H. C. HARVEY.

PAPER FEEDING MECHANISM.

APPLICATION FILED MAR. 6, 1917.

1,238,138.

Patented Aug. 28, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

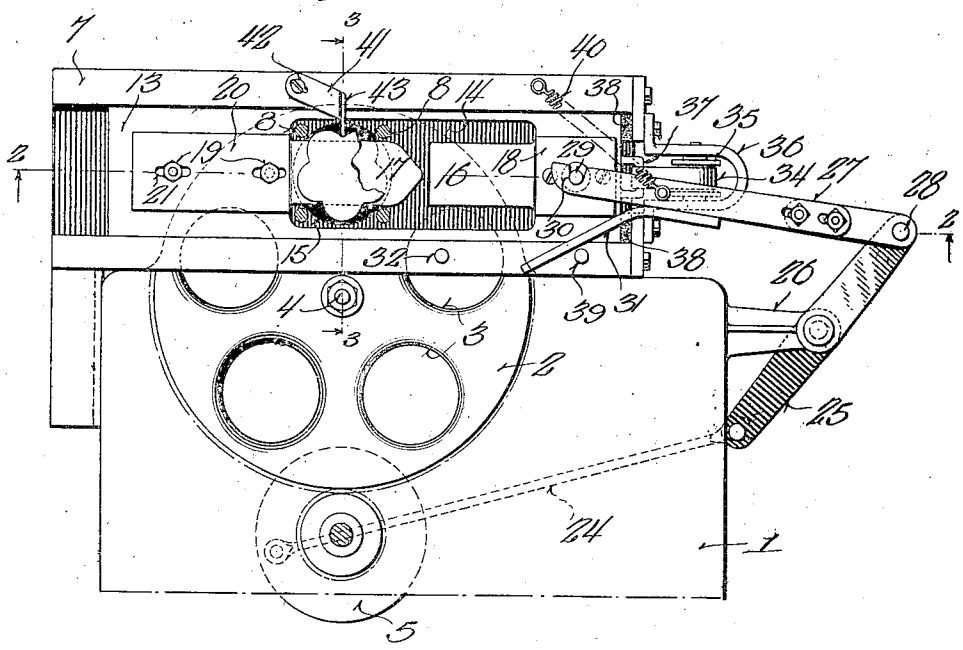
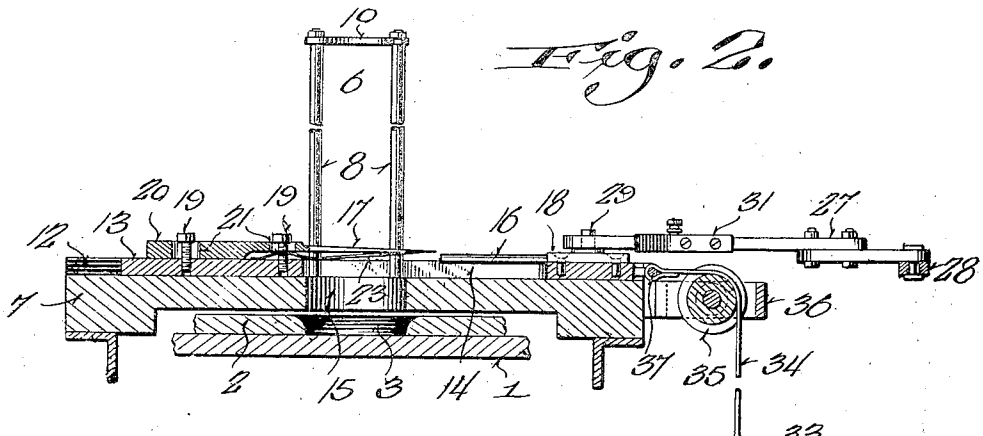


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

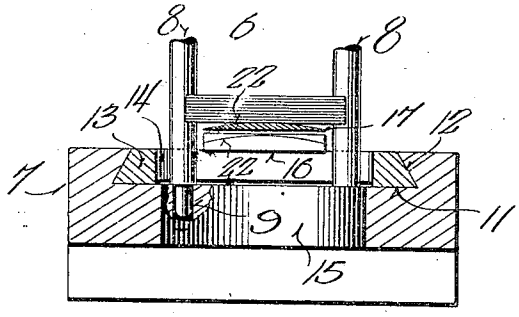


Fig. 4.

