

Nov. 18, 1952

H. E. PEYREBRUNE
SHEET TRANSFER MECHANISM

2,618,479

Filed Aug. 3, 1948

8 Sheets-Sheet 1

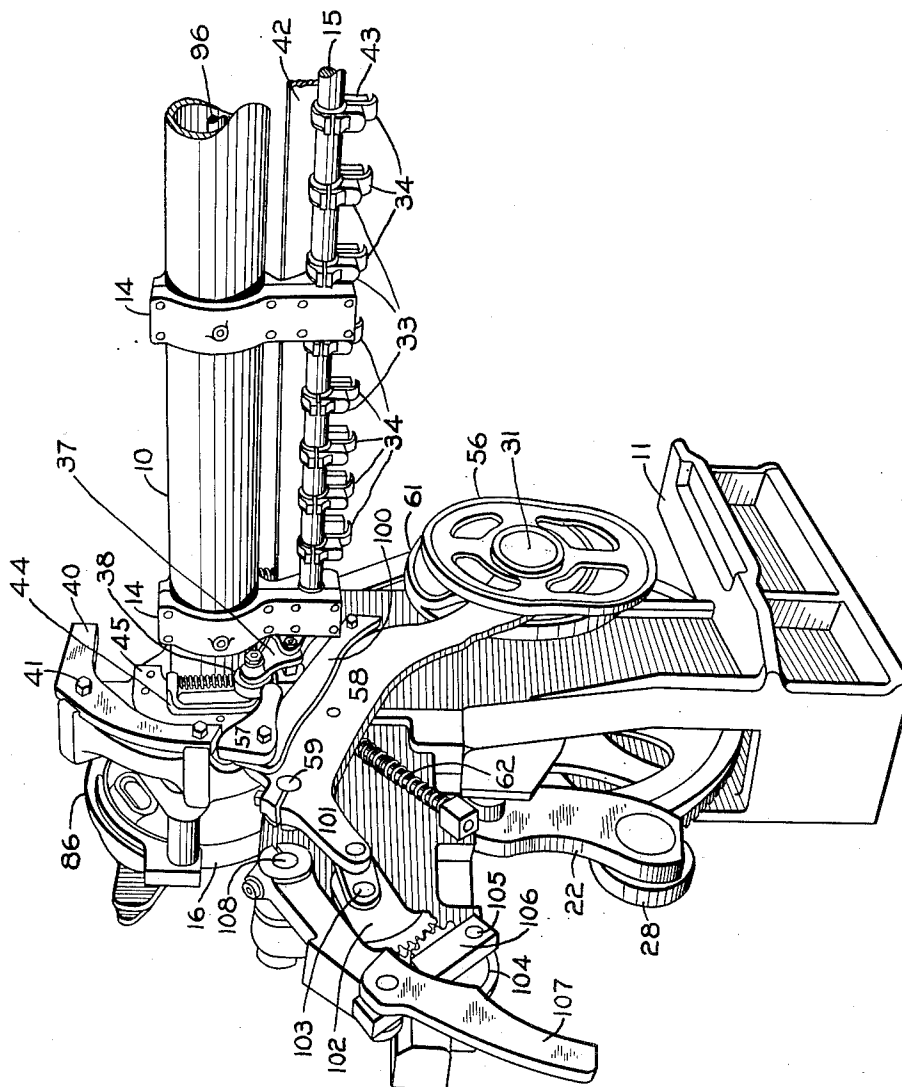


FIG. 1

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Nov. 18, 1952

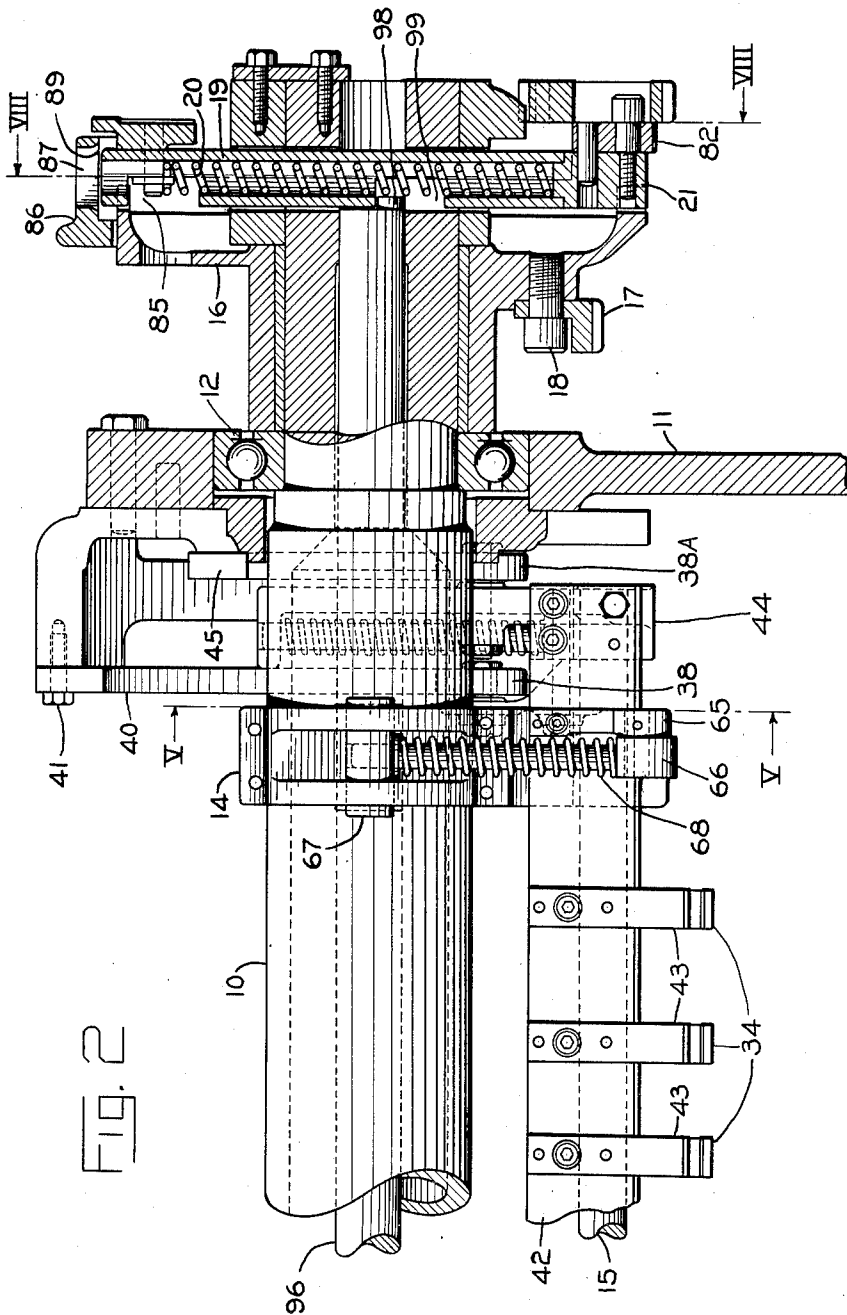
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2,618,479

