

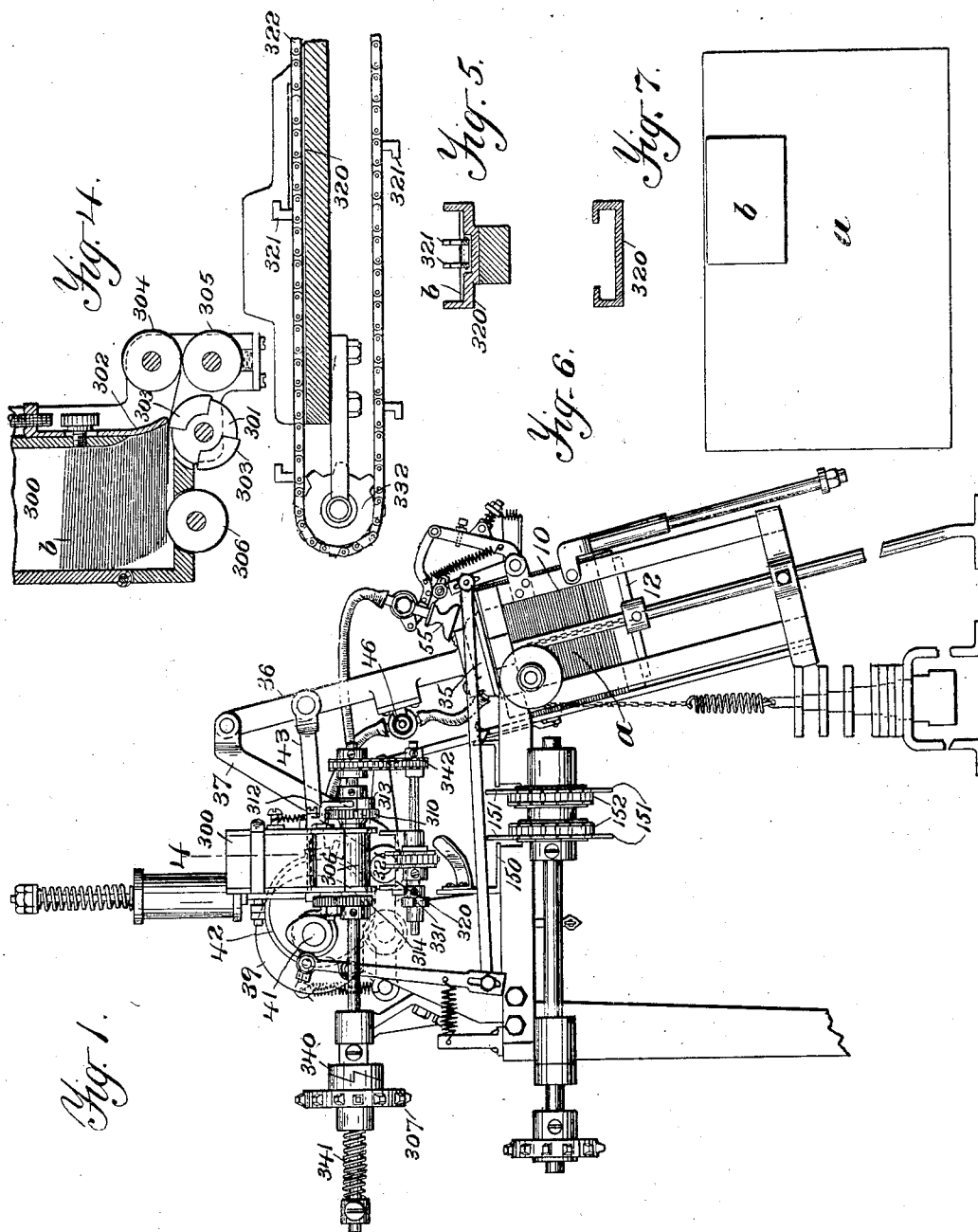
No. 805,099.

PATENTED NOV. 21, 1905.

C. E. SAGE.
SHEET SEPARATING AND FEEDING MECHANISM.

APPLICATION FILED DEC. 16, 1902.

