A. NOVICK.

SHEET FEEDING MECHANISM.

APPLICATION FILED APR. 24, 1913.

1,134,550.

Patented Apr. 6, 1915.

3 SHEETS—SHEET 1.

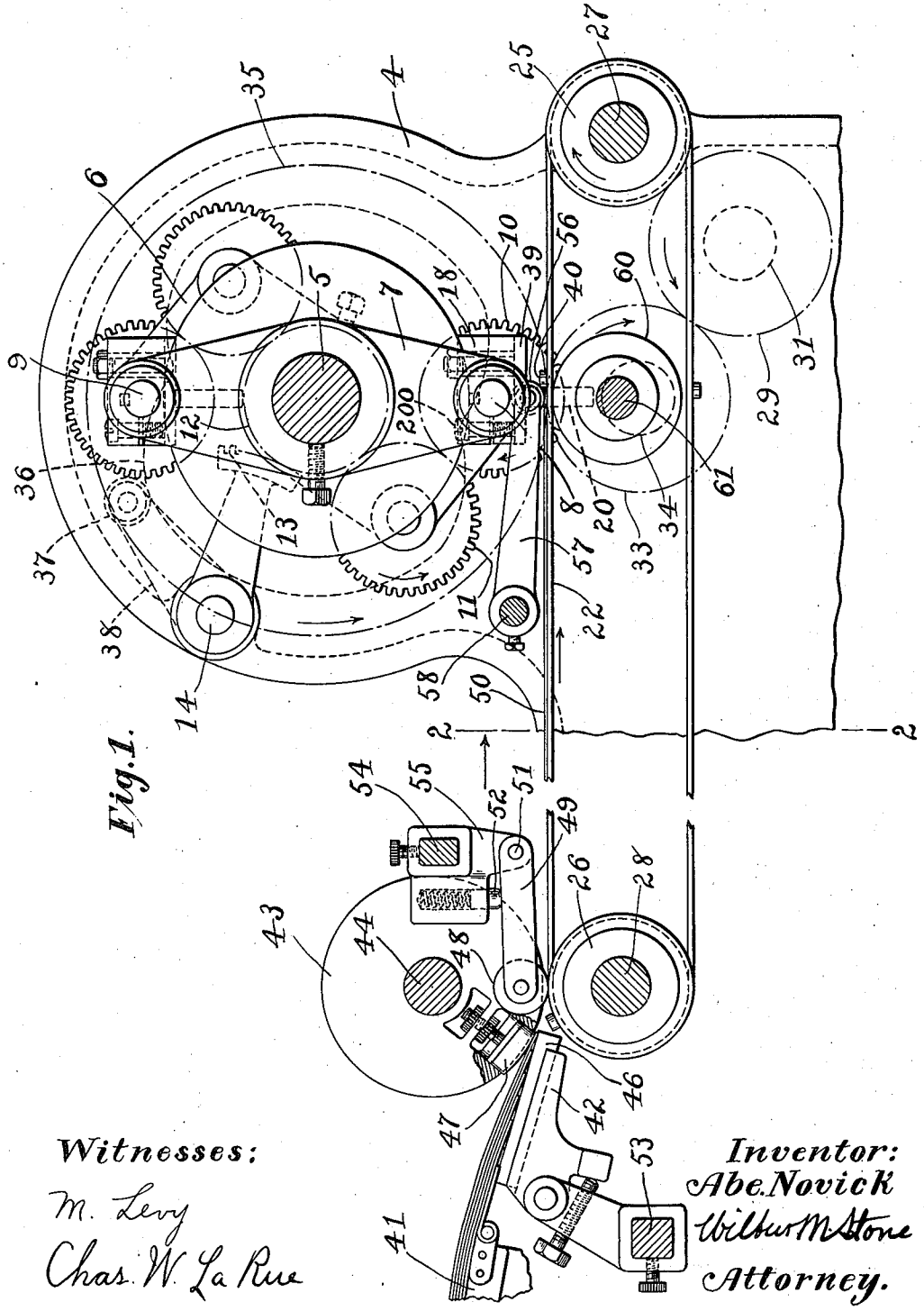

Fig. 1.

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3 SHEETS—SHEET 2.

