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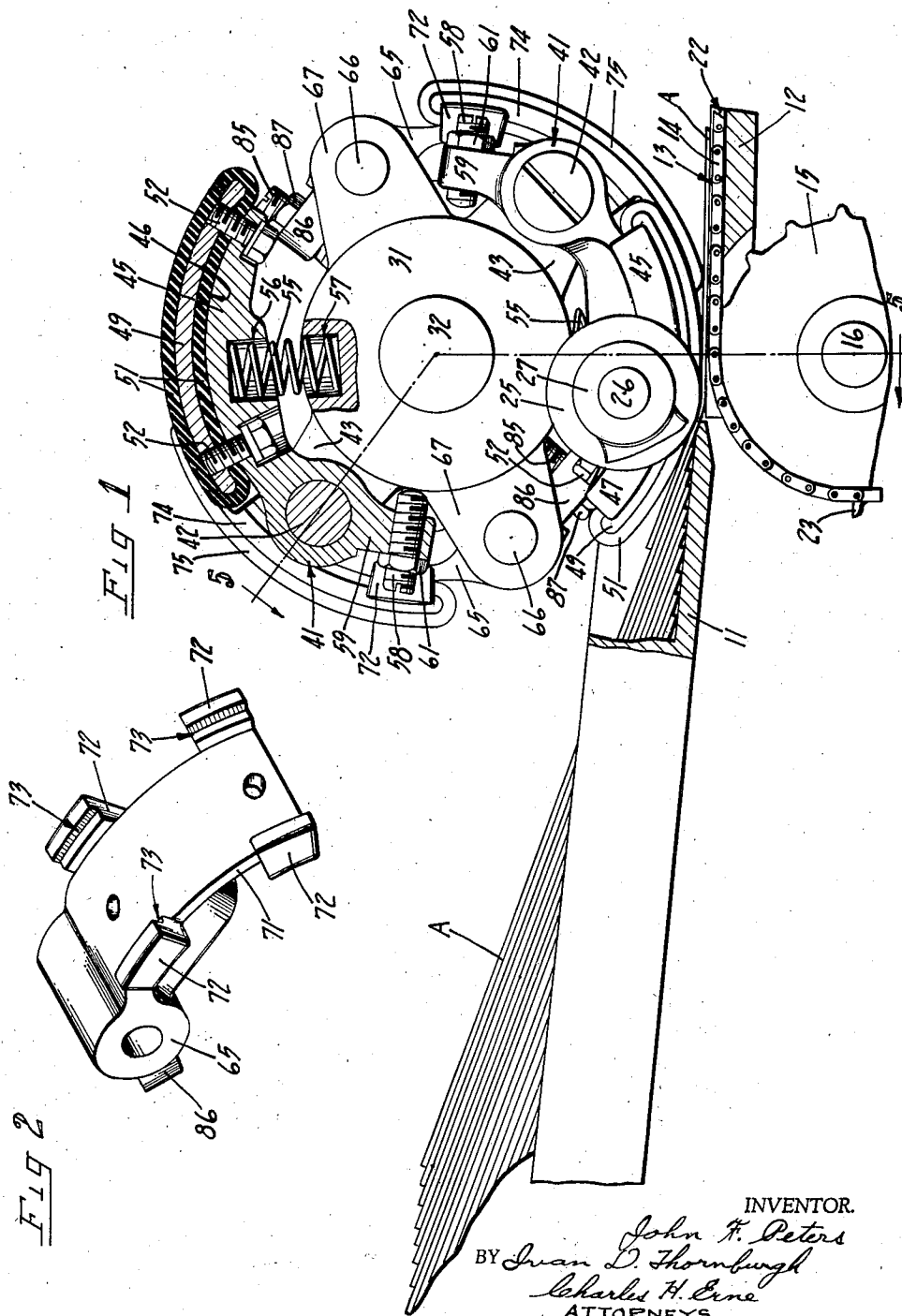
J. F. PETERS

2,303,385

SHEET FEEDING DEVICE

Filed Aug. 26, 1941

4 Sheets--Sheet 1



INVENTOR.

