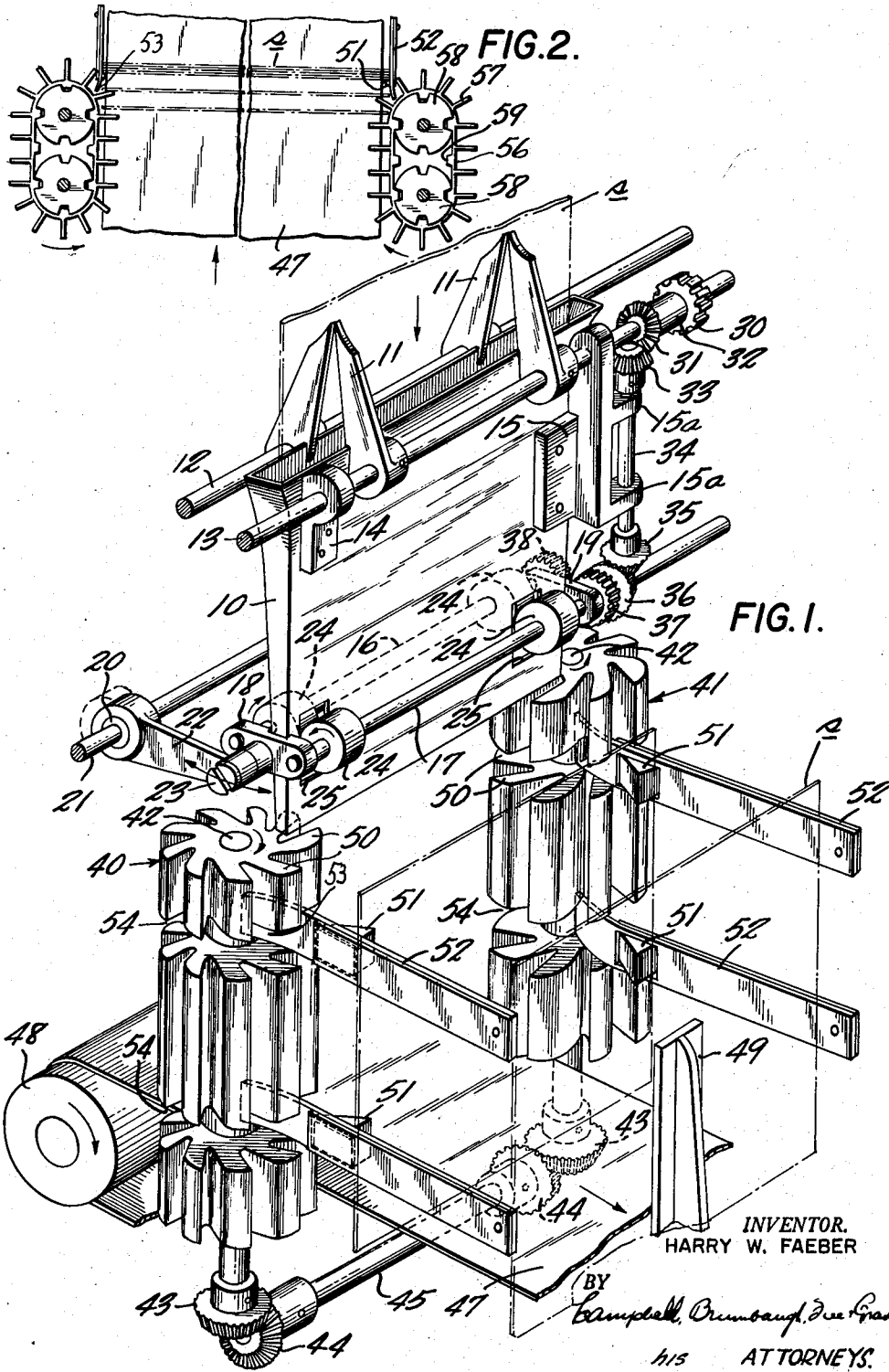


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JOGGER MECHANISM - SIGNATURES DELIVERED TO
STACKING MECHANISM INDIVIDUALLY
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1

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JOGGER MECHANISM—SIGNATURES DELIVERED TO STACKING MECHANISM INDIVIDUALLY

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11 Claims. (Cl. 271—87)

This invention relates to a delivery mechanism which receives printed sheets or folded signatures one by one and assembles them side by side in upright fashion on a moving conveyor.