3 SHEETS—SHEET 1.



Attest:
James Kalami
J. F. Kehoe

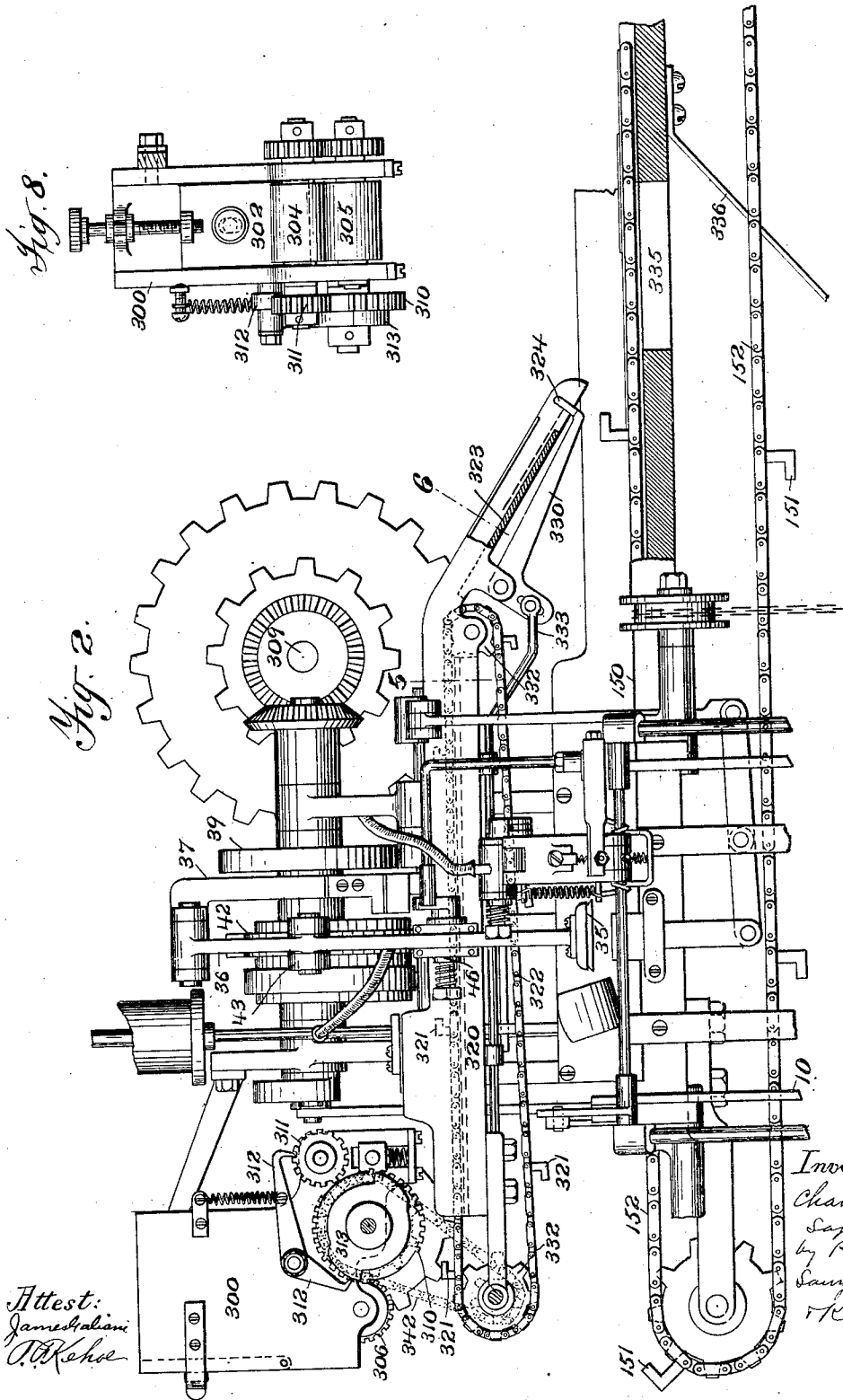
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3 SHEETS—SHEET 2.



