 and 36 from the pins 22 and 35. This is a manual setting of the machine, however. If it be desired to run the press while the cylinders are in this position, the eccentric bushings 47 and 48 may be actuated by means of the hand cranks operative thereon, to move the cylinders 16 and 29 away from the impression cylinder co-operating with each. Under such conditions the link 49 will be disengaged from the crank 48 to permit the movement of the bushing 47 independently of any movement of the connecting rod 36.

The resetting of the cams 67 and 73 is a manual operation, against the tension of the spring 60. When said cams are reset, the connecting rods 23 and 36 respectively are permitted to drop toward the pins 22 and 35 so that if the notch in each connecting rod is not in a position to engage said pins respectively, their movement, when the machine is placed in operation, will bring said notch into a position where it will drop over the pin with which it co-operates.

In moving the cylinders 16 and 29 into the printing relation with their co-operating impression cylinders 12 and 14, a reverse movement is imparted to said bushings by their hand cranks which will automatically bring the link 49 into a position where it will engage the crank 48 as a result of movement of the connecting rod 36 under the control of the cam groove 37. While the cranks 72 and 78 have movement with the shafts 19 and 32, this movement is not sufficiently great to cause a disengagement of the rods 23 or 36 from the pins 22 or 35.

It is not my intention to claim broadly a numbering machine capable of doing perfecting work, and in which two co-operating printing couples are employed, this being old in the art. My present invention is directed to a machine of this general character in which the striker members co-operating with the actuating mechanisms of the various numbering heads, will be automatically made inoperative during alternate revolutions of each of the numbering head cylinders so as to secure a double inking of the numbering heads carried by each, this operation of the striker members being controlled from the same source so as to ensure a synchronized, though dissimilar, timing in the actuation of the striker members with regard to the printing interval of the numbering heads upon each of the numbering head cylinders.

It is not my intention to limit the invention to the precise details of construction shown in the drawings, it being apparent

that the design of the machine in its entirety may be varied without departing from the essential characteristics of the invention.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. A numbering machine embodying therein a main impression cylinder, a secondary impression cylinder adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, a striker mechanism associated with each numbering head cylinder, means operative upon each of said striker mechanisms, whereby it will be made operative during one revolution of its numbering head cylinder, and will be made inoperative during the succeeding revolution thereof, and an actuating mechanism operative upon said last named means whereby the actuation of each of said striker mechanisms is timed in relation to the delivery of a sheet to the impression cylinder with which it is associated.

2. A numbering machine embodying therein a main impression cylinder, a secondary impression cylinder adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, a striker mechanism associated with each numbering head cylinder, means operative upon each of said striker mechanisms, whereby it will be made operative during one revolution of its numbering head cylinder, and will be made inoperative during the succeeding revolution thereof, an actuating mechanism operative upon said last named means whereby the actuation of each of said striker mechanisms is timed in relation to the delivery of a sheet to the impression cylinder with which it is associated, a reciprocatory flat bed co-operating with said main impression cylinder, whereby impressions may be made upon a sheet carried by said main impression cylinder after numbers have been impressed upon one side thereof and before the sheet is transferred to said secondary impression cylinder, and an inking mechanism associated with said flat bed.

3. A numbering machine embodying therein a main impression cylinder, a secondary impression cylinder adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, a striker mechanism associated with each numbering head cylinder, a movable member operative upon each of said striker mechanisms to make it operative during one revolution of its numbering head, and inoperative during the succeeding revolution thereof, actuating means for said members, whereby the movements of said striker mechanisms are timed in re-

lation to the printing interval of each numbering head cylinder, and means operative upon said members whereby they may be simultaneously made inoperative in relation to their respective striker mechanisms.