In the mechanism of the present invention, a driven carrier having pocket forming means thereon is stationed adjacent each side of a moving conveyor at receiving end thereof. The sheets or signatures to be assembled on the conveyor pass through a pivotally mounted oscillating chute, and they are discharged from the chute in the direction of the moving conveyor. The pivotally oscillating chute and the pair of driven carriers operate in timed relationship so that during the forward pivotal stroke of the chute, a sheet or signature is guided into one of the pockets of the carriers. The sheet or signature thus received in a pocket of the carriers is advanced in the direction of movement of the conveyor until the side edges of the sheet or signature are advanced between and beyond yieldable sheet or signature retaining members which serve as a gate to engage the last sheet or signature to be assembled and to prevent the sheet signature from falling backwardly to obstruct succeeding signatures to be assembled.

The present invention, therefore, serves as a very effective and positive means of continuously delivering sheets or signatures one at a time in rapid succession to a moving conveyor and assembling them in upright fashion on the moving conveyor without obstructions or pile-ups.

For a complete understanding of the present invention, reference may be had to the detailed description which follows and to the accompanying drawing in which:

Figure 1 is a perspective view of the mechanism of the present invention; and

Figure 2 is a plan view of an alternative embodiment thereof.

Referring to the drawing, printed sheets or printed folded signatures are delivered one at a time edge-wise into the upper bell-mouth end of a guide chute 10. The signature is guided into the receiving end of the chute 10 between pairs of upwardly disposed stripper guides 11 which are mounted on the horizontal shafts 12 and 13 on opposite sides of the chute. The chute 10 is suspended from the shaft 13 by the brackets 14 and 15 which are pivoted on the shaft 13 and attached to the front wall of the chute 10.

A pair of rotatable shafts 16 and 17 are also mounted on opposite sides of the chute between the horizontally disposed shaft supporting members 18 and 19, which members are notched so as to interlock with the side edges of the chute. Feed rolls 24 are mounted on the rotatable shafts 16 and 17, and the front and back walls of the chute 10 are provided with slots 25 to permit the rotating feed rolls 24 to engage and feed the sheets or signatures passing through the guide chute 10.

The lower end of the chute 10 is adapted to be oscillated back and forth on the pivot shaft 13 by an eccentric cam member 20 mounted on a rotating driven shaft

2

21. The eccentric cam 20 transmits the oscillating motion to the lower end of the chute by means of an arm 22 which is pivotally connected at its forward end to a stem or shaft 23 projecting from the support member 18.

The drive transmission for the shaft 17 and the feed rolls 24 supported thereon includes the drive-take-off gear 30 and a bevel gear 31, both mounted on a sleeve 32 which rotates freely on the pivot shaft 13, a bevel gear 33 meshing with the bevel gear 31 and mounted at the upper end of a vertically disposed shaft 34, a bevel gear 35 mounted at the lower end of the shaft 34, and a bevel gear 36 affixed to the shaft 17. The shaft 16 is driven from the shaft 17 by the engagement of a gear 38 mounted at one extreme end of the shaft 16 with a gear 37 mounted on the shaft 17.

It is noted that the drive transmitting shaft 34 and the feed roll supporting shafts 16, 17 are mounted to and oscillate with the pivotal chute 10. For example, the vertically disposed shaft 34 is supported in horizontally disposed arms 15a of the bracket 15. The drive arrangement described above permits the feed rolls 24, which are mounted in fixed relation to the lower oscillating end of the pivotally suspended chute 10, to be driven continuously during the oscillating movement of the chute. This is possible, of course, by virtue of the fact that the drive is transmitted via the pivot shaft 13 from which the chute is suspended by the bevel gear 31.

A signature passing through the oscillating chute 10 is discharged from the lower end thereof, and the side edges of the signature are guided into the gaps between the teeth 50 of a pair of rotors 40, 41, the gaps between the teeth 50 serving as sheet or signature receiving pockets. The rotors 40, 41 are mounted on vertically disposed shafts 42 which rotate in opposite directions in synchronism. The lower ends of the vertically disposed shafts 42 carry bevel gears 43, and the bevel gears 43 mesh with bevel gears 44 mounted at both ends of a horizontally disposed drive shaft 45.