SHEET TRANSFER MECHANISM

Filed Aug. 3, 1948

8 Sheets-Sheet 2



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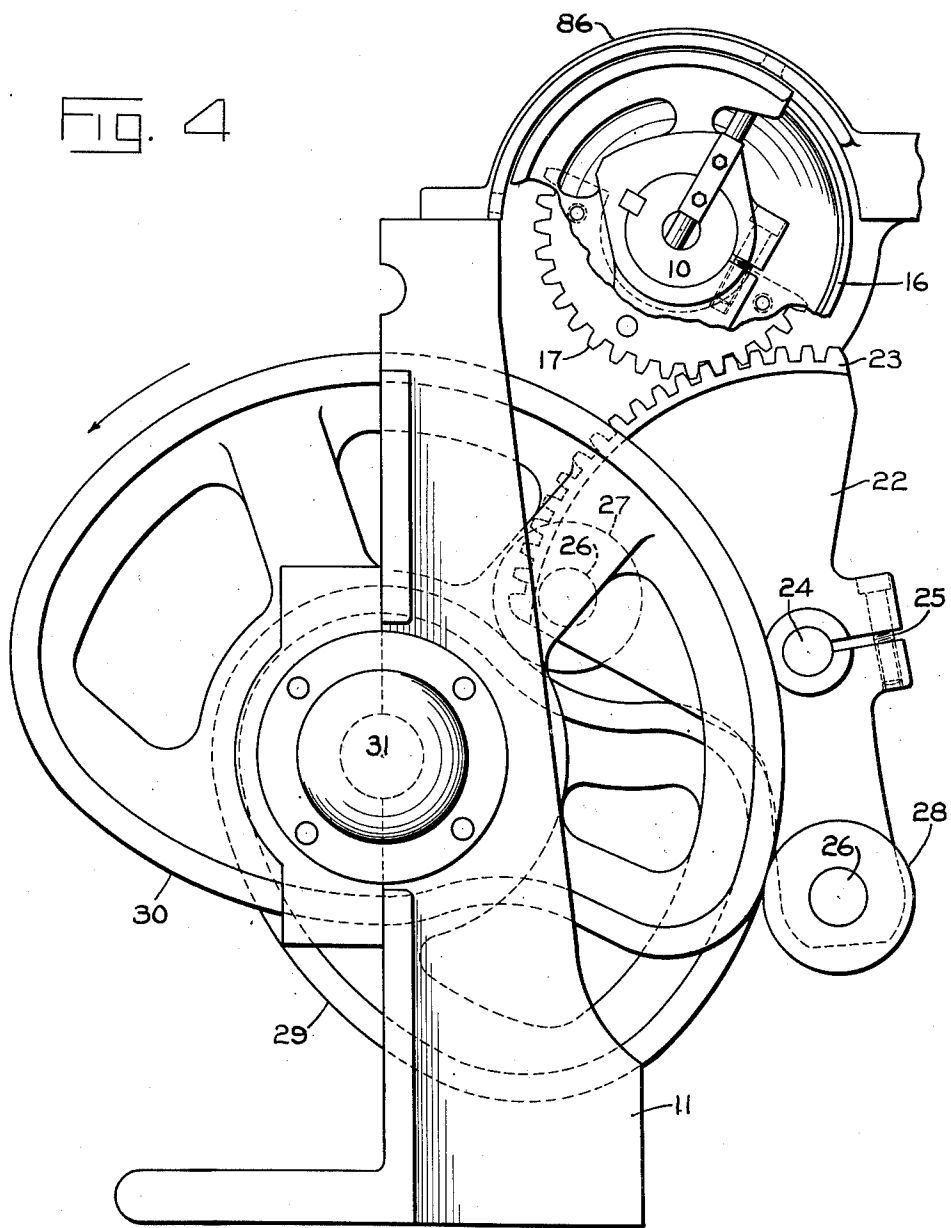
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SHEET TRANSFER MECHANISM