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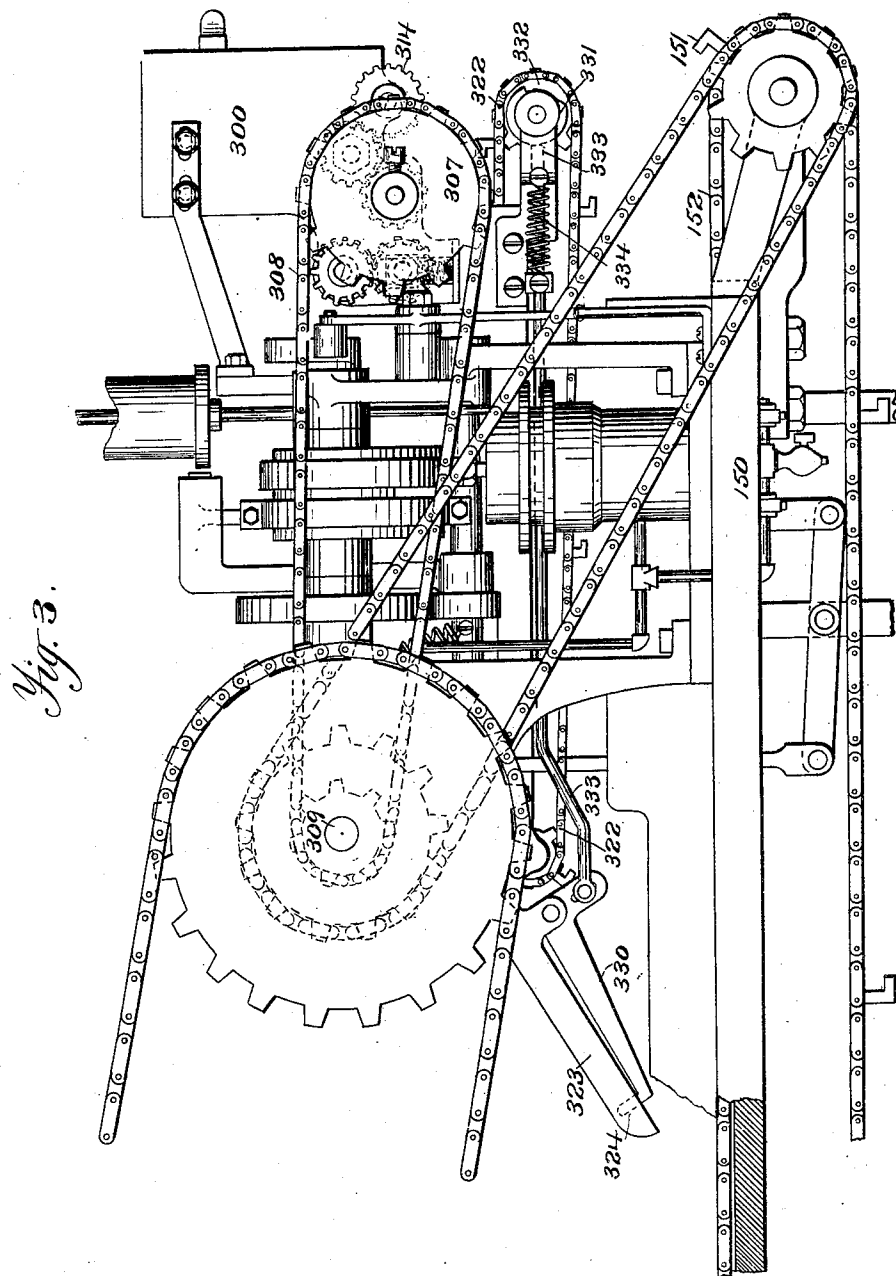
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SHEET SEPARATING AND FEEDING MECHANISM.

APPLICATION FILED DEC. 16, 1902.

3 SHEETS—SHEET 3.



Attest:
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UNITED STATES PATENT OFFICE.

CHARLES E. SAGE, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO THE AMERICAN TOBACCO COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

SHEET SEPARATING AND FEEDING MECHANISM.

No. 805,099.

Specification of Letters Patent.

Patented Nov. 21, 1905.

Application filed December 16, 1902. Serial No. 135,363.

To all whom it may concern:

Be it known that I, CHARLES E. SAGE, a citizen of the United States, residing at Jersey City, county of Hudson, and State of New Jersey, have invented certain new and useful Improvements in Sheet Separating and Feeding Mechanism, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to machines for feeding sheets successively from a pile and for associating sheets as they are advanced successively from a plurality of sources, and the invention aims generally to improve such machines and to provide mechanisms for accomplishing these results which shall be rapid and sure in operation.

A full understanding of the invention can best be given by a detailed description of a preferred construction embodying the various features of the invention, and such a description will now be given in connection with the accompanying drawings, showing such a preferred construction.