4. A numbering machine embodying therein a main impression cylinder, a secondary impression cylinder adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, a striker mechanism associated with each numbering head cylinder, a movable member operative upon each of said striker mechanisms to make it operative during one revolution of its numbering head, and inoperative during the succeeding revolution thereof, actuating means for said members, whereby the movements of said striker mechanisms are timed in relation to the printing interval of each numbering head cylinder, means operative upon said members whereby they may be simultaneously made inoperative in relation to their respective striker mechanisms, and means carried by each of said striker mechanisms and co-operating with said last named means, whereby if said mechanisms are not made inoperative before said striker mechanisms are brought into the inoperative relation to their respective numbering heads, said mechanisms will be further actuated to bring them into such inoperative relation.

5. A numbering machine embodying therein a main impression cylinder, a secondary impression cylinder of one-half the diameter of said main impression cylinder, adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, a striker mechanism associated with each numbering head cylinder, means operative upon each of said striker mechanisms, whereby it will be made operative during one revolution of its numbering head cylinder, and will be made inoperative during the succeeding revolution thereof, an actuating mechanism for said last named means, whereby the movements of said striker mechanisms are timed in relation to the printing intervals of said numbering head cylinders, means whereby the numbering head cylinder co-operating with said secondary cylinder is movable into and out of the printing relation to said secondary impression cylinder, and operative connections between said last named means and the means operative upon the striker mechanism for the numbering head cylinder associated with said secondary cylinder, whereby said numbering head cylinder receives movement into and out of the printing relation to said secondary impression cylinder simultaneously with the movements of said

striker mechanism into or out of the operative relation to the numbering heads upon said numbering head cylinder.

6. A numbering machine embodying
5 therein a main impression cylinder, a secondary impression cylinder adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, oscillatory
10 shafts associated with said numbering head cylinders respectively, a plurality of striker arms carried by each of said shafts, a crank upon each shaft, connecting rods co-operating with said cranks respectively, and cams
15 carried by and rotatable with said main impression cylinder and operative upon said connecting rods respectively, said cams being so set with relation to each other as to time the actuation of said shafts in relation
20 to the printing interval of the numbering heads upon said numbering head cylinders respectively.

7. A numbering machine embodying
25 therein a main impression cylinder, a secondary impression cylinder adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, oscillatory shafts associated with said numbering head cylinders
30 respectively, a plurality of striker arms carried by each of said shafts, a crank upon each shaft, connecting rods co-operating with said cranks respectively, cams carried
35 by and rotatable with said main impression cylinder and operative upon said connecting rods respectively, said cams being so set with relation to each other as to time the actuation of said shafts in relation to the
40 printing interval of the numbering heads upon said numbering head cylinders respectively, and means operative upon said connecting rods respectively, whereby they may be simultaneously disconnected from said
45 cranks.

8. A numbering machine embodying
45 therein a main impression cylinder, a secondary impression cylinder adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each
50 of said impression cylinders, oscillatory shafts associated with said numbering head cylinders respectively, a plurality of striker arms carried by each of said shafts, a crank upon each shaft, connecting rods co-operating
55 with said cranks respectively, cams carried by and rotatable with said main impression cylinder and operative upon said connecting rods respectively, said cams being so set with relation to each other as to
60 time the actuation of said shafts in relation to the printing interval of the numbering heads upon said numbering head cylinders respectively, means operative upon said connecting rods respectively, whereby they may

be simultaneously disconnected from said
65 cranks, and cranks carried by said oscillatory shafts respectively, and acted upon by said last named means, whereby if said
70 striker arms are not so actuated as to be inoperative before said connecting rods are disconnected from the cranks upon said oscillatory shafts, further oscillatory movement will be imparted to said shafts to make
75 said striker arms inoperative.