2,618,479

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8 Sheets-Sheet 4



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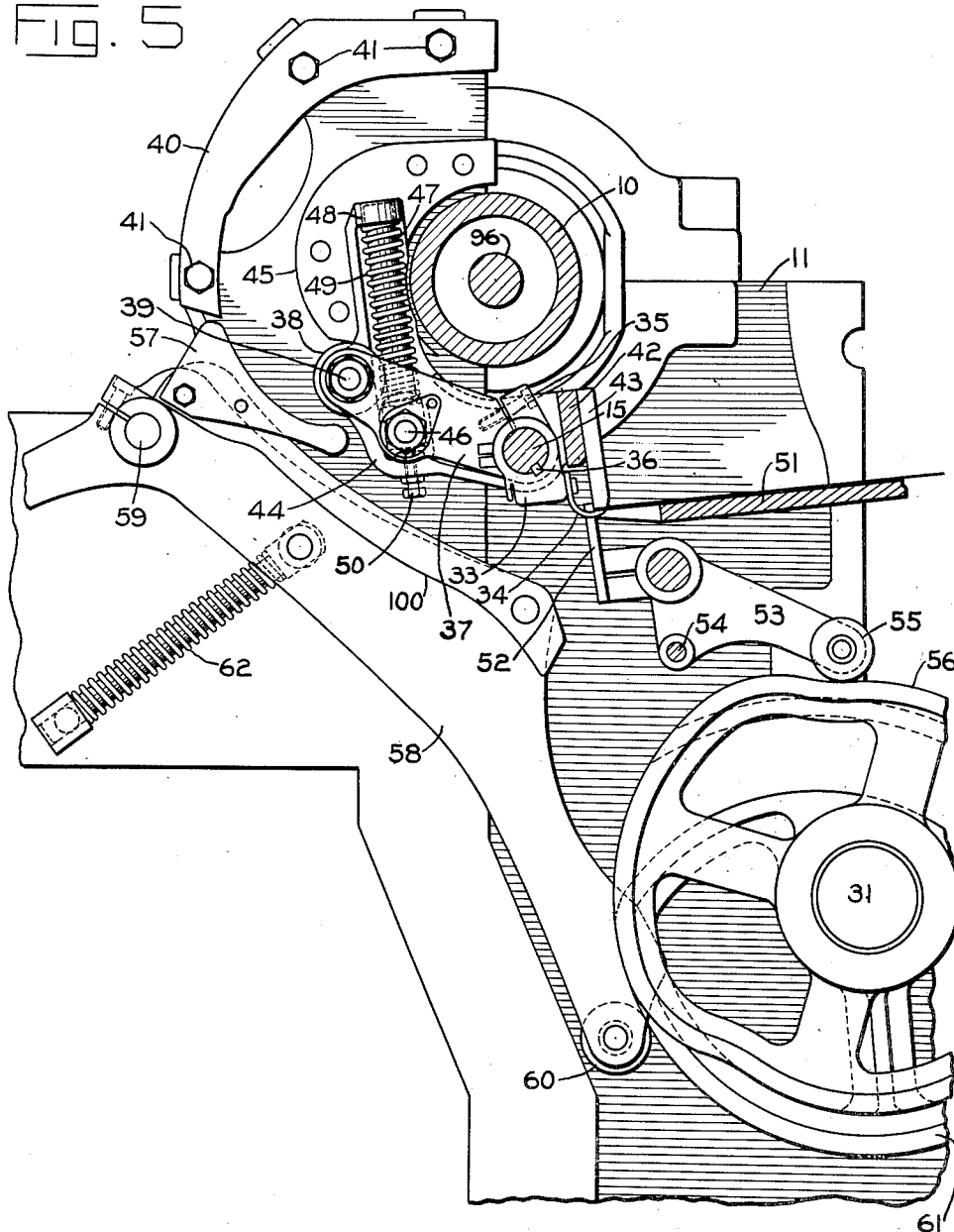
H. E. PEYREBRUNE
SHEET TRANSFER MECHANISM

2,618,479

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8 Sheets-Sheet 5

FIG. 5



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SHEET TRANSFER MECHANISM

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8 Sheets-Sheet 6

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2,618,479

SHEET TRANSFER MECHANISM

Filed Aug. 3, 1948

8 Sheets-Sheet 7

FIG. 7

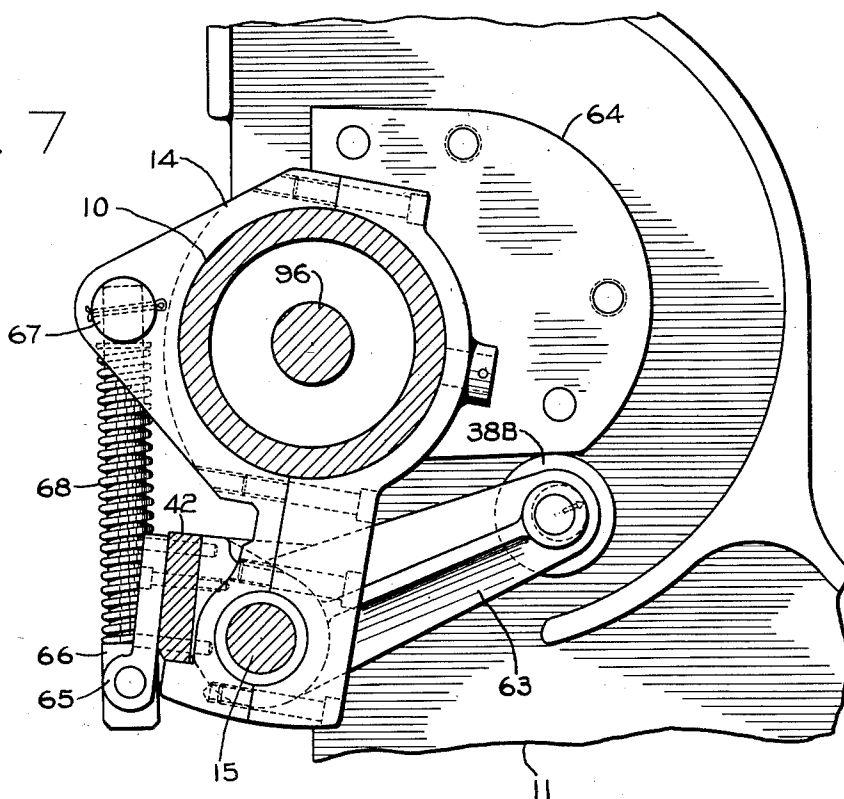
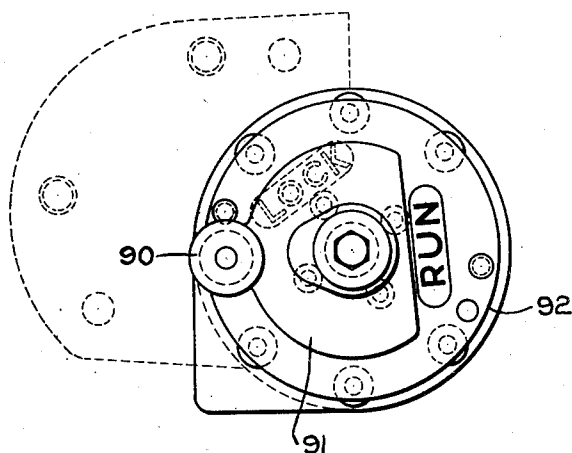