In said drawings, Figure 1 is an end elevation of a sheet separating and associating machine constructed in accordance with the invention. Fig. 2 is a front side view thereof. Fig. 3 is a rear view thereof. Fig. 4 is a sectional detail view taken on the line 4 of Fig. 1. Figs. 5 and 6 are sectional detail views taken on the lines 5 and 6, respectively, of Fig. 2. Fig. 7 is a plan view of two sheets as associated by the machine, and Fig. 8 is a front elevation of the magazine and feeding devices shown in Fig. 4.

This invention has been made with the idea of providing a machine for feeding small sheets, such as coupons, from a pile and for associating such sheets or coupons with larger sheets, such as wrapper-sheets. Any suitable mechanism may be provided for advancing the wrapper-sheets separately, but they are preferably, and as shown, advanced successively from the pile by sheet separating and feeding mechanism such as is described in my application, Serial No. 80,789, filed November 1, 1901.

Referring to the drawings, 10 represents a holder for supporting a pile of sheets *a*, which holder has a bottom or support 12, which is moved upward for maintaining the upper

sheets of the pile in position to be engaged by the separating and transferring devices. The sheets are removed singly from the pile by means of a suction-transferring device, comprising a suction-cup 35, carried by an arm 36, which is pivotally connected to a supporting-lever 37, actuated by a cam-disk 39 on a shaft 41 to raise and lower the suction-cup. The arm 36 is also given a forward and rearward swinging movement by means of an eccentric 42 on the shaft 41, acting through a pitman 43, pivoted to the arm 36 and connected to the eccentric-strap. The suction-cup is connected with a vacuum apparatus, and communication between the suction-cup and the vacuum apparatus is controlled by a valve 46, which is operated to establish communication between the suction-cup and vacuum apparatus, and to close such communication and open communication between the suction-cup and atmosphere at proper times to cause the suction-cup to seize and release the sheets. This sheet-separating mechanism also includes an auxiliary suction-cup 55, connected with the vacuum apparatus by a passage controlled by a suitably-operated valve, and which auxiliary suction-cup acts to raise the edge of the sheet slightly before the sheet is seized by the suction-cup 35. The sheets are deposited by the suction-transferrer 35 upon the table or way 150, along which they are advanced by means of fingers 151 on endless chains 152. These parts are or may be as shown and described in my application above referred to and for fuller description of such parts reference is made to said application.

Mounted above the way 150 is a magazine or holder 300, adapted to receive a pile of sheets *b* and from which the bottom sheets are fed successively through an opening beneath the front wall of the holder by means of a feeder 301, mounted in position to coact with the bottom edge of the front wall of the holder to cause but a single sheet to be advanced from the holder at a time. The lower portion of the front wall of the holder is preferably formed by a vertically-adjustable plate 302, and the inner face of the lower portion of the front wall of the holder is preferably inclined outward, as by means of an outward bend of the plate 302.

The feeder 301 is preferably a rotary feeder

and is arranged to advance the sheets only part way from the holder and then to release them and leave them free to be drawn from the holder. For this purpose the rotary feeder is preferably formed by a cylinder having one or more slightly-projecting segmental feeding-faces 303 of a circumferential length less than the length of the sheets to be fed. If formed of a roll of a size to provide sufficient space between the feeding-segments, the feeder may be continuously driven, as shown. For completing the feeding of the sheets from the holder drawing-rolls 304 and 305 are preferably provided mounted in position to receive between them the edge of the sheet which has been advanced by the feeder 301. These rolls are preferably geared to rotate together, and one of said rolls is preferably spring-mounted, as shown. The rotary feeder will thus act to advance the sheet from the holder far enough to enter its forward edge between the rolls 304 and 305 and will then release the sheet and permit it to be entirely withdrawn by the rolls 304 and 305. By having the rotary feeder release the sheet after its forward edge has been advanced by the feeding-rolls the feeding of but a single sheet at a time between the feeding-rolls is insured, since even if the edge of the second sheet should be drawn between the bottom sheet and the lower edge of the plate 302 there will be no further forward movement of the second sheet when the feeding-segment of the rotary feeder has passed the edge of the plate 302; but it will remain stationary until the feeder again begins to coact with the plate 302 for advancing the next sheet in time to the feeding-rolls.

In order to insure an accurate timing of the sheets, the feeding-rolls 304 305 are preferably driven intermittently, having a movement long enough to insure the feeding between the rolls of a sheet and then resting until the edge of the next sheet has been entered between them. To move the bottom sheets toward the plate 302 and insure the forward edge of the bottom sheet entering between the plate 302 and the feeding-segments 303, a feeding-roll 306 is preferably provided in the bottom of the holder.