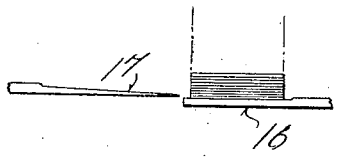


Fig. 5.

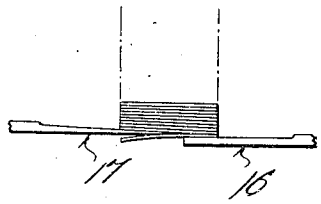
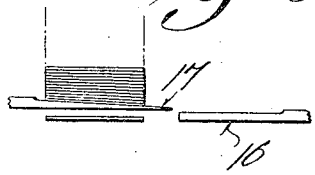


Fig. 6.



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UNITED STATES PATENT OFFICE.

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PAPER-FEEDING MECHANISM.

1,238,138. Specification of Letters Patent. Patented Aug. 28, 1917.

Application filed March 6, 1917. Serial No. 152,623.

To all whom it may concern:

Be it known that I, HAROLD C. HARVEY, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Paper-Feeding Mechanisms; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to new and useful improvements in paper feeding mechanisms for machines used in the manufacture of paper drinking cups, and in other arts.

One of the objects of the invention is to provide a simply constructed mechanism whereby one or more sheets of paper may be removed from the stack containing a plurality of sheets and deliver it to an apparatus for conveyance to a point where it may be further operated upon.

An additional object is to provide a new and improved operating means for the mechanism which removes the sheets of paper from the stack.

A still further object is to provide a simply constructed device for engaging certain of the sheets of paper in said stack to prevent their shifting within the magazine which contains them.

With these and many other objects in view the invention resides in the novel features of structure, combination and arrangement of parts which will be hereinafter more particularly described and claimed and shown in the drawings, wherein Figure 1 is a plan view of certain portions of a paper drinking cup forming machine having my invention applied thereto. Fig. 2 is a central vertical section taken on the plane of the line 2—2 of Fig. 1. Fig. 3 is an enlarged detailed transverse section on the line 2—2 of Fig. 1 and Figs. 4, 5 and 6 are detailed diagrammatic views showing the several steps in the removal of a sheet of paper from the stack containing a plurality of sheets.

In the accompanying drawings I have shown my improved feeding mechanism applied to certain portions of an ordinary paper cup forming machine, but it is obvious it may be used on various machines and also for feeding other material than paper, for instance sheets of cloth. Therefore, only so much of the cup forming machine has been illustrated as to show a complete and operative paper feeding mechanism.

Referring more particularly to the several figures of the drawings it will be seen that the numeral 1 designates a table of a cup forming machine, the same being supported in a suitable manner and having rotatably mounted thereabove a circular delivery plate 2 having a plurality of concentrically arranged circular openings 3. This plate 2 is adapted to be rotated by any suitable means, it being pivoted at 4 and preferably has gear teeth in its periphery, the same meshing with teeth on the upperly projecting portion of a crank plate 5. The latter is suitably connected to the operating means forming part of my invention which will hereinafter be more particularly described. The bottoms of the paper cups which are to be formed are disposed in the circular openings 3, while the other portions are fed into position and connected to said bottoms by suitable mechanism (not shown).

My invention is so arranged that it may automatically feed one or more sheets of paper of appropriate size and shape to each of the openings 3 as the plate 2 revolves, therefore the magazine 6 which is to contain the plurality of sheets of paper is disposed above said plate 2 and in a plane extending radially from the pivot 4 of said plate. The magazine is mounted in a bed plate 7 also positioned above said plate 2 and table 1, it being preferably mounted on the supports which carry said table. It will be noted that the magazine in the present instance comprises four vertical rods 8 of desired length having their lower ends reduced as at 9 and disposed loosely in sockets which are formed in said bed plate 7. The upper ends of the rods are held by means of a plate 10. The loose connection between the lower end of the magazine and the bed plate permits the former to be readily removed for filling.

The bed plate 7 is preferably rectangular in plan view and has a longitudinally extending recess 11 formed from end to end thereof, the longitudinal side walls of said recess being under-cut as shown at 12 to slidably hold a carriage 13 in said recess. Said carriage also consists of a rectangular plate having its longitudinal edges beveled

to engage the under-cut walls 12 and has a rectangular opening 14 substantially in its central portion to receive the magazine 6. This carriage is adapted to reciprocate within the recess 11, means for performing this function being hereinafter described.