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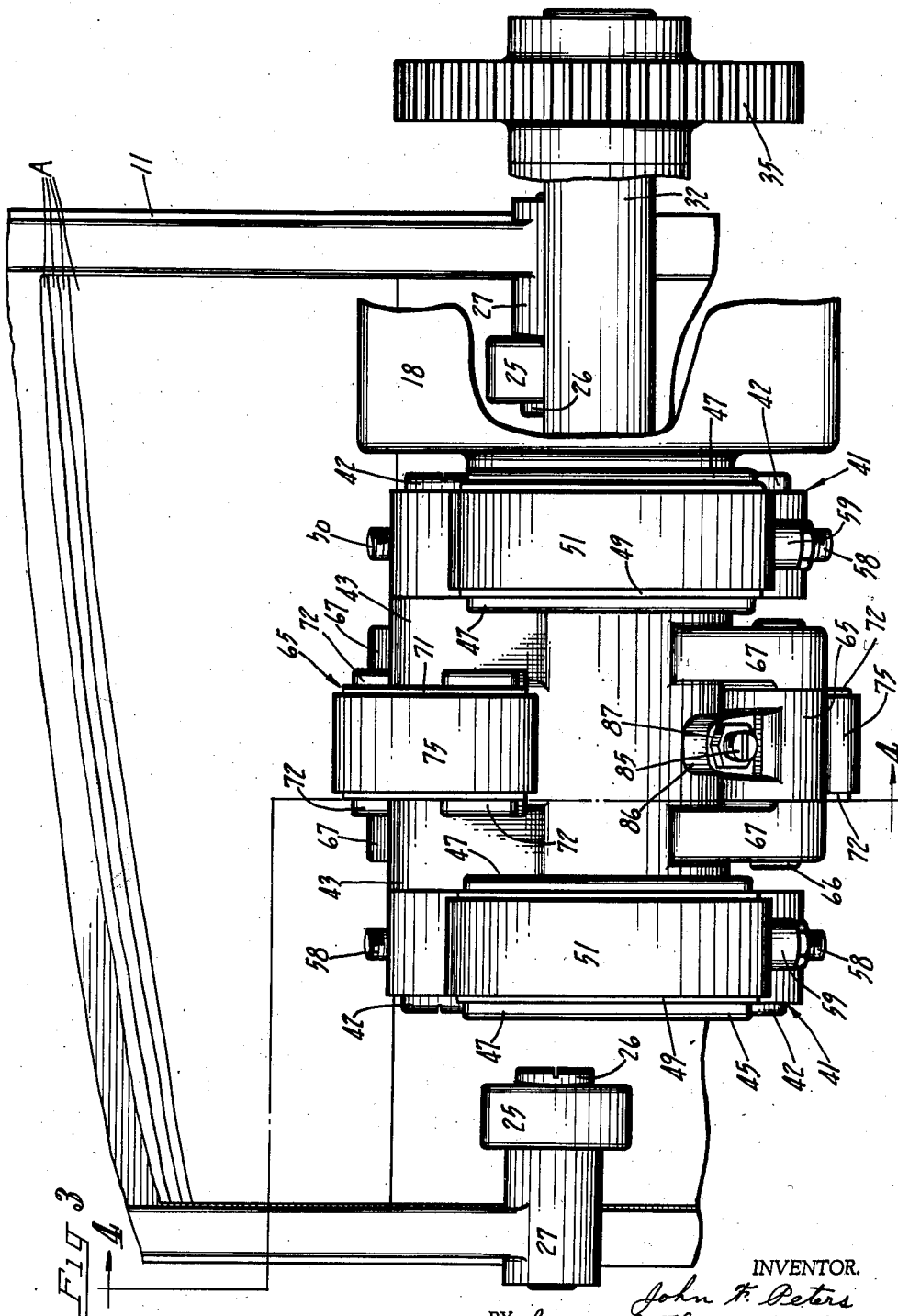
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SHEET FEEDING DEVICE