FIG. 10



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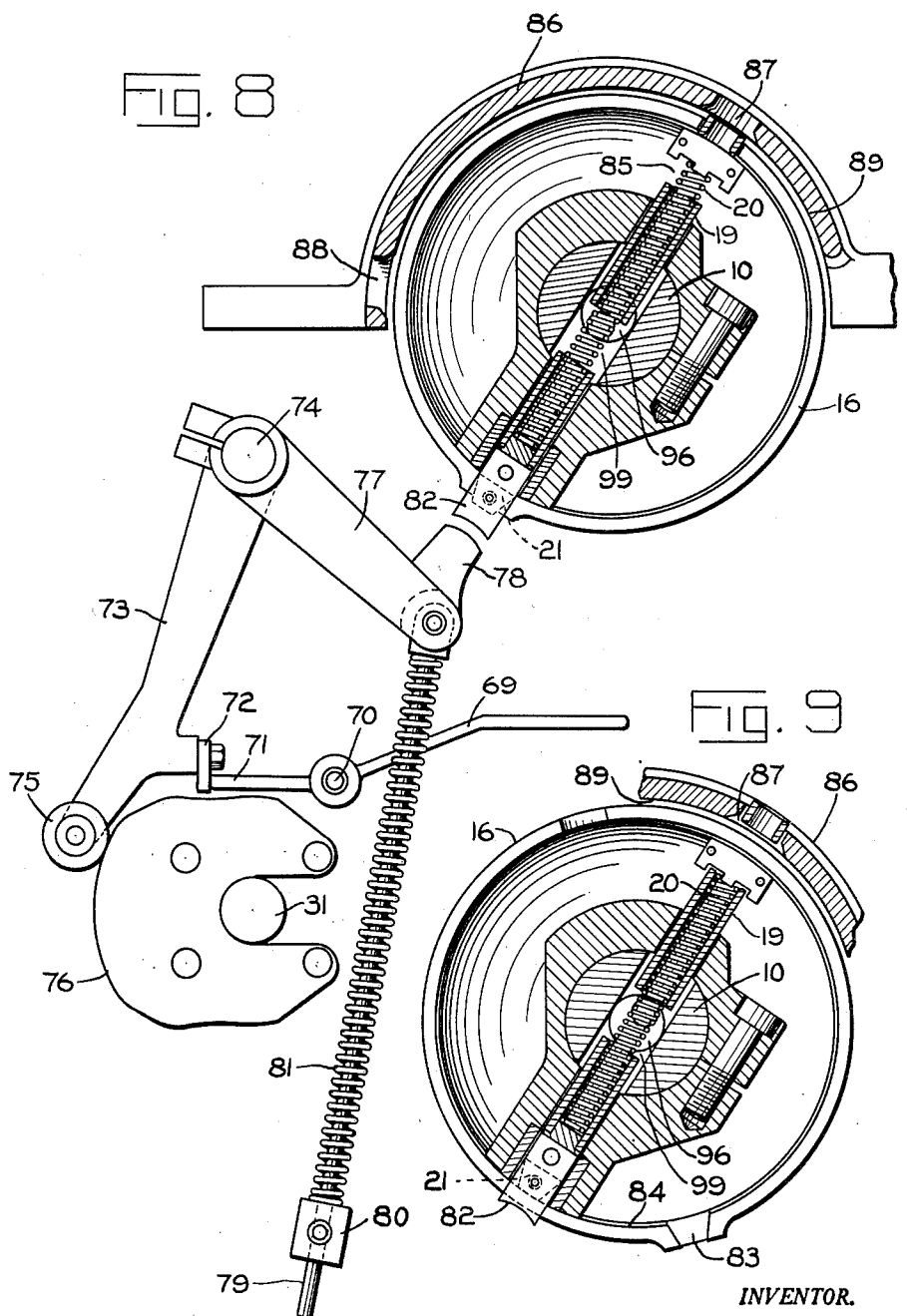
Nov. 18, 1952

H. E. PEYREBRUNE
SHEET TRANSFER MECHANISM

2,618,479

Filed Aug. 3, 1948

8 Sheets-Sheet 8



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UNITED STATES PATENT OFFICE

2,618,479

SHEET TRANSFER MECHANISM

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ware

Application August 3, 1948, Serial No. 42,172

7 Claims. (Cl. 271—56)

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The present invention relates to improvements in mechanism whereby sheets of material, such as paper, are fed to a sheet processing machine.

More specifically, the invention pertains to means operative to engage registered sheets and transfer them, one by one, to a moving sheet carrier.

Devices, whereby this principle of sheet feeding is accomplished, have been widely used in the field of job printing presses and they usually are comprised of either a rotary or an oscillating transfer gripper mechanism, whereby a registered sheet, while at rest, is engaged and then conveyed at an accelerating speed, to a rotating impression cylinder or to any other sheet carrying member of a press.

In such prior art devices the transfer grippers, while conveying the registered sheets to the press, travel merely in a circular path so that the distance or angular travel within which the sheet transfer grippers must be accelerated to the surface speed of the sheet receiving member, is definitely limited.

In many instances, and particularly so when presses are run at comparatively high speeds, it is difficult to hold register of the sheets, while they are being transferred at an accelerating speed to a traveling sheet carrier.

One of the advantages, which my invention provides is an improved motion and mechanism to produce it, whereby the path followed by the transfer grippers is substantially that of a parabola during their travel to and from the stationary support to the point of transferring the sheets to the moving sheet carrier.

In other words, the grippers follow a non-circular path which extends appreciably beyond the location of the point of sheet register, if the grippers were to follow merely a circular path. Therefore, the distance available within which the sheets must be accelerated to the point of transfer, i. e., to cylinder speed, is correspondingly increased.

This provides for additional inherent advantages. For instance, it permits the locating of the transfer mechanism at a point considerably higher with relation to the moving sheet carrier than has been possible heretofore with known mechanism of this class, thereby, in addition to other advantages, also affording better accessibility to the parts involved for registering the sheets and for transferring them.

Furthermore, the improved mechanism provides for a much smoother transfer of the sheets from the point of register to the sheet receiving

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member than has been possible with the sheet transfer apparatus known heretofore.

The novel principle involved in my invention also assures a minimum of wear on the parts which constitute the driving mechanism. This is made possible because of the fact that the angular displacement of the driving members, such as gears and other associated elements, is held to a given minimum, while the extent of angular displacement of the sheet transfer grippers is increased very appreciably beyond that of their driving members.