Any suitable connections may be employed for driving rolls 301, 304, 305, and 306, as described. As shown, the shaft of the roll 301 carries a sprocket-wheel 307 and is driven by means of a sprocket-chain 308 from a sprocket-wheel on a main driving-shaft 309, and the rolls 304 305 are driven intermittently by means of a mutilated gear 310 on the shaft of the roll 301, adapted to engage a pinion 311 on the shaft of the roll 304 and to give the rolls 304 305 two movements for each rotation of the roll 301 and to rotate them at each movement a distance at least sufficient to feed a sheet between them. To insure the stopping of the rolls 304 305 after each feed-

ing movement and to insure their stopping with the pinion 311 in proper position for engagement by the segments of the gear 310, a stop-pawl 312 is mounted in position to engage the teeth of the pinion 311 and actuated by means of a double cam 313, moving with the mutilated gear 310 and against which an arm of the pawl is held by means of a spring, as shown in Fig. 2. It will be seen that by the gearing shown the rolls 304 305 are driven with a greater surface-speed than the feeding-roll 301. The feeding-roll 306 is driven by a pinion on the shaft 301 through an intermediate meshing with a pinion 314 on the shaft of the roll 306.

The sheets may be received from the rolls 304 305 by any suitable conveying or other mechanism. In the machine shown the sheets fed from the rolls 304 305 drop onto a way 320, along which they are advanced by feeding-fingers 321 on a chain 322, the feeding-fingers being spaced and the chain driven at such a speed that the rear edges of successive sheets dropped onto the way will be engaged by the feeding-fingers and the sheets advanced along the way.

For associating the sheets fed from the holder 300 with sheets fed from the holder 10 the way 320 is preferably provided with a downwardly-inclined extension 323, which forms an inclined way into which the sheets are advanced by the feeding-fingers 321 and from which they drop onto sheets being advanced in the way 150. If the sheets *b* were allowed to simply slide down the inclined way 323 and onto the sheets *a* in the way 150, they would have considerable momentum and be apt to slide along too far on the sheets in the way 150. To prevent this, a stop 324 is provided at or near the lower extremity of the inclined way 323 in position to arrest the movement of the sheets near the end of the way and which after arresting a sheet is withdrawn to permit the sheet to slide from the inclined way onto the sheet in the way 150. The sheets will thus fall onto the way 150 with but little momentum, and there will be but slight, if any, sliding of the sheets on the sheets in the way 150.

The stop 324 may be operated by any suitable means; but, as shown, it is carried by a lever 330, which is operated by means of a cam 331 on the shaft of one of the sprocket-wheels 332, about which the chain 322 turns, said cam acting through a connecting-rod 333, one end of which is pivotally connected to an arm of the lever 330 and the other end of which is suitably guided in position to bear against the face of the cam 331 and held in contact therewith by means of a spring 334.

An opening 335 is preferably provided in the way 150 at the point where the sheets from the inclined way fall. A plate 336 is preferably provided to guide into a suitable receptacle the sheets *b*, which will fall through the

opening if no sheet *a* is over the opening when the sheet *b* falls to the way 150.

In order to prevent backward movement of the devices for feeding the sheets *b* from the holder 300 if other parts of the machine shown should be turned back, the sprocket-wheel 307 is preferably loosely mounted on the shaft of the feeding-roll 301 and has a driving connection with said shaft by means of a one-way-operating clutch 340. This clutch may be of any suitable form; but as shown a shouldered collar is provided fast on the shaft and engaged by the shouldered face of the hub of the sprocket-wheel, the sprocket-wheel hub being held in engagement with the fast collar by a spring 341, and the shouldered collar and face of the hub being formed with inclined faces, so that if the sprocket-wheel is moved backward its hub will be moved away from the fast collar against the tension of the spring 341, and no movement will be given to the shaft.

The feed-chain 322 may be driven in any suitable manner. As shown, it is driven from the shaft of the roll 301 by means of a sprocket-chain 342, running over sprocket-wheels on the shaft of the roll 301 and on the shaft of one of the sprocket-wheels 332, by which the chain 322 is carried.

It is to be understood that the invention is not limited to the exact arrangement or construction of parts as shown in the drawings for the purpose of illustrating the invention and to which the foregoing description has mainly been confined, but that various changes and modifications thereof may be made within the claims. It will be understood also that parts of the invention may be employed independently of other parts thereof and in combination with other coacting parts.