When there is a plurality of sheets of paper or other material within the magazine 6 they will tend to drop downwardly through the opening 15 in the bed plate and into one of the openings in the delivery plate 2, therefore means has been provided in connection with the carriage 13 to hold the sheets within the magazine so that only a predetermined number will be delivered at one time to any one of the openings 3. This means consists of a support 16 and a blade 17, each of which extends longitudinally of the carriage and into the opening 14 therein. The support 16 is in the form of an elongated plate having an attaching portion 18 by which it is secured to one end of the carriage. It extends into the opening 14 from one end edge thereof as clearly shown in Fig. 1, while the blade 17 extends inwardly from the opposite end edge and is also secured to the carriage by set screws 19. The blade is adjustable to position its inner end varying distances away from the inner end of the support, its attaching portion 20 being provided with slots 21 for this purpose, said slots receiving said set screws 19. Both the support 16 and the blade 17 have their upper faces which engage the sheets of material within the magazine transversely curved as shown at 22, so that the entire weight of the stack of sheets will be disposed substantially upon the center of either the blade or the support 16. This is a very desirable feature inasmuch as the edges of the sheets are prone to curl and it would be difficult to disengage one sheet at a time from the plurality if the blade had its upper face flat.

When the machine is idle the plurality of sheets of material forming the stack within the magazine rests upon the support 16 as shown in Fig. 4, but as soon as the mechanism begins to operate the carriage 13 is reciprocated to bring the blade 17 beneath the lower end of the stack of sheets, both said support and blade moving between the rods forming the magazine as clearly shown in the various figures in the drawing. Since the bottom of the blade 17 is in a plane above the top of support 16 it is obvious that as soon as the end of the blade approaches the stack it will be disposed between the main portion thereof and one or more sheets of paper which are to be disposed in one of the openings in the delivery plate 2. The support 16 and the blade 17 both being mounted upon the carriage 13, they will be simultaneously moved so that as said support is moving from beneath the stack of sheets the end of blade 17 will be entering the stack as shown in Fig. 5.

Continued movement of the blade through the stack will sever a predetermined number of sheets as is shown in Fig. 6. The sheets which have been severed from the stack drop down through the opening 15 and into one of the openings 3 as hereinbefore mentioned, the stack however rests upon the upper face of said blade until the carriage is caused to move in the reverse direction to permit the support 16 to be again moved beneath the end of said stack. As soon as the weight of the stack is shifted from the blade to the support the carriage is ready to be reciprocated in the opposite direction to remove another sheet for disposition in the next opening 3 as the plate 2 revolves. These movements of the several parts continue as long as the machine is in operation.

As a general rule it is only necessary to remove one sheet at a time from the plurality of sheets within the magazine, but should it become necessary to deliver more than one sheet to each of the openings 3, means have been provided for adjusting the blade 17 with respect to the support 16 to readily permit this. It is obvious that vertical movement of the inner end of the plate will cause it to engage the stack at varying distances from its lower end, depending upon the direction and amount of vertical movement imparted to the blade. In carrying out this arrangement the attaching portion 20 except the part immediately adjacent the blade 17 is considerably thicker than the latter as shown in Fig. 2. The inner slot 21 is disposed in the thin part of the attaching portion, and the nature of the metal from which the blade is formed is such that by adjusting the inner set screw 19 the inner end of the blade will be raised or lowered vertically. In this simple manner a predetermined number of sheets may be readily removed at any time from the stack.

Under certain climatic or atmospheric conditions, for instance when there is an excessive amount of humidity or electricity in the air, the sheets of paper as they are severed from the stack will tend to adhere or cling to the lower side of the blade, therefore a stripper 23 has been disposed on the under side of said blade. This stripper consists of a thin leaf spring of appropriate design attached to the carriage by means of the inner set screw 19.

As hereinbefore mentioned the crank plate 5 is connected to the operating means of the carriage 13, this connection being shown to consist of a pitman 24. The said pitman is connected to one end of a lever 25 which is mounted intermediately of its ends on a bracket 26 carried by the table 1. The other end of the lever has a two part longitudinally adjustable arm 27 pivoted thereto as

at 28, said arm having its free end detachably connected to one end of the carriage 13. Any form of quick detachable connection may be used to unite the end of the arm 27 and the carriage, the same being shown as comprising a stud 29 projecting from the attaching portion 18 of the support 16 and a notch 30 in one side of said arm for engaging with the stud. It will be seen that as the crank plate revolves movement will be transmitted therefrom to the carriage 13 through the pitman 24, the lever 25 and the arm 27.