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4 Sheets-Sheet 2



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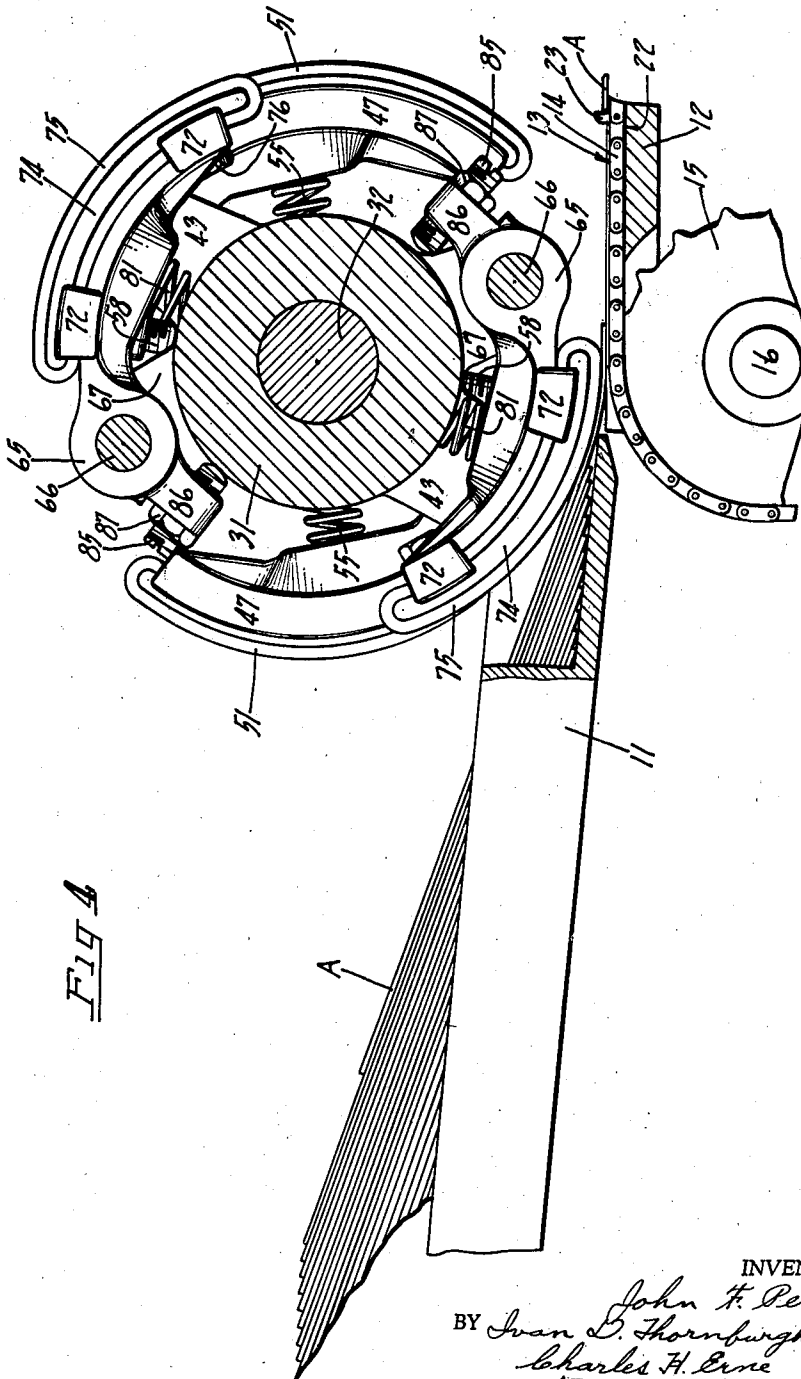
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4 Sheets-Sheet 3