9. A numbering machine embodying
75 therein a main impression cylinder, a secondary impression cylinder adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of
80 said impression cylinders, oscillatory shafts associated with said numbering head cylinders respectively, a plurality of striker arms carried by each of said shafts, a crank upon
85 each shaft, connecting rods co-operating with said cranks respectively, cams carried by and rotatable with said main impression cylinder and operative upon said connecting rods respectively, said cams being so set
90 with relation to each other as to time the actuation of said shafts in relation to the printing interval of the numbering heads upon said numbering head cylinders respectively, means operative upon said connecting
95 rods respectively, whereby they may be simultaneously disconnected from said cranks, cranks carried by said oscillatory
100 shafts respectively, and acted upon by said last named means, whereby if said striker arms are not so actuated as to be inoperative before said connecting rods are disconnected from the cranks upon said oscillatory
105 shafts, further oscillatory movement will be imparted to said shafts to make said striker arms inoperative, a reciprocatory flat bed co-operating with said main impression cylinder, whereby impressions may be made upon a sheet carried by said main
110 impression cylinder after numbers have been impressed upon one side thereof and before the sheet is transferred to said secondary impression cylinder, and an inking mechanism associated with said flat bed.

10. A numbering machine embodying
115 therein a main impression cylinder, a secondary impression cylinder adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of
120 said impression cylinders, oscillatory shafts associated with said numbering head cylinders respectively, a plurality of striker arms carried by each of said shafts, a crank upon
125 each shaft, connecting rods co-operating with said cranks respectively, cams carried by and rotatable with said main impression cylinder and operative upon said connecting rods respectively, said cams being so set with relation to each other as to time the actuation of said shafts in relation to the

printing interval of the numbering heads upon said numbering head cylinders respectively, cams acting respectively upon said connecting rods, whereby said rods may be moved into or out of engagement with said cranks, means whereby said cams may be simultaneously actuated, a stop acting normally to prevent the actuation of said last named means, and manually operative means for releasing said stop.

11. A numbering machine embodying therein a main impression cylinder, a secondary impression cylinder adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, oscillatory shafts associated with said numbering head cylinders respectively, a plurality of striker arms carried by each of said shafts, a crank upon each shaft, connecting rods co-operating with said cranks respectively, cams carried by and rotatable with said main impression cylinder and operative upon said connecting rods respectively, said cams being so set with relation to each other as to time the actuation of said shafts in relation to the printing interval of the numbering heads upon said numbering head cylinders respectively, cams acting respectively upon said connecting rods, whereby said rods may be moved into or out of engagement with said cranks, cranks carried by said oscillatory shafts in the path of movement of said last named cams, whereby if said connecting rods are disconnected from their cranks before said striker arms are brought into the inoperative relation to the respective numbering heads, said shafts will be further actuated to bring said striker arms into such inoperative relation, means whereby said cams may be simultaneously actuated, a stop acting normally to prevent the actuation of said last named means, and manually operative means for releasing said stop.

12. A numbering machine embodying therein a main impression cylinder, a secondary impression cylinder of one-half the diameter of said main impression cylinder, adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, oscillatory shafts associated with said numbering head cylinders respectively, a plurality of striker arms carried by each of said shafts, a crank upon each shaft, connecting rods co-operating with said cranks respectively, cams carried by and rotatable with said main impression cylinder and operative upon said connecting rods respectively, said cams being so set with relation to each other as to time the actuation of said shafts in relation to the printing interval of the numbering heads upon said numbering head cylinders respectively, means whereby the

numbering head cylinder co-operating with said secondary cylinder is movable into and out of the printing relation to said secondary impression cylinder, operative connections between said last named means and the means operative upon the striker mechanism for the numbering head cylinder associated with said secondary cylinder, whereby said numbering head cylinder receives movement into and out of the printing relation to said secondary impression cylinder simultaneously with the movements of said striker mechanism into or out of the operative relation to the numbering heads upon said numbering head cylinder, cams acting respectively upon said connecting rods, whereby said rods may be moved into or out of engagement with said cranks, a stop acting normally to prevent the actuation of said last named means, and manually operative means for releasing said stop.