The carriage will thus be caused to reciprocate, but since it is desirable to cause the blade 17 to move through the stack of sheets at a high rate of speed, an additional operating means is provided for moving the carriage in this direction. In order that this means may effectively operate it is necessary to disengage the end of the arm 27 from the stud 29 as the same reaches the end of its path of movement in an inward direction. In carrying this out a laterally extending finger 31 is secured to one side of the arm 27 so that as said arm moves inwardly one inclined face of the finger will engage a pin 32 projecting from one side of the bed plate and gradually disengage the notch 30 from the stud 29. As soon as these parts are disengaged a weight 33 connected to the end of the carriage by a belt 34 or the like will exert its force to quickly move the blade 17 through the stack of sheets, the speed of movement being such that there will be no danger of the blade mutilating any of the sheets.

The belt 34 is trained over the pulley 35 mounted between the arms of a yoke 36 which is secured to one end of the bed plate 7. An eye or loop 37 formed on the end of the carriage is preferably used for attaching the end of the belt thereto. Semi-resilient stops 38 are secured at the end of the bed plate to receive the impact of the carriage as it is forcibly moved outwardly by the weight 33.

The finger 31 may further be utilized to return the arm 27 into engagement with the stud 29, a second pin 39 being carried by the bed plate at a point spaced from the pin 32 for this purpose. The pin 39 engages the opposite face of the finger from that with which the pin 32 contacts and when the arm is moving in an opposite direction, in other word outwardly, it is believed that the movement of the arm during its disengagement from the stud 29 and its reëngagement therewith is readily evident from Fig. 1 without further description. In some instances it might be necessary to use the coil spring 40 to more quickly return the arm 27 into engagement with stud 29, said spring being secured by its opposite ends to the bed plate and arm respectively.

On some occasions the bottoms of the drinking cups or other articles which are to be made are formed in other than circular shape, for instance they might be scalloped as shown in Fig. 1. In such a case it is desirable to have a device for preventing shifting of the sheets within the magazine and to hold the same in such a position that the end of the blade 17 will engage the outwardly projecting portions thereof instead of the notches therein. A suitable form of such device is illustrated in Fig. 1, wherein it will be noted that the same consists of a substantially right-angular member, one arm 41 of which is slotted to receive a set screw 42 for adjustably securing the member to the bed plate. The other arm 43 is disposed substantially vertically and is adapted to engage in any one of the notches in the peripheries of the sheets. When this member is not in use the set screw may be loosened and the same swung outwardly so that the arm 43 will not project within the magazine.

From the foregoing description taken in connection with the accompanying drawings it is obvious that a very simply constructed paper feeding mechanism has been produced. The parts of this mechanism are so arranged that the same will be much more efficient and more easily and quickly operated than any other similar mechanism now in use. Various minor changes may be made in form and proportion of various parts to accommodate their use with machines of different kinds without departing from or sacrificing any of the principles of the invention as set forth in the claims.

I claim:

1. In the mechanism of the class described, a magazine adapted to contain a plurality of sheets of material, a pair of simultaneously shiftable members disposed end to end in longitudinal alinement and adapted to alternately engage the plurality of sheets, one of said members being adapted to remove one of said sheets upon each engagement with the plurality, means for adjusting one of said members with respect to the other to move their adjacent ends varying distances apart, and means for shifting said members.

2. In a mechanism of the class described, a magazine adapted to contain a plurality of sheets of material, a carriage movable thereadjacent and having an opening therein, a blade for removing a sheet from said plurality and projecting into said opening, said blade having a slotted attaching portion of greater thickness than its sheet engaging portion, said sheet engaging portion also having a slot, a support projecting into said opening and secured to the carriage, set screws extending through said slots and into the carriage to adjustably secure said blade

thereto, said blade being adjustable longitudinally with respect to the support to move the same varying distances apart, the sheet engaging portion of said blade being also adjustable transversely with respect to the support by adjusting the set screw extending through the slot in said sheet engaging portion, and means for operating said carriage.

3. In a mechanism of the class described, a magazine adapted to contain a plurality of sheets of material, a support to engage the plurality of sheets, a blade to remove one of said sheets from the plurality, the upper faces of said support and blade being transversely curved for engagement with the plurality of sheets, the lower face of said blade being flat to readily separate one of said sheets from the plurality, and means for shifting said support and blade to alternately engage said plurality of sheets.