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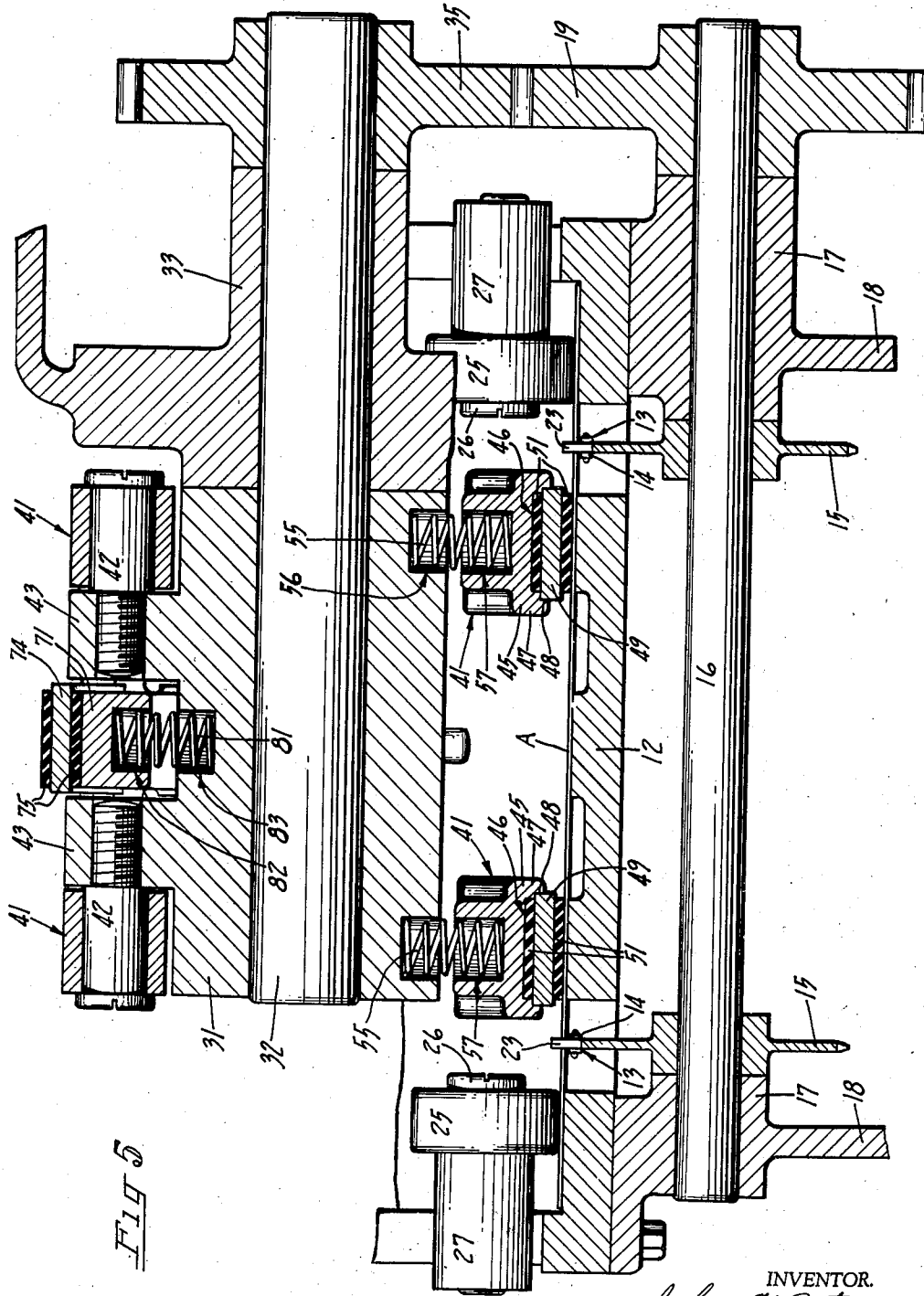
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SHEET FEEDING DEVICE

Filed Aug. 26, 1941

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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SHEET FEEDING DEVICE

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5 Claims. (Cl. 271—37)

The present invention relates to a sheet feeding device and has particular reference to a rotary feeding device which is adapted to high speed feeding of sheets in succession from a stack of such sheets.

In high speed production of articles made from sheet material such as containers and the like it has been found that the usual chain and slide bar feeding devices common in container making practice, is sometimes unsuitable for feeding the sheets fast enough to keep up with other high speed elements of newer machines. This difficulty has been overcome by the instant invention which contemplates a rotary feeding device which is capable of feeding sheets at almost any speed which is now required in container making machines.

An object therefore of the invention is the provision of a sheet feeding device wherein the sheets are fed from a stack in timed order with a rotary sweeping motion which separates a sheet from the remainder of the sheets in the stack and advances it along a predetermined path of travel so that a continuous procession of sheets may be fed into a machine at a high rate of speed.

Another object is the provision of such a feeding device which includes yieldable gripper elements of simple construction that grip a sheet from the stack and feed it forward with a rapid but easy motion.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a side elevation of a sheet feeding device embodying the instant invention, the view showing a plurality of sheets in the device, with parts broken away and shown in section;

Fig. 2 is a perspective view of one of the working parts of the device;

Fig. 3 is a top plan view of the device shown in Fig. 1, with parts broken away;

Fig. 4 is a sectional view taken substantially along the line 4—4 in Fig. 3; and

Fig. 5 is a transverse section taken substantially along the line 5—5 in Fig. 1, with parts broken away.

As a preferred embodiment of the instant invention the drawings disclose a rotary feeding device for feeding fibre blanks A from which container parts are made, although the device is equally well adapted to the feeding of me- 1 or

other sheets such as tin plate or the like from which containers are made.