13. A numbering machine embodying therein a main impression cylinder, a secondary impression cylinder of one-half the diameter of said main impression cylinder, adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, oscillatory shafts associated with said numbering head cylinders respectively, a plurality of striker arms carried by each of said shafts, a crank upon each shaft, connecting rods co-operating with said cranks respectively, cams carried by and rotatable with said main impression cylinder and operative upon said connecting rods respectively, said cams being so set with relation to each other as to time the actuation of said shafts in relation to the printing interval of the numbering heads upon said numbering head cylinders respectively, means whereby the numbering head cylinder co-operating with said secondary cylinder is movable into and out of the printing relation to said secondary impression cylinder, operative connections between said last named means and the means operative upon the striker mechanism for the numbering head cylinder associated with said secondary cylinder, whereby said numbering head cylinder receives movement into and out of the printing relation to said secondary impression cylinder simultaneously with the movements of said striker mechanism into or out of the operative relation to the numbering heads upon said numbering head cylinder, cams acting respectively upon said connecting rods, whereby said rods may be moved into or out of engagement with said cranks, cranks carried by said oscillatory shafts in the path of movement of said last named cams, whereby if said connecting rods are disconnected from their cranks before said striker arms are brought into the inoperative relation to the respective numbering heads, said shafts

will be further actuated to bring said striker arms into such inoperative relation, means whereby said cams may be simultaneously actuated, a stop acting normally to prevent the actuation of said last named means, and manually operative means for releasing said stop.

14. A numbering machine embodying therein a main impression cylinder, a secondary impression cylinder adapted to receive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, oscillatory shafts associated with said numbering head cylinders respectively, a plurality of striker arms carried by each of said shafts, a crank upon each shaft, connecting rods co-operating with said cranks respectively, cams carried by and rotatable with said main impression cylinder and operative upon said connecting rods respectively, said cams being so set with relation to each other as to time the actuation of said shafts in relation to the printing interval of the numbering heads upon said numbering head cylinders respectively, cams acting respectively upon said connecting rods, whereby said rods may be moved into or out of engagement with said cranks, cranks carried by said oscillatory shafts in the path of movement of said last named cams, whereby if said connecting rods are disconnected from their cranks before said striker arms are brought into the inoperative relation to the respective numbering heads, said shafts will be further actuated to bring said striker arms into such inoperative relation, said last named cams each having a recess therein adapted to receive the cranks acted upon by said cams and permit the shafts carrying said striker arms to be manually moved to a position to make said striker arms operative with relation to the numbering heads upon the numbering head cylinders respectively, means whereby said cams may be simultaneously actuated, a stop acting normally to prevent the actuation of said last named means, and manually operative means for releasing said stop.

15. A numbering machine embodying therein a main impression cylinder, a secondary impression cylinder adapted to re-

ceive a sheet of paper therefrom, a numbering head cylinder associated with each of said impression cylinders, oscillatory shafts associated with said numbering head cylinders respectively, a plurality of striker arms carried by each of said shafts, a crank upon each shaft, connecting rods co-operating with said cranks respectively, cams carried by and rotatable with said main impression cylinder and operative upon said connecting rods respectively, said cams being so set with relation to each other as to time the actuation of said shafts in relation to the printing interval of the numbering heads upon said numbering head cylinders respectively, cams acting respectively upon said connecting rods, whereby said rods may be moved into or out of engagement with said cranks, cranks carried by said oscillatory shafts in the path of movement of said last named cams, whereby if said connecting rods are disconnected from their cranks before said striker arms are brought into the inoperative relation to the respective numbering heads, said shafts will be further actuated to bring said striker arms into such inoperative relation, said last named cams each having a recess therein adapted to receive the cranks acted upon by said cams and permit the shafts carrying said striker arms to be manually moved to a position to make said striker arms operative with relation to the numbering heads upon the numbering head cylinders respectively, means whereby said cams may be simultaneously actuated, a stop acting normally to prevent the actuation of said last named means, manually operative means for releasing said stop, and manually operative means whereby said numbering head cylinders respectively may be moved out of the printing relation to the impression cylinder with which each co-operates.

In witness whereof I have hereunto affixed my signature, in the presence of two subscribing witnesses, this 6th day of March, 1924.

AMOS H. SMITH.

Witnesses:

FRIEDA KOEHLER,
CAROLINE BRANDEL.