In other words, with a minimum of angular displacement of the driving parts, a very substantial increase in the travel, i. e., angular displacement of the transfer gripper elements is made available.

I furthermore contemplate the introduction of means whereby the sheets, as they approach the front registering guides, shall be retarded by the transfer gripper elements in a manner similar to that disclosed in prior Patent No. 1,991,003 issued to Burt D. Stevens, also assignor to the assignees of the present invention.

With these and other advantages in view, it is one of the primary objects of my invention to provide an improved sheet transfer mechanism of the class specified, in which the gripper elements are caused to travel in a non-circular, such as a parabolic path for the purpose of removing a registered sheet from its support and to thereupon follow a circular path in order to transfer it to the sheet receiving member.

Another object of my invention resides in the provision of means whereby the travel of the sheet transfer grippers shall be extended very appreciably beyond the normal point of register as known heretofore in the art of transferring registered sheets, so that more time will become available for accelerating the sheets to cylinder, i. e., printing speed.

A further object of my invention is to provide improved mechanism whereby the above advantages and objects will be accomplished effectively and economically.

Still further objects of the invention will become apparent from the appended claims read in the light of the following specification and accompanying drawings in which I have chosen to exemplify the invention as embodied in a printing press.

In these drawings:

Figure 1 is a perspective view showing the general arrangement of the cooperating parts I have provided to effect the transfer of sheet material

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from a sheet support to a sheet carrying means;
Figure 2 is a fragmentary front elevational view, partly in section, illustrating the drive end of the sheet transfer unit;

Figure 3 is a fragmentary, front elevational view, partly in section, showing the mechanism at the opposite end of the transfer unit;

Figure 4 shows the means whereby the transfer unit receives its oscillating or reciprocating motion;

Figure 5 is a cross section taken in the plane along line V—V of Figure 2 as viewed from the left;

Figure 6 is a diagrammatic illustration showing the path followed by the transfer unit grippers when transferring a sheet from a sheet support to a sheet carrying member, while

Figure 7 is a view of cross-section taken on line VII—VII of Figure 3, seen from the right;

Figure 8 depicts a sectional elevation taken along line VIII—VIII of Figure 2 as viewed from the right and illustrates part of the clutch means for automatically locking the sheet transfer unit to its driving means;

Figure 9 is a view similar to Figure 8 but showing the clutch means in its tripped or disengaged position;

Figure 10 is an end view of Figure 3, and

Figure 11 is a diagrammatic view similar to Figure 6, but showing the path followed by the transfer grippers when the sheet retarding principle is incorporated in the device.

Referring now to Figures 1, 2 and 3, the transfer shaft 10 is shown suitably journaled for rotation in the side frames 11 by means of the bearings 12 and 13 and it provides an oscillating support for a series of transfer shaft arms 14 clamped securely thereto and which in turn support the gripper shaft 15, which is rotatably mounted therein.

On the drive end of the transfer shaft 10 is a drive disc 16 which carries the segment 17, said segment being fixed to the drive disc by conventional means such as the bolts 18.

Oscillatory motion is transmitted from the drive disc 16 to the transfer shaft 10 by means of a clutch consisting of the slotted tube 19, the compression spring 20 and the dog or latch 21 fixed to the depending end of the tube 19 which is slidably inserted through an opening provided therefor in the transfer shaft, and can be raised or lowered to either engage or disengage the drive disc 16 as will be explained later.

The means provided for imparting oscillatory motion to the drive disc 16 and thereby to the transfer shaft 10 is shown in Figure 4. Lever 22 is formed with the segment 23 which meshes with the drive disc segment 17. It is rigidly secured on stud 24 by means of the bolt 25 said stud being rotatably fastened in the side frame.

Identical rollers 27 and 28 are attached to lever 22 by means of eccentric studs 26 and are operatively associated with their respective conjugate cams 29 and 30. The cams in turn are secured to the drive shaft 31 which is timed to make one revolution per impression of a two revolution press. By virtue of the contour of the cams 29 and 30, and the followers 27 and 28, reciprocating motion is imparted to the lever 22 and thereby to the drive disc 16 by means of the segments 17 and 23. Rollers 27 and 28 are secured to lever 22 by means of eccentric studs for the purpose of providing adjustment whereby the contact relation of the rollers with their respective cams can be maintained and any backlash or play can

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be positively eliminated. They also provide means for varying the extent of travel of the lever 22 in either direction.

Mounted in series on the gripper shaft 15 and in spaced relation with the grippers on the sheet carrying member or impression cylinder, are the gripper assemblies 33 having the gripper fingers 34 as shown in Figure 5. Also fixed on the drive end of the gripper shaft bar 15 is the lever 37, secured thereto by means of the bolt 35 and key 36 and which carries at its free end the cam follower 38. The latter is secured to lever 37 by means of an eccentric stud 39 which permits adjustment of said follower for purposes which will be explained hereinafter. During the transfer operation, follower 38 traverses cam 40 which is rigidly secured to frame 11 by means of the bolts 41.

Operating in conjunction with lever 37 and means for imparting relative motion to the gripper pad bar 42 and thereby to the gripper pads 43 mounted thereon, is the lever 44 which is pivotally supported on the end of the gripper shaft 15. The gripper pad bar 42 is in turn rockably supported by brackets mounted on the gripper shaft 15 and which are inserted in the depending ends of the arms 14, see Figure 7. Attached to the free end of lever 44 and also by eccentric means is the cam follower 38A which is identical to roller 38 on lever 37. During the transfer movement roller 38A rides on fixed cam 45 which is also fastened to the frame 11.

Pivotally attached to lever 37 by means of the stud 46 is the rod 47 having its free end slidably inserted through the projection 48 of lever 44. A compression spring 49, concentrically mounted on rod 47, exerts pressure between the projection 48 of lever 44 and the end of rod 47 which is attached to lever 37, urging said lever in a counter-clockwise direction thereby imparting like motion to the gripper shaft 15 and the grippers 33, maintaining the gripper fingers 34 in contact with their associated pads 43. In order to regulate the extent of counter-clockwise movement of lever 37 and consequently the amount of pressure between the gripper fingers and their associated pads, the set screw 50 is adjustably threaded in lever 44 with its end contacting the stud 46 in lever 37.