The sheets designated by the letter A are preferably arranged in stack form in an inclined chute or magazine 11 (Fig. 1) and are adapted to be fed onto a table 12 where they may be further propelled along a desired path of travel by a conveyor 13. Such a conveyor is shown, by way of example, for advancing the sheets in timed order after being fed from the magazine.

The conveyor 13 preferably includes a pair of spaced and parallel endless chains 14 (see also Fig. 5) which take over sprockets 15 carried on a cross shaft 16 journaled in bearings 17 formed in a machine frame 18 which supports the table 12. The shaft may be rotated in any suitable manner such as by a gear 19 which is carried on one end of the shaft. The chains operate in longitudinal grooves 22 formed in the top of the table. Feed dogs 23 spaced at intervals along the chain engage in back of the fed sheets and advance them along the table.

The stack of sheets A are retained in an inclined position in the chute 11 by a pair of roller stops 25 (Figs. 1, 3 and 5) which are located at the bottom of the stack of sheets. There is one of these roller stops on each side of the chute and they are arranged to permit a sheet to pass under them while being fed from the stack. The rollers are mounted on studs 26 which are threaded into lugs 27 formed on the sides of the chute.

The sheet feeding device is located at the bottom of the stack of sheets adjacent the roller stops 25. This feeding device includes a rotatable body member or long hub 31 mounted transversely of the machine table 12 and is carried on a driving shaft 32 which overhangs the table. The shaft is journaled in a bearing 33 formed in a portion of the frame 18 which extends above the table and preferably overhangs one edge thereof. This shaft is driven in time with the conveyor 13 and for this purpose carries a gear 35 which meshes with and is driven by the gear 19.

Adjacent each end of the hub 31, the feeding device includes two yieldable feed shoes 41 disposed on opposite sides of the hub, i. e., 180° apart, making four feed shoes in all. These feed shoes 41 are mounted on pivot studs 42 secured in lugs 43 which project out from the hub.

Each feed shoe 41 (Fig. 5) has a long arm 45 which curves around the outside of the hub and which is formed with a wide groove 46 in its outer surface. The groove sets off a pair of spaced and parallel side guides 47 having a shoulder seat 48

for a curved plate 49. The plate is surrounded by a resilient band 51, preferably made of rubber. This plate rests on the shoulder seats 48 and thereby permits the lower run of the band to fit into the wide groove without unduly squeezing it. The plate and band are secured in place by cap screws 52 which extend through the arm and through the resilient band and are threaded into the plate.

The arm 45 of each shoe is maintained under spring pressure by a compression spring 55 which is interposed between the arm and the hub 31. These springs are seated in recesses 56 formed in the arms and in recesses 57 formed in the hub. The springs force the arms outwardly and this pressure is normally resisted by a setscrew 58 threaded into a lug 59 which extends out from each of the shoes 41.

The setscrews 58 engage against the hub and may be adjusted to limit the outward travel of the shoe arm 45. After adjusting the screw it may be locked against movement by a locknut 61. The normal position of the shoe arm 45 is preferably with its outermost end spaced slightly further away from the hub than its innermost end as shown in Fig. 1.

In the middle of the hub 31, i. e., between each pair of the outer shoes 41, the hub carries two inner or co-operating shoes 65 (see also Fig. 2). These shoes are spaced so that each one is on an opposite side of the hub and slightly in advance of the adjacent outer shoe 41 so that they will be in overlapping and staggered relation. These inner shoes are mounted on short pivot pins 66 carried in pairs of spaced lugs 67 which extend outwardly from the hub 31.

The inner shoes 65 are formed with curved arms 71 provided with transversely spaced side lugs 72 formed with shoulder seats 73 which retain in position a curved plate 74 having a surrounding resilient band 75 similar to the band 51. The plate of each shoe is clamped in position by cap screws 76 which extend through the shoe arm 65 and through the inner run of the band 75 and are threaded into the plate.

Like the outer shoe arms 45, these inner shoe arms 71 are maintained under pressure of compression springs 81 which are interposed between the arms and the hub 31. These springs are seated in recesses 82 formed in the arms and in recesses 83 formed in the hub. An adjusting setscrew 85 threaded into a lug 86 formed on each inner shoe 65 engages against the hub and thus retains the shoes, in a position identical with the outer shoes 41, against the resistance of the springs 81. A locknut 87 is also provided on the screw to hold it in an adjusted position.