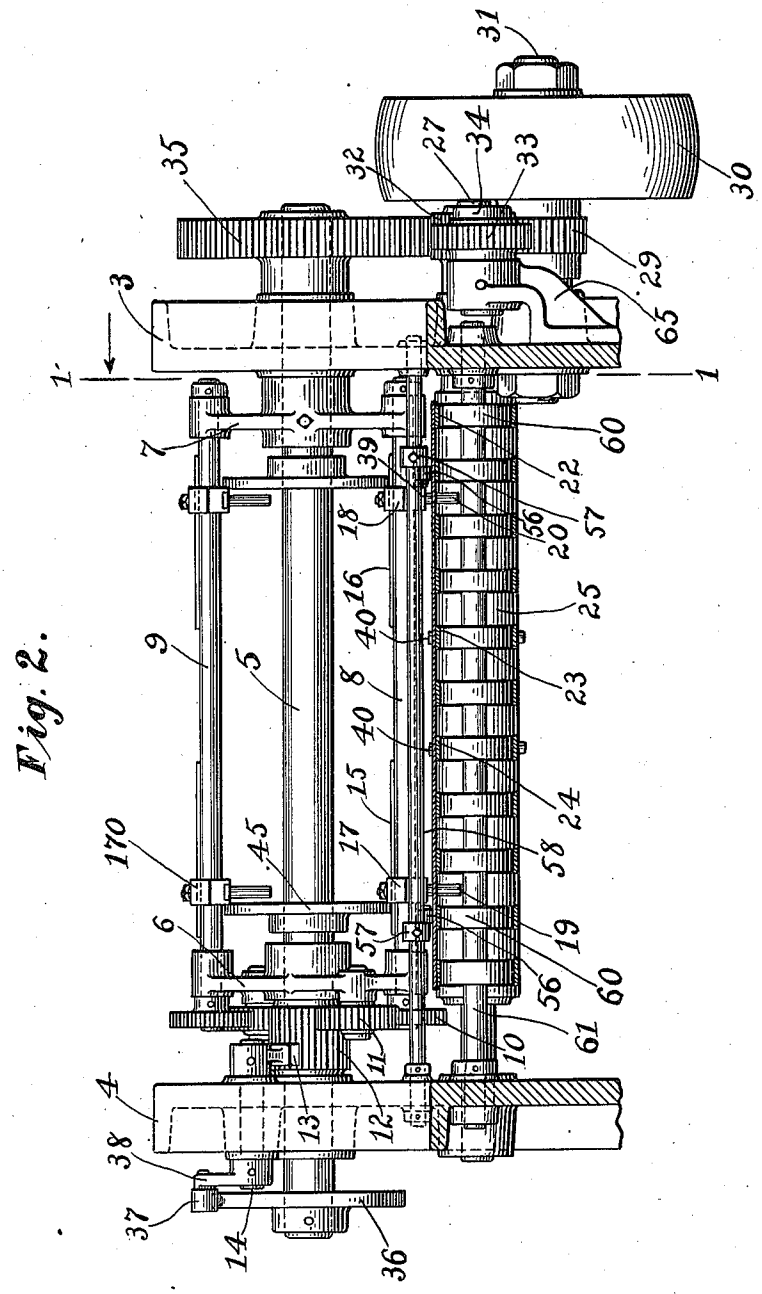

Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 4.

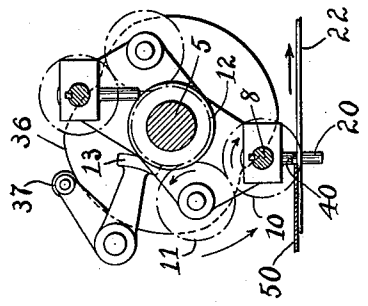


Fig. 6.

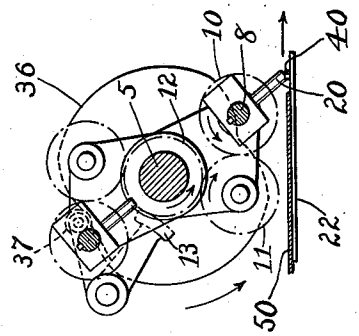


Fig. 3.