In mechanisms of this type the sheets to be transferred are fed in any conventional manner across a feed board 51 where they are registered against the front guides 52. To permit transfer of the sheet after it has been registered, the front guides are receded by means of the lever 53 pivoted at 54 and having attached to its free end cam follower 55 which rides on the revolving cam 56 mounted on shaft 31.

Means for opening and closing the grippers 33 to engage each succeeding sheet is provided in the cam 57 which is secured to lever 58, said lever being rockably mounted on stud 59 and having attached to its free end cam follower 60 which rides on the revolving cam 61 also mounted on shaft 31. Movement of cam 61 raises and lowers lever 58 thereby moving cam 57 into and out of the path of cam follower 38 of lever 37 at the proper time to open and close the grippers 33 as they move to take a sheet to be transferred. The spring and rod assembly 62 maintains the cam follower 60 in intimate relation with the cam 61.

During the transfer of a sheet the gripper fingers 34 and pads 43 follow a substantially parabolic path as shown in Figure 6, with the

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grippers and pads moving tangent to the impression cylinder B at the point of transfer. The circular path followed by the grippers in conventional sheet transfer mechanisms is shown by the broken line C in Figure 6, also in Figure 11, thereby indicating the extent of change in the path followed by the transfer grippers, which improvement has been made possible by the development of my invention. By following the parabolic path, the distance travelled by the grippers between the front guides 52 and the point where the sheets are transferred to the cylinder B is substantially increased, allowing more time to gradually accelerate a sheet from its register position against the front guides to the surface speed of the cylinder at the transfer point, thereby eliminating any abrupt pull on the sheet which might otherwise disturb its register.

At the point of transfer the cylinder grippers D close on the sheet while the transfer grippers begin to open due to the movement of lever 37 as the cam follower 38 traverses the high point of cam 40. This movement of lever 37 in a clockwise direction against the pressure of spring 49 also turns the gripper bar 15, thereby moving the gripper fingers 34 away from the pads 43 in order to release the sheet to the cylinder grippers D. After the sheet is released by the transfer grippers they are again decelerated to a stop before their return for the next sheet. On their return stroke the transfer grippers pass tangent to the impression cylinder B after it has completed its first revolution and preferably when the recessed portion or gap G of the cylinder presents itself at that point.

Referring now to Figures 5 and 7, it will be seen that pivoted at the opposite end of the gripper shaft 15, and operating in conjunction with lever 44, is the lever 63 as shown in Figure 7. Supported at one end of lever 63 is the gripper pad bar 42, while to its free end is attached by eccentric means the cam follower 38B which is identical to those on levers 37 and 44. Cam follower 38B rides on cam 64 which has the same contour as cam 45 in Figure 5.

Due to the contour of the cam 45, see Figure 5, the lever 44 is caused to pivot in a clockwise direction about the axis of the gripper shaft 15 as the complete assembly rocks counter-clockwise about the axis of the supporting shaft 10, whereas the direction of rotation of the lever 63, as viewed in Figure 7, because of the contour of the cam 64, will be in the counter-clockwise direction. This compound movement causes the gripper pads 43 and their associated gripper fingers 34 to follow a parabolic path thereby effecting a displacement of said fingers and pads beyond that in which they would normally travel if moved in a circular path with the same relative angular displacement of the transfer shaft 10.

The three followers 38, 38A, see Figure 2, and 38B, see Figure 7, are affixed to their respective levers 37, 44 and 63 by eccentric means to make possible adjustments in order to eliminate any play or lost motion that might develop in the mechanism, also to prevent any torque or twist in the gripper pad bar 42 which extends the full width of the mechanism and would otherwise be subject to considerable torsional strain.

To maintain the cam followers 38A and 38B of levers 44 and 63 respectively in contact with their associated cams 45 and 64, a spring and rod assembly as shown in Figure 7 is used. One such assembly being installed in the transfer

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shaft arms 14 at each end of the transfer shaft as shown in Figures 2 and 3. Rigidly secured to the gripper pad bar 42 is the bracket 65 to which is pivotally attached the rod 66, the free end of which is slidably inserted through the pin 67, said pin being rotatably mounted in the transfer shaft arms 14. The compression spring 68 exerts pressure between the pin 67 and the rod 66 urging the levers 44 and 63 in a counter-clockwise direction and thus maintaining the followers 38A and 38B in contact with cams 45 and 64.

In the event a sheet is not registered properly at the front guides the transfer shaft clutch is disengaged by the tripping mechanism shown in Figure 8. This mechanism can be actuated by any conventional sheet detector and as the detector is not a part of the invention, it is not shown.

When a sheet is fed in proper register the lever 69 pivoted on shaft 70 is depressed by a sheet detector to the position shown with its end 71 in the path of the plate or stop 72 on lever 73 which is clamped on shaft 74 thus preventing cam follower 75 from remaining in contact with the revolving cam 76 mounted on shaft 31. Also clamped on shaft 74 is the lever 77 having projection 78 and to which is pivotally attached the rod 79. The free end of rod 79 is slidably inserted through the boss 80. Concentrically mounted on rod 79 is the compression spring 81, the pressure of which tends to move the lever 77 and thereby the lever 73 in a counter-clockwise direction maintaining cam follower 75 in contact with cam 76 or the stop 72 in contact with end 71 of lever 69 depending on whether or not the press is tripped.

If however, a sheet arrives out of register, the sheet detector will not depress lever 69 so the end 71 will not interrupt stop 72 and cam follower 75 urged by the spring 81 will remain in contact with cam 76, which action permits lever 77 to rise causing its projection 78 to move into the path of and press on plate 82, compressing the spring 20 and moving latch 21 and tube 19 to the position shown in Figure 9.

In this position the latch 21 is raised out of the V-shaped slot 83 in the drive disc 16 and rides on the surface 84 within the disc. In the same action the tube 19 is raised bringing the slot 85 in line with the drive edge of the disc 16 allowing the disc to oscillate without contacting the clutch tube 19.

As long as a properly registered sheet is not present at the front guides, the tripping mechanism will maintain the clutch in its disengaged position by raising and holding the latch 21 in its depressed position each time the opening 83 in the disc reaches the point of engagement. However, as soon as a sheet is delivered at the guides in correct register the tripping mechanism will cease operating and the latch 21, forced by pressure of the spring 20, will drop into the slot 83 in the drive disc when it reaches the proper position and the transfer mechanism will again oscillate with the drive disc 16.