Rotation of the hub 31 is in a counter-clockwise direction, as viewed in Figs. 1 and 4, and hence during this rotation an inner shoe 65 first engages the foremost sheet A in the stack and withdraws it therefrom. This is immediately followed by the outer shoes 41 which come into engagement with the sheet and continue its advancement. In engaging the sheet the foremost or lower end of the resilient band 75 of the inner shoe first comes into contact with the sheet and as the hub rotates the remainder of the band revolves into contact with the sheet. This engagement rocks the shoe inwardly against the force of the spring 81. This puts a slight pressure on the sheet and increases the frictional contact between the contacting band and the sheet.

In a similar manner the foremost ends of the bands of the outer shoes 41 first engage the sheet

and as the hub continues to rotate the remainder of the band rolls into place with a dragging action that continues the advancement of the sheet. The sheet thus separated from the stack moves onto the table 12 and as its rear edge leaves the bands of the outer shoes 41 the feed dogs 21 of the conveyors 13 pick up the fed sheet and carry it away as hereinbefore mentioned.

By reference to Fig. 1 it will be seen that the resilient bands of both of the shoes 41, 65 remain in frictional engagement with the sheet until the sheet is well beyond the vertical center line of the feeding device so that the next following sheet may be fed right on the tail of the first sheet. This is brought about by the springs 55, 81 which yield when the shoes come in contact with the sheet as the shoe passes down and under the hub 31. The springs expand and rock the shoes outwardly against the sheet as the shoes travel upwardly with the hub.

With such a construction close feeding of sheets may be obtained. In order to further expedite the feeding of the sheets for high speed operation, the device is arranged to feed two sheets for each revolution of the hub 31. It is for this purpose that there are two oppositely disposed inner shoes 65 and two cooperating outer shoes 41 for each inner shoe.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A sheet feeding device comprising in combination, a rotatable body member, and an elongated feed element pivotally connected intermediate its ends to said body member, spring means disposed between said pivotal connection and one end of said feed element for yieldably urging said element outwardly to feeding position, and means disposed between said body member and said feed element on the opposite side of said pivotal connection for limiting outward movement of said feed element under the urge of said spring means, said feed element being engageable with a sheet in a stack of such sheets for withdrawing the sheet from the stack and for advancing it along a predetermined path of travel when the body member rotates.

2. A sheet feeding device comprising in combination, a rotatable body member, an arcuate feed element pivotally connected intermediate its ends to said body, spring means disposed between said pivotal connection and one end of said feed element for yieldably urging the latter outwardly to feeding position, and means disposed between said body member and said feed element on the opposite side of said pivotal connection for adjustably limiting the extent of outward movement of said feed element under the urge of said spring means, and a resilient instrumentality secured to the feeding end of said element and engageable with a sheet in a stack of such sheets for withdrawing the sheet from the stack and for advancing it along a predetermined path of travel when the body member rotates.

3. A sheet feeding device comprising in combination, a rotatable body member, and a plu-

ality of feed elements pivotally connected to said body member in staggered and overlapping relation, said feed elements progressively pressing against a sheet in a stack of such sheets for completely withdrawing the sheet from the stack and for advancing it along a predetermined path of travel when the body member rotates. 5

4. A sheet feeding device comprising in combination, a rotatable body member, and a plurality of sets of feed elements each pivotally connected intermediate its ends to said body member at spaced intervals therearound, spring means disposed between said pivotal connection and the outer end of each of said feed elements for normally yieldably urging the latter outwardly radially of said rotatable body member into sheet feeding position, and means interposed between said body member and each of said feed elements on the opposite side of said pivotal connection for adjustably limiting the degree of outward movement of said feed element under the urge of said spring means, said sets of feed 10 15 20

elements being successively engageable with successive sheets in a stack of such sheets for rapidly withdrawing them from the stack in spaced and timed order when the body member rotates, said feed elements also advancing said withdrawn sheets along a predetermined path of travel.

5. A sheet feeding device comprising in combination, a rotatable hub, means for rotating said hub, a plurality of arcuate feed arms pivotally connected to said hub, compression springs interposed between said arms and said hub for pressing the arms outwardly and for rendering them yieldable, stop screws on said feed arms for limiting their outward travel, removable arcuate plates secured to said feed arms, and a resilient instrumentality on each of said plates for frictionally engaging against a sheet in a stack of such sheets for withdrawing the sheets individually from the stack.

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