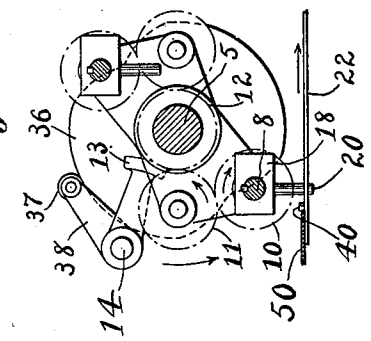
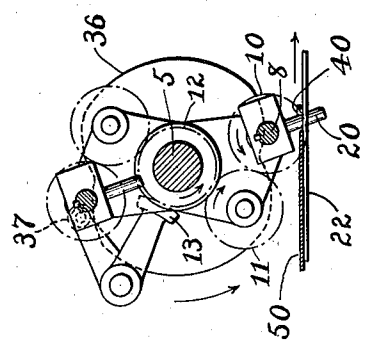


Fig. 5.



Witnesses:

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UNITED STATES PATENT OFFICE.

ABRAHAM NOVICK, OF NEW YORK, N. Y., ASSIGNOR TO F. L. SCHMIDT COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SHEET-FEEDING MECHANISM.

1,134,550. Specification of Letters Patent. Patented Apr. 6, 1915.

Application filed April 24, 1913. Serial No. 763,250.

To all whom it may concern:

Be it known that I, ABRAHAM NOVICK, a citizen of the United States, and a resident of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Sheet-Feeding Mechanism, of which the following is a specification.

This invention relates to sheet feeding mechanism and is directed particularly to means for straightening and timing sheets as they are successively advanced by my improved device.

The object of my improvements is to provide means of the class specified, simple in construction, reliable in operation at high speed and adjustable to a variety of sizes of sheets.

In the drawings accompanying this specification I have illustrated the preferred form of my improvements as particularly adapted for feeding sheets such as of paper. Therein Figure 1 is a side elevation partly in section on line 1—1 of Fig. 2. Fig. 2 is a rear elevation partly in section on line 2—2 of Fig. 1. Figs. 3 to 6 inclusive are diagrammatic side elevations illustrating the operation of my improved device. Figs. 2 to 6 inclusive are to one scale while Fig. 1 is to a scale about double that of the other figures.

Before describing the invention in detail I desire to have it understood that the invention is not limited to the particular construction and arrangement of parts which I have illustrated and shall hereinafter describe, and that various changes may be made in the mechanism shown without departing from the spirit or scope of the invention, and that the phraseology which I employ is for the purpose of description and not of limitation.

My improved machine may be conveniently supported on the usual side frames 3, 4. Main shaft 5 is supported for rotation in the usual bearings in said side frames, and has fixed thereto spiders 6, 7 in which are rotatably mounted one or more planetary shafts. In the present instance I have chosen to employ two such shafts 8, 9 arranged diametrally opposite one another. As said planetary shafts and their appurtenances are alike I will confine my description to one only. Shaft 8 has fixed to one outboard end gear 10 adapted to be driven, through intermediate gear 11 pivotally mounted on spider 6, from gear 12, equal in diameter to gear 10, loosely mounted on main shaft 5 between frame 4 and spider 6. Said gear 12 is of wider face than gears 10 and 11 so that it may be engaged by rocking or modifying gear 13 without interfering with the revolution of planetary gear 10 as frame 6 rotates with shaft 5. Modifying gear 13 is fixed to short shaft 14 having a bearing in frame 4. Mounted on shaft 8 and on feathers 15, 16 thereof are dogs 17, 18 having pins or sheet engaging members 19, 20 respectively. It will be seen that said dogs are thus permitted movement lengthwise said shaft but not rotatively thereof. Set screws, as 200, are provided for holding said dogs in any chosen position lengthwise said shaft. Said sheet engaging pins, as 20 are fixed to slides as 39 for adjustment relatively to their dogs as 18. For synchronously adjusting in equal amounts dogs as 17 and 170 for instance, lengthwise opposite planetary shafts 8 and 9 respectively, I preferably employ disk 45 slidably mounted on main shaft 5. Said disk is of sufficient diameter to engage at one time both said dogs. Said dogs as 18 carrying pins, as 20, will thus be seen to be mounted for orbital movement about the fixed axis of shaft 5.

Below the planetary mechanism just described and intersecting the paths respectively of pins as 19, 20 is sheet advancing means comprising one or more feed belts as 22, 23, 24. These belts may be conveniently supported on the usual pulleys 25, 26 whose shafts 27, 28 respectively are journaled in frames 3, 4. Shaft 27 and main shaft 5 may be driven through common means such as gear 29 fixed to the hub of pulley 30 on stud 31 fixed to frame 3. Gear 29 drives gear 32, fixed to shaft 27 and through intermediate gear 33 on stud 34 in bracket 65 of frame 3 drives gear 35 fixed to main shaft 5.