What I claim is—

1. The combination of feeding members coacting to advance a sheet edgewise between them part way from a pile and then releasing the sheet to permit it to move freely between them, and feeding means for completing the feeding of the sheet from the pile, substantially as described.

2. The combination of feeding members coacting to advance a sheet edgewise between them part way from a pile and then releasing the sheet to permit it to move freely between them, and feeding-rolls for completing the feeding of the sheet from the pile, substantially as described.

3. The combination of feeding members coacting for advancing bottom sheets successively part way from a pile and then releasing the sheet to permit it to move freely between them, and feeding means intermittently operative for completing the feeding of the sheet from the pile, substantially as described.

4. The combination of feeding members coacting to advance a sheet edgewise between them part way from a pile and then releasing

the sheet to permit it to move freely between them, and feeding-rolls intermittently operative for completing the feeding of the sheet from the pile, substantially as described.

5. The combination of feeding members coacting to advance a sheet edgewise between them part way from a pile and then permitting the sheet to move freely between them, and intermittently-rotating feeding-rolls for completing the feeding of the sheet from the pile, substantially as described.

6. The combination of feeding members coacting to advance a sheet edgewise between them part way from a pile and then releasing the sheet to permit it to move freely between them, and feeding means intermittently operative for completing the feeding of the sheet from the pile, substantially as described.

7. The combination of a stationary member past which sheets are fed from a pile, a feeding member opposed to and coacting with said stationary member to advance the sheet part way between said members and then releasing the sheet to permit it to move freely between said members, and feeding means for completing the feeding of the sheets from the pile, substantially as described.

8. The combination of a stationary member past which sheets are fed from a pile, a feeding member coacting therewith to advance the sheet part way between said members and then releasing the sheet to permit it to move freely between said members, and feeding means intermittently operative for completing the feeding of the sheet from the pile, substantially as described.

9. The combination of a stationary member past which sheets are fed from a pile, a feeding member coacting therewith to advance the sheet part way between said members and then permitting the sheet to move freely between said members, and an intermittently-rotating roll for completing the feeding of the sheet from the pile, substantially as described.

10. The combination of a stationary member past which sheets are fed from a pile, a feeding member opposed to and coacting with said stationary member to advance the sheet part way between said members and then releasing the sheet to permit it to move freely between said members, feeding means for completing the feeding of the sheets from the pile, and means for pushing the sheets edgewise toward said coacting members to enter the edge of the sheet between said members, substantially as described.

11. The combination of a stationary member past which sheets are fed from a pile, a feeding member opposed to and coacting with said stationary member to advance the sheet part way between said members and then releasing the sheet to permit it to move freely between said members, feeding means for completing the feeding of the sheets from the pile, and a feeding-roll for bearing against the face

of the successive sheets to be fed from the pile to move said sheets toward said coacting members and enter the edge of the sheet between said members, substantially as described.

12. The combination of a stationary member past which sheets are fed from a pile, a rotary feeding member opposed to and coacting with said stationary member, said feeding member having a segmental feeding-face of a circumferential length less than the length of the sheets, and means for adjusting the stationary member toward or away from the rotary feeding member, substantially as described.

13. The combination of a stationary member past which sheets are fed from a pile, a rotary feeding member having a segmental feeding-face of a circumferential length less than the length of the sheets, intermittently-rotating feeding-rolls for completing the feeding of the sheets from the pile, and a feeding-roll bearing against the face of the successive sheets to be fed from the pile to advance said sheets to said members, substantially as described.

14. The combination of a stationary member past which sheets are fed from a pile, and a feeding-roll opposed to and coacting with said member having a segmental feeding-face extending slightly above the surface of the roll and of a circumferential length less than the length of the sheets, substantially as described.

15. The combination of a stationary member past which sheets are fed from a pile, said member having an outwardly-inclined inner face, a feeding member opposed to and coacting with said stationary member to advance the sheet part way from the pile and then releasing the sheet to permit it to move freely between said members, and feeding means for completing the feeding of the sheets from the pile, substantially as described.

16. The combination of a holder 300, a rotating feeding-segment 303 mounted opposite to and in position to coact with the bottom edge of one face of the holder to advance successive bottom sheets part way from the holder, feeding-rolls 304 and 305 intermittently operative for completing the feeding of the sheets from the holder, and feeding-roll 306 on which the pile of sheets in the holder rests, substantially as described.