4. In a mechanism of the class described a bed plate having a number of sockets, therein, a magazine adapted to contain a plurality of sheets of material and comprising a number of spaced parallel rods having one end loosely disposed in said sockets, a plate connected to other ends of the rods, and a member movable between certain of said rods to remove sheets from said plurality.

5. In a mechanism of the class described, a bed plate, a carriage having an opening therein, a magazine adapted to contain a plurality of sheets of material and comprising a number of spaced rods secured in said bed plate and projecting through said opening in the carriage, a member attached to the carriage, and extended into the opening therein, said member being movable between certain of said rods to remove sheets from said plurality, and means for moving said member.

6. In a mechanism of the class described, a magazine adapted to contain a plurality of sheets of material, a blade for removing one of said sheets from the plurality, and a leaf spring disposed on one side of said blade to prevent adhesion of the separated sheet to said blade.

7. In a mechanism of the class described, a magazine adapted to contain a plurality of sheets of material, a carriage movable thereadjacent, a blade, means for attaching said blade to the carriage, and a leaf spring disposed on one side of the blade to prevent adhesion of the sheets to the blade, said spring being secured to the carriage by said blade attaching means.

8. In a mechanism of the class described, a bed plate, a magazine adapted to contain a plurality of sheets of material, said magazine being mounted on said bed plate, means for removing one of said sheets from said plurality, and a pivoted device movable into and out of said magazine for engagement with said sheets to prevent the shifting thereof, said device comprising a rightangular member having one arm slotted, the other arm forming a head for engagement with the periphery of the sheets, and a set screw extending through said slot in the arm into the bed plate to hold said member in adjustable positions thereon.

9. In a mechanism of the class described, a magazine adapted to contain a plurality of sheets of material, a member adapted to remove one of said sheets, means for projecting the member, means for retracting the member, and means for automatically discontinuing the operation of the retracting means at a predetermined point to start actuation of the projecting means.

10. In a mechanism of the class described, a magazine adapted to contain a plurality of sheets of material, a member adapted to remove one of said sheets, means for projecting the member, means for retracting said member comprising an arm, a detachable engagement between said arm and the member, means for detaching the arm from said member upon movement of the former, and an operating means connected with the arm.

11. In a mechanism of the class described, a bed plate, a magazine adapted to contain a plurality of sheets of material, a member adapted to remove one of said sheets, means for projecting the member, and means for retracting the member comprising an arm, a detachable connection between said arm and the member, a stud on the bed plate, a finger carried by the arm to engage said stud upon movement of the member, whereby to detach the arm from the latter, and an operating mechanism connected with the arm.

12. In a mechanism of the class described, a magazine adapted to contain a plurality of sheets of material, a member adapted to remove one of said sheets, means for projecting the member, means for retracting the member comprising an arm, a detachable connection between the free end of the arm and the member, means for detaching said arm from the member, means for reattaching said arm to the member, and an operating mechanism connected with the other end of the lever.

13. In a mechanism of the class described, a bed plate, a magazine adapted to contain a plurality of sheets of material, a member adapted to remove one of said sheets, means for projecting the member, means for retracting the member comprising an arm, a detachable connection between said arm and the member, a stud on the bed plate, a finger carried by the arm to engage said stud upon movement of the member in one direction,

whereby to detach the arm from the member, means for reattaching said arm to the member upon further movement of the latter, and an operating mechanism connected with the arm.

14. In a mechanism of the class described, a bed plate, a magazine adapted to contain a plurality of sheets of material, a member adapted to remove one of said sheets, means for projecting the member, means for retracting the member comprising an arm, a detachable connection between said arm and the member, a pair of studs on the bed plate, a finger carried by the arm to engage one of said studs when moved in one direction, whereby to detach the arm from the member, said finger being adapted to engage the other stud to reattach said arm to the member when the latter is moved in the reverse direction, and an operating mechanism connected with the arm.

15. In a mechanism of the class described, a magazine adapted to contain a plurality of sheets of material, a carriage movable thereadjacent, a member carried by the carriage and adapted to remove one of said sheets, means for projecting said member, and means for retracting said member comprising an arm, said arm having a notch formed in its free end, a stud on the carriage to be detachably engaged by the notch in said arm, and an operating mechanism connected with the end of the lever.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee, in the county of Milwaukee and State of Wisconsin.

HAROLD C. HARVEY.