For successively delivering sheets to belts as 22, 23 I preferably employ means comprising table 41 having adjustable delivery shelf 42. Above the delivery end of said shelf I rotatably mount wheel 43 fixed to shaft 44. Shaft 44 may be driven from shaft 28 by the usual gears not shown to cause the periphery of wheel 43 and belts as

22, 23 to advance at the same surface speed. Shelf 42 is provided with rubber shoe 46 and wheel 43 is provided with a similar shoe 47. On either or both sides of wheel 43 I provide friction rolls as 48 for coaction with belts as 22 to grip the sheets as they are delivered one at a time from table 41. Said roll 48 may be mounted in the free end of arm 49 pivoted at 51 in bracket 55. Spring urged plunger 52 is adapted to press arm 49 downwardly to cause roll 48 to coact with its respective belt therebelow. Shelf 42 may be adjusted transversely of the machine on bar 53 and bracket 55 of roll 48 may be similarly adjusted on bar 54.

As the pitch line of gear 35 is tangent to the feed belts as 22 and as gear 32 has a pitch diameter substantially equal to the diameter of pulley 25 it will be seen that pin 20 in the position of Fig. 1 travels at the same speed as the belts, as 22. It will further be understood, that as gears 10 and 12 have the same diameter, pin 20 in its orbital revolution about shaft 5 will maintain a uniform angular relation to the belts as 22, as long as gear 12 is held stationary. As illustrated this angular relation is normal to said belts. It will further appear that, gear 12 being stationary, pin 20 in its anti-clockwise orbital movement, normal to the plane of the belts as 22, while approaching the position of Fig. 1 moves slower than those belts but at an increasing ratio until it reaches said position of Fig. 1, when it will have attained the speed of those belts. Then as it moves onward in anti-clockwise direction from the position of Fig. 1 it will again move slower than those belts but at a decreasing ratio. Now the slower movement at an increasing ratio is desirable for the purpose specified as that pin travels to the position of Fig. 1, but that slower movement at a decreasing ratio after leaving the position of Fig. 1 is undesirable. I therefore provide the following means for causing pin 20 to increase its speed of departure from the position of Fig. 1 by causing shaft 8 to rotate in anti-clockwise direction relatively to its carrying spiders 6, 7, whereby said pins as 20 are swung forwardly out of their previously normal relation to the plane of the belts, as 22: Fixed to main shaft 5, outboard frame 4 is cam 36 for engagement with roll 37 of rock-arm 38 fixed to shaft 14 of modifying gear 13. Cam 36 is of such profile and so positioned as to permit arm 38 to move in clockwise direction directly after said cam leaves in anti-clockwise rotation the position of Fig. 1, whereby normally stationary gear 12 is rotated in anti-clockwise direction and through intermediate gear 11, gear 10 is also rotated in anti-clockwise direction.

The usual spring not shown may be provided for urging roll 37 to engagement with cam 36 but such spring is unnecessary as the frictional resistance of the mechanism is sufficient for such purpose.

For maintaining the blank, as 50, in corrected position relatively to belts as 22, 23 after said sheet has been retarded and straightened by pins 19, 20 and for coaction with said belts for advancing said sheet, I provide one or more rolls as 56. Said rolls 56 may be mounted in the free ends of arms as 57 adjustable transversely of the machine on rod 58 extending from side frame 3 to side frame 4. Said rolls as 56 are illustrated as urged by gravity to their work. For supporting belts as 22, below rolls as 56 I provide pulleys as 60 fixed to shaft 61 mounted for free rotation in side frames 3, 4.