The tooth bearing rotors 40, 41 are situated adjacent opposite sides of a moving conveyor 47 which passes around the rotating roller 48 at its receiving end. The signatures are received on the upper span of the conveyor 47, and they are transported thereby toward the discharge end, the signatures being assembled thereon side by side in upright fashion with the lower edges thereof being in registered contact with the upper surface of the conveyor. The leading signature in the stacked array, is supported in upstanding position by a retainer arm 49 which is urged, for example, by a counter-weight in the direction of the receiving end of the conveyor but yields toward the discharge end thereof under the influence of the incoming signatures delivered to the conveyor. A yielding retaining arm of this type is shown in my copending application, Serial No. 547,936 filed November 21, 1955, now U.S. Patent No. 2,853,298.

As mentioned above, the signatures are delivered to the rotors 40, 41 with the side edges thereof interposed in the pocket forming gaps between the teeth 50, and the rotation of the rotors advance the signature between and beyond the retainer or latch members 51 which are mounted to yielding spring members 52. The downstream ends of the spring members 52 are mounted to a fixed support, and the upstream ends 53 thereof are free and are received in grooves 54 in the rotors 40, 41. The free upstream ends of the spring members 52 curve outwardly so as to guide the side edges of the signature being advanced in a forward direction by the rotors between the retainer or latch members 51. The retainer or latch members 51 readily yield outwardly as the signature is advanced between them, and when the signature is advanced past them they close behind the signature, thereby serving as a gate to prevent the signature from

falling backwardly and interfering with succeeding signatures to be assembled.

Thus, summarizing the operation of the present invention, signatures are delivered one at a time into the upper bell-mouth receiving end of the oscillating chute 10, and they are discharged from the lower end thereof into the pockets or gaps formed between the teeth 50 of the rotors 40, 41. The feed rolls 24 assist in conveying the signature downwardly toward the moving conveyor 47. The lower end of the oscillating chute 10 moves in timed relation to the rotation of the rotors 40, 41 so that during the forward oscillation of the chute the lower discharge end thereof is in substantial alignment with the pockets or gaps between the teeth of the rotors into which the signature is to be delivered. The rotors receive the signatures one by one and advance them forwardly and positively to the retainers 51 which yield outwardly as the signature moves between them but close behind the signature to prevent it from falling backwardly on the conveyor.

It is to be noted that various vibrating and jogging devices, as well as moving side belts adjacent the conveyor 47, may be employed to facilitate the assembly of the signatures on the moving belt. These devices are shown and described in my above mentioned co-pending application.

It may be noted that the forward surfaces of the teeth 50 which engage and advance the signatures are curved so that the signature will not be injured as the teeth slide outwardly against the back of the signature toward the edges thereof just prior to the point at which the teeth lose contact with the signatures. Rotor teeth of other forms and shapes may, of course, be employed. Furthermore, as shown in Figure 2, the rotors may be replaced entirely by flexible belts 56 adapted to travel in orbital paths around the gears 58. The belt in the form shown is provided with fins or teeth 57 projecting outwardly from the belt which perform the same function as the teeth 50 of the rotors 40, 41. Since it is important that the teeth move in predetermined timed relationship with the oscillating chute 10, the inner surface of the belt is formed with teeth 59 which interlock with notches on the gears 58, thus avoiding undesirable slippage between the belts and the gears which could destroy the timed relationship between the travel of the belts and the movement of the discharge end of the chute 10.

The invention has been shown in preferred forms and by way of example only, and obviously many modifications and variations may be made therein without departing from the spirit of the invention. The invention, therefore, is not to be limited to any specified form or embodiment, except insofar as such limitations are set forth in the appended claims.

I claim:

1. A delivery mechanism for receiving sheets one by one and assembling them side by side on a moving conveyor, comprising a pair of carriers driven in synchronism and having pocket forming means thereon, said carriers being disposed on each side of the receiving end of the moving conveyor and said pocket forming means of the carriers advancing a sheet delivered thereto, an oscillatory guide means for directing a sheet edge-wise into a pocket formed by said pocket forming means, and means for imparting a predetermined oscillatory movement to the guide means to oscillate the guide means in timed relationship with the movement of said carriers.