To prevent the transfer unit from being disengaged in any but two predetermined positions, the safety disc 86 is provided. The safety disc has two openings 87 and 88 into which the tube 19 must enter in order to disengage the clutch. In any intermediate positions the tube 19 is maintained in its engaged position by the inner surface 89 of the safety disc.

The automatic tripping mechanism will only disengage the clutch in the position shown in

Figure 8. The other position is used for manually tripping the mechanism in an extreme position wherein the impression cylinder and the transfer mechanism are more accessible for adjustments or make-ready.

Manual tripping of the transfer mechanism is controlled by the locking pin 90 and housing 91 shown in Figure 10, which, as illustrated, can be turned to two positions indicated on the surface plate 92 as "Run and Lock."

The mechanism involved when tripping the device manually can be seen more clearly in Figures 2 and 3 wherein the pin 90 is shown as being set in the Run position indicated in Figure 10. To trip the mechanism, pin 90 is pulled out against the pressure of the spring 93 acting against flange 94 until the end 95 is withdrawn from its seat in the plate 92. Pin 90 and thereby housing 91, which is fastened to shaft 96 by means of the key 97, are then turned in a counter-clockwise direction until they reach the Lock position at which time end 95 of pin 90 will drop into a seat provided to hold it in said position. Any movement of the housing and pin will of course impart a like motion to the shaft 96 which is mounted concentrically in the transfer shaft 10, and suitably journaled therein at each end. On the drive end of the shaft 96 is the eccentric projection 98 which projects into the slot 99 in tube 19 of the clutch mechanism.

Therefore, as the shaft 96 is turned the eccentric 98 contacts the upper edge of the slot 99 in tube 19 tending to raise the tube against the pressure of the spring 20. However, the tube 19 will remain in the position shown in Figure 2 by virtue of the safety disc 86 until the transfer mechanism reaches a position in which the tube 19 is in line with one of the two openings 87 or 88 in the safety disc. At either point the tube will be raised until it projects into one of said openings which will bring the latch 21 out of the V-shaped slot 83 in the drive disc 16 and will move the slot 85 in line with the drive edge of said disc. As long as the pin 90 remains in the Lock position eccentric 98 will maintain the tube 19 in its raised or disengaged position and the drive disc will continue to oscillate without affecting the transfer mechanism.

To re-engage the clutch, pin 90 and the parts connected thereto, are turned to the Run position which moves the eccentric to its lowered position as shown and wherein it will cease to maintain the tube 19 in its raised position. However, the tube 19 will remain in its disengaged position with the latch riding on the inner surface 84 of the drive disc 16 until the V-shaped slot 83 moves to a position in line with tube 19. Then, due to the pressure of spring 20 the tube and latch will again spring into engagement with the disc 16 and the transfer mechanism will again operate.

Precision timing of the impression cylinder grippers for opening and closing on the transferred sheet is essential and is accomplished by means incorporated in the transfer mechanism. As illustrated in Figure 1, the lever 58 which controls the movement of the transfer gripper opening cam 57 also controls the opening and closing of the impression cylinder grippers by means of the cam 100 attached thereto. The raising and lowering of the lever 58 by virtue of the cam 61 causes cam 100 to move into and out of the path of the impression cylinder gripper opening lever to effect the opening and closing

of the impression cylinder grippers in timed relation to the transfer grippers.

Likewise, the impression cylinder grippers are opened to release a printed sheet to the delivery mechanism, not shown, by means which are also actuated by lever 58. Pivotaly attached to the free end 101 of lever 58 is the arcuate segment 102 which is rockably mounted on the frame by means of the stud 103. In mesh with the segment 102 is another segment 104 having eccentrically attached thereto by means of stud 105, the bar or shaft 106 which in turn is pivotally connected to the impression cylinder gripper opening cam 107. Said cam being rockably mounted on the frame 11 by means of the stud 108. It can be seen that any lowering or raising of lever 58 will impart a relative motion to the cam 107 by virtue of the segments 102 and 104 and the shaft 106 which will bring said cam into and out of the path of the cylinder gripper opening lever in timed relation to the delivery mechanism to effect transfer of the sheet to the delivery mechanism.

With modern high speed presses and stream feeders the accurate transfer of sheets to the impression cylinder in rapid succession is essential in order to attain maximum output of the press. While this invention will meet the requirements of the most rapid automatic sheet fed presses and stream feeders, it can also be used with equal efficiency on hand fed presses or presses equipped with sheet by sheet feeders. As is well known in the art, however, the greatest difficulty encountered with sheet by sheet feeders, when an attempt is made to increase the speed, is the rebounding of the sheets from the front register guides, or in cases where thin sheets such as onion skin are used, the leading edge is apt to curl back when it strikes the front guides. To prevent such difficulties it often becomes necessary to reduce the speed of the feeders and consequently the speed of the press, resulting in a corresponding loss in production.

If desired and as indicated herein, the device could readily be modified to permit additional retardation of the oncoming sheets, just before they contact the front guides. Thereby any possible rebounding or curling back of the sheets at the moment when they contact the front guides 52 would be prevented. In some cases this method may be preferred.

For this purpose, and as shown in Figure 11, the contour of cam 57 is altered to provide for the extended travel of the grippers past the point at which a registered sheet is grasped. The addition of slowdown fingers 109 provides means for retarding the speed of the oncoming sheet as it is fed over the sheet support 51 to the front guides 52. Said fingers intercept the sheet while they are moving in the same direction and at slightly less than the speed of the sheet and then they decelerate gradually until movement of the sheet is practically nil when it reaches the front guides 52. During this slowdown procedure the leading edge of the sheet is prevented from curling back on the slowdown fingers by the lower face of the gripper pads 43 which also hold the sheets in position at the front guides until the gripper fingers 34 close on the leading edge. The gripper fingers remain open during the slowdown procedure and do not close on the sheet until it has been registered against the front guides 52.