For convenience of explanation I have provided belts 23, 24 with gages as 40 against which to locate roughly the sheets one after another. Referring now to Fig. 3 roll 37 will be seen to be riding on a concentric portion of cam 36 whereby gear 12 is held against rotation. Pin 20 is therefore moving forwardly and downwardly relatively to the belts as 22, its forward movement being slower than that of said belts, as already described. Also sheet 50 with its leading end near or against gage 40 is moved forwardly with said belts. Upon reaching the position of Fig. 4 said sheet will overtake pin 20 and be engaged thereby and then retarded relatively to said belts until the mechanism reaches the position of Fig. 1 when the belts and pins will be traveling at the same speed and said sheet 50 will have come to rest in corrected and prescribed position relatively to said belts. It will be observed that, in its passage from the position of Fig. 4 to that of Fig. 1, the pins as 20 move downwardly relatively to said belts whereby the leading edge of sheet 50 in contact with said pins will be urged downwardly against said belts by the frictional engagement of those pins therewith. Immediately succeeding the position of Fig. 1 roll 37 will be permitted by cam 36 to move inwardly toward shaft 5 whereby shaft 8 will be either held stationary or rotated in anti-clockwise direction, moving pins as 20 forwardly, Fig. 5, out of engagement with sheet 50 and thereafter, roll 37 continuing its inward movement said pins will be swung even farther away from said sheet, Fig. 6, and thence entirely out of the path of said sheet. Roll 37 will then climb to a higher part of cam 36 and pin 20 will resume its position of normality to the belts.

I claim:

1. A device of the class specified including in combination, a feed belt, a main shaft mounted for rotation on a fixed axis, a planetary shaft carried by said main shaft, a gear mounted coaxially with said main shaft and normally stationary, a gear fixed

to said planetary shaft, an intermediate gear for driving said planetary shaft gear from the first mentioned gear, sheet engaging means carried by said planetary shaft, means for rotating at predetermined times said normally stationary gear, means for moving said feed belt, and means for rotating said main shaft.

2. A device of the class specified including in combination, a feed belt, a main shaft mounted for rotation on a fixed axis, a planetary shaft carried by said main shaft, a gear mounted coaxially with said main shaft and normally stationary, a gear fixed to said planetary shaft, an intermediate gear for driving said planetary shaft gear from the first mentioned gear, sheet engaging means carried by said planetary shaft, a modifying gear rotatably mounted on a fixed axis for engagement with said first mentioned gear, means for rotatably moving at predetermined times said modifying gear, means for moving said feed belt, and means for rotating said main shaft.

3. A device of the class specified including in combination, a feed belt, a main shaft mounted for rotation on a fixed axis, a plurality of planetary shafts carried by said main shaft, a gear mounted coaxially with said main shaft and normally stationary, a gear fixed to each planetary shaft, intermediate gears for driving said planetary shaft gears respectively from the first mentioned gear, sheet engaging means carried by each of said planetary shafts, a modifying gear rotatably mounted on a fixed axis for engagement with said first mentioned gear, means for rotatably moving at predetermined times said modifying gear, means for moving said feed belt, and means for rotating said main shaft.

4. A device of the class specified including in combination, a feed belt, a main shaft mounted for rotation on a fixed axis, a plurality of planetary shafts carried by said main shaft, a gear mounted coaxially with said main shaft and normally stationary, a gear fixed to each planetary shaft, intermediate gears for driving said planetary shaft gears respectively from the first mentioned gear, sheet engaging means carried by each of said planetary shafts, means for synchronously adjusting in equal amounts the sheet engaging means lengthwise said plurality of planetary shafts, a modifying gear rotatably mounted on a fixed axis for engagement with said first mentioned gear, means for rotatably moving at predetermined times said modifying gear, means for moving said feed belt, and means for rotating said main shaft.

5. A device of the class specified including in combination, a fed belt, a main shaft mounted for rotation on a fixed axis, a plurality of planetary shafts carried by said main shaft, a gear mounted coaxially with said main shaft and normally stationary, a gear fixed to each planetary shaft, intermediate gears for driving said planetary shaft gears respectively from the first mentioned gear, sheet engaging means carried by each of said planetary shafts, means slidably mounted on said main shaft for synchronously adjusting in equal amounts the sheet engaging means lengthwise said plurality of planetary shafts, a modifying gear rotatably mounted on a fixed axis for engagement with said first mentioned gear, means for rotatably moving at predetermined times said modifying gear, means for moving said feed belt, and means for rotating said main shaft.

6. A device of the class specified including in combination, a sheet engaging member comprising a pin carried by a dog, said dog being mounted and actuated for rotary and orbital movement, means for adjusting said dog in parallelism with its axis of orbital movement, means for adjusting said pin relatively to said dog, and means for maintaining said sheet engaging member in predetermined relation to a given plane.

Signed at New York, in the county of New York and State of New York, this 22nd day of April, 1913, before two subscribing witnesses.

ABE NOVICK.

Witnesses:
ELIOT L. WILLIAMS,
WESLEY H. TAYLOR.