2. A delivery mechanism for receiving sheets one by one and assembling them side by side on a moving conveyor, comprising a pair of tooth bearing carriers driven in synchronism, said carriers being disposed on each side of the receiving end of the moving conveyor, the teeth of said carriers being spaced apart from each other to form sheet receiving gaps therebetween and said teeth of said

carriers engaging a sheet delivered thereto near the side edges and thereby advancing the sheet, an oscillatory guide chute for guiding a sheet into the gaps between the teeth of said carriers, and means for imparting oscillatory movement to the guide chute such that the guide chute moves in synchronism with the tooth bearing carriers during the stroke of the guide chute in the same direction as the movement of the tooth bearing carriers.

3. A delivery mechanism as set forth in claim 2 wherein the tooth bearing carriers comprise rotating gears.

4. A delivery mechanism as set forth in claim 2 wherein the tooth bearing carriers comprise belts moving in an orbital path and having teeth formed at spaced intervals along the belt.

5. A delivery mechanism as set forth in claim 2 including a pair of yieldable sheet retaining members disposed in the vicinity of the receiving end of the conveyor to prevent retrograde movement of a sheet advanced by the tooth bearing carriers beyond the sheet retaining members.

6. A delivery mechanism for receiving sheets one by one and assembling them side by side on a moving conveyor, comprising a pair of tooth bearing carriers driven in synchronism, said carriers being disposed on each side of the receiving end of the moving conveyor, the teeth of said carriers being spaced apart from each other to form sheet receiving gaps therebetween, said teeth engaging a sheet delivered to the gap near the side edges thereof and advancing the sheet in upstanding position, a pivotal oscillating chute for guiding sheets into the gaps formed between the teeth of said carriers, and means for imparting a predetermined oscillatory movement to the oscillating chute such that the guide chute completes one oscillation in substantially the same period of time that the tooth bearing carriers advance the distance from one gap to the next.

7. A delivery mechanism as set forth in claim 6 including feed rolls mounted on opposite sides of the chute for advancing a sheet through the chute, and slots formed in the side walls of the chute to permit the feed rolls to engage the sheet passing through the chute.

8. A delivery mechanism as set forth in claim 7 including a shaft for supporting the chute for pivotal oscillation thereon, and a drive transmission for driving the feed rolls, said drive transmission being driven by driving means carried on said shaft, and means for mounting at least part of the drive transmission to the oscillating chute.

9. A delivery mechanism for receiving sheets one by one and assembling them side by side on a moving conveyor, comprising a pair of endless tooth bearing carriers driven in synchronism, said carriers being disposed on each side of the receiving end of the moving conveyor, the teeth of said carriers being spaced apart from each other to form gaps therebetween, said teeth engaging the side edges of a sheet delivered to said gaps and advancing the sheet in upstanding position, a guide chute mounted above the tooth bearing carriers, the sheets being received one by one into the receiving end of the chute and being discharged from the other end of the chute into the gaps between the teeth of said carriers, a shaft from which the guide chute is pivoted, means for imparting oscillatory motion to the lower end of the chute, moving the lower discharge end of the chute in timed relation to the moving carriers, such that the number of complete oscillations of the guide chute equals the number of gaps formed on one of the tooth bearing carriers during each complete revolution of the tooth bearing carrier and sheet retaining means spaced at the receiving end of the conveyor and ahead of the tooth bearing carriers for receiving the sheets advanced by the carriers.

10. A sheet feeding mechanism comprising a horizontally moving conveyor on which sheets are assembled

5

side-by-side, an oscillatory guide chute mounted above the horizontally moving conveyor, said guide chute having a relatively long passage of slot-like configuration formed therethrough, said passage having an upper inlet end and a lower discharge end, means for imparting oscillatory motion to the guide chute to move the lower end of the chute in the direction of travel of the conveyor during one stroke thereof and in a direction of travel opposite to the direction of travel of the conveyor during the reverse stroke thereof, means for feeding sheets to the inlet end of the guide chute in timed relationship to the oscillatory motion of the guide chute to insure that the sheets will be delivered from the discharge end of the guide chute to the conveyor on the stroke during which the lower end of the guide chute is moving in the same direction as the conveyor, and means on opposite sides of the horizontally moving conveyor defining side walls between which the sheets are discharged from the oscillatory guide chute and registered.

6

11. A sheet feeding mechanism as set forth in claim 10 wherein each of said means defining side walls is driven in an orbital path, and including pocket-forming means carried by each side wall means, whereby the side edge of a sheet discharged from the guide chute is introduced into said pocket means.

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