The operation of the mechanism for transferring the registered sheets is as follows:

A sheet to be transferred is at rest on the

sheet support 51 after having been registered by the front guides 52 and the gripper fingers 34 have closed on the leading edge as shown in Figure 5. Rotation of the drive cams 29 and 30 shown in Figure 4 will impart an oscillatory motion to the lever 22 which in turn will transmit a like motion to the drive disc 16 and thereby to the transfer shaft 10. When the transfer mechanism starts its clockwise movement the front guides 52, see Figure 5, are simultaneously withdrawn from the path of the sheet, actuated by the lever 53 as the cam follower 55 rides over the high part of cam 56. The cam follower 38A of lever 44 then rides on cam 45 with the spring 49 maintaining lever 37 in the position shown with the gripper fingers 34 closed on their associated pads 43. The two levers 37 and 44 travel as a unit, starting in a linear path substantially parallel to the sheet support 51 and then following a substantially parabolic path, see Figures 5 and 6, until they reach the point at which the sheet is to be transferred to the impression cylinder. Then cam follower 38 of lever 37 contacts the raised portion of cam 40 which causes lever 37 to compress spring 49 and turn the gripper shaft 15 in a clockwise direction thus opening the gripper fingers 34.

While this action has been taking place the lever 50 was lowered by virtue of the cam 61, moving cam 57 from the path of the cam follower 38 and placing cam 100 in the path of impression cylinder gripper operating lever. When the impression cylinder grippers arrive at the transfer point they are open to engage the sheet and close on it an instant before the transfer grippers release their hold. The transfer grippers continue to rotate in their clockwise direction as viewed in Figure 6 until they are clear of the sheet, thereafter they reverse their direction and return for engaging the succeeding sheet. On the return stroke the transfer grippers pass the impression cylinder while the recessed portion or gap G thereof presents itself.

With the return of the transfer grippers, lever 53 begins to raise also as cam follower 60 rides on the low portion of cam 61 bringing the cam 57 into the path of cam follower 38. When the follower 38 contacts cam 57, see Figure 5, the lever 37 will again compress the spring 49 thereby turning shaft 15 in a clockwise direction and opening the gripper fingers 34 as they return to receive the next sheet. Cam 57 holds the lever 37 in this position with the grippers 34 open until they are in position to close on the succeeding sheet. By this time lever 53 has begun its downward movement carrying the cam 57 away from the cam follower 38 and allowing the pressure of spring 49 to close the gripper fingers 34 on the pads 43 clamping the edge of the sheet therebetween.

While I have herein disclosed a preferred embodiment of my invention and merely by way of example, it shall be understood that I do not wish to be limited to the precise details illustrated and described, because many modifications in structure and mode of operation may be introduced without departing from the principle of my invention and scope of the appended claims.

I claim:

1. In a sheet fed printing press, the combination of sheet registering means, a sheet carrying impression cylinder provided with sheet engaging grippers, an oscillating transfer gripper mechanism including sheet engaging elements

for grasping registered sheets and transferring them to the grippers of said cylinder, driving means for oscillating said transfer gripper mechanism, and an oscillating cam member associated with said driving means for opening and closing the sheet engaging elements on the transfer mechanism, as well as for opening and closing the grippers on said cylinder.

2. In an oscillating sheet transfer mechanism for transferring sheets from a position of rest on a feed table to a continually rotating impression cylinder of a printing press or the like, the combination of gripper elements, drive mechanism for oscillating said elements, means associated with said drive mechanism including cam members arranged to guide said elements during their transfer motion in a manner that the initial portion of their movement is in a path substantially parallel to the feed table and thereafter, in an arcuate path tangent to the impression cylinder, and means associated with said drive mechanism for rendering the transfer mechanism inoperative when a sheet is misfed.

3. A sheet transfer mechanism as set forth in claim 2, wherein selectively automatic and manual means are provided for rendering the transfer mechanism inoperative.

4. In an oscillating sheet transfer mechanism for transferring sheets from a position of rest on a feed table to the grippers of a continually rotating impression cylinder, the combination of gripper elements, drive means for oscillating said elements, means including cam members arranged to guide said elements in a substantially straight path parallel to the plane of the feed table during the initial portion of their movement and thereafter in a circular path tangent to the impression cylinder at the point of transfer, and oscillating alternately effective cam means associated with said drive means for controlling the opening and closing action of the impression cylinder grippers at the moment when a sheet is being transferred to said cylinder, as well as when the sheet is to be released in order to deliver it.

5. In an oscillating sheet transfer device for feeding sheets from a position of rest on a feed table to a continually rotating impression cylinder, the combination of gripper elements, a supporting shaft for said elements, a disc rotatably mounted on said shaft, drive mechanism for oscillating said disc including conjugate cams, and clutch mechanism associated with said disc and operative to transmit motion from said disc to said shaft, selectively manual and automatic means for disengaging said clutch in a plurality of positions, and safety means operative to prevent disengagement of said clutch in any but a predetermined position.

6. In an oscillating sheet transfer device for feeding sheets from a position of rest on a feed table to a continually rotating impression cylinder, the combination of sheet gripper elements, drive means including conjugate cams for oscillating said elements, stationary cam means arranged to guide the gripper elements in a straight path parallel to the plane of the feed table during the initial portion of their transfer movement and thereafter in a circular path tangent to the impression cylinder in order to transfer a sheet thereto, additional cam members for opening said gripper elements at the point of transfer, and oscillating cam means associated with said transfer mechanism to control the cylinder gripper action when taking a sheet from the

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transfer mechanism as well as when releasing it for delivery.

7. In a sheet feeder for transferring sheets from a feed table to a continually rotating sheet carrier, the combination comprising transfer gripper elements, a gripper shaft, means for oscillating said gripper elements including a stationary cam and a lever rotatably mounted on the gripper shaft for controlling the movement of the gripper elements in a manner that the initial portion of their transfer motion is in a substantially straight path parallel to the plane of the feed table and thereafter in a circular path tangent to the sheet carrier in order to transfer a sheet thereto, a second lever fixed on said gripper shaft, cam means arranged to cooperate with said second lever for the purpose of opening the grippers at the point of transfer, resilient

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means constantly urging said levers into relative predetermined positions, and means provided on said first mentioned lever for adjusting the relative positions of said levers.

HENRI E. PEYREBRUNE.

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The following references are of record in the file of this patent:

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