17. The combination of a holder 300 having a vertically-adjustable gage-plate 302, a rotating feeding-segment 303, mounted opposite to and in position to coact with the bottom edge of said plate to advance successive bottom sheets part way from the holder and then release the sheet to permit it to move freely between the gage-plate and the segment, and feeding-rolls 304 and 305 intermittently operative for completing the feeding of the sheets from the holder, substantially as described.

18. The combination of feeding members coacting to advance a sheet between them part way from a pile of sheets and then permitting the sheets to move freely between them, intermittently-acting feeding means for completing the feeding of the sheets from the pile, feeding devices for receiving the sheets from said feeding means and advancing them edgewise, feeding devices for advancing other sheets edgewise, and means for delivering sheets from one of said feeding devices and superposing them on the sheets being advanced by the other of said feeding devices, substantially as described.

19. The combination of feeding members coacting to advance a sheet edgewise between them part way from the pile and then permitting the sheets to move freely between them, feeding means for completing the feeding of the sheets from the pile, feeding devices for receiving the sheets from said feeding means and for advancing them edgewise, feeding devices below said feeding devices for advancing other sheets edgewise, an inclined way to which the sheets are delivered by the first-said feeding devices and from which they fall onto sheets being advanced by the second-said feeding devices, and means for arresting the movement of said sheets in said inclined way and for releasing said sheets to permit them to move from said way with a speed less than if they had moved continuously through and from said way, substantially as described.

20. The combination of feeding members coacting to advance a sheet edgewise between them part way from the pile and then permitting the sheets to move freely between them, feeding means for completing the feeding of the sheets from the pile, feeding devices for receiving the sheets from said feeding means and for advancing them edgewise, feeding devices below said feeding devices for advancing other sheets edgewise, and an inclined way to which the sheets are delivered by the first-said feeding devices and from which they fall onto sheets being advanced by the second-said feeding devices, substantially as described.

21. The combination of means for advancing successive sheets edgewise, means below said means for advancing other sheets edgewise, an inclined way to which the sheets are delivered by the first-said feeding means and from which they fall onto sheets being advanced by the second-said feeding means, and means for causing the sheets to move from said way with a speed less than they would have in the absence of such means, substantially as described.

22. The combination of means for advancing successive sheets edgewise, means below said means for advancing other sheets edgewise, an inclined way to which sheets are delivered by the first-said feeding means and from which they fall onto sheets being advanced by the second-said feeding means, a

stop for arresting the movement of the sheets in said way, and means for retracting said stop, substantially as described.

23. The combination of feeding means for
5 advancing successive sheets edgewise, means for supplying sheets to said feeding means, feeding means below said feeding means for
10 advancing successive sheets edgewise, means for supplying sheets to the second-said feeding means, an inclined way to which the sheets
15 are delivered by the first-said feeding means and from which they fall onto sheets being advanced by the second-said feeding means, and means for causing the sheets to move from
20 said way with a speed less than they would have in the absence of such means, substantially as described.

24. The combination of a way 320, feeders for advancing sheets along said way, a second
20 way 150, feeders for advancing sheets along said way, an inclined way 323 to which the sheets are advanced from the way 320, and a reciprocating stop 324 near the lower end of the way 323, substantially as described.

25 25. The combination of a way 320, feeders for advancing sheets along said way, a second way 150, feeders for advancing sheets along
the way 150, an inclined way 323 to which the

sheets are advanced from the way 320, and an opening in the way 150 at the point where the
30 sheets from the inclined way fall, substantially as described.

26. The combination of a stationary member past which sheets are fed from a pile, a
rotating feeding-segment 303 for coacting 35 with said member to advance sheets part way from the pile, feeding-rolls 304, 305 for completing the feeding of the sheets from the pile, means for driving said rolls intermittently in-
40 cluding a mutilated gear and means for positively stopping the rotation of said rolls in position for the next meshing of the mutilated gear, substantially as described.

27. The combination of the feeding-rolls 304, 305, a mutilated gear for driving said
45 rolls intermittently, stop-pawl 312, and cam 313 moving in time with said mutilated gear for controlling the movement of said pawl, substantially as described.

In testimony whereof I have hereunto set
50 my hand in the presence of two subscribing witnesses.

CHARLES E. SAGE.

Witnesses:

A. L. KENT,

W. H. KENNEDY.