No. 694,634. Patented Mar. 4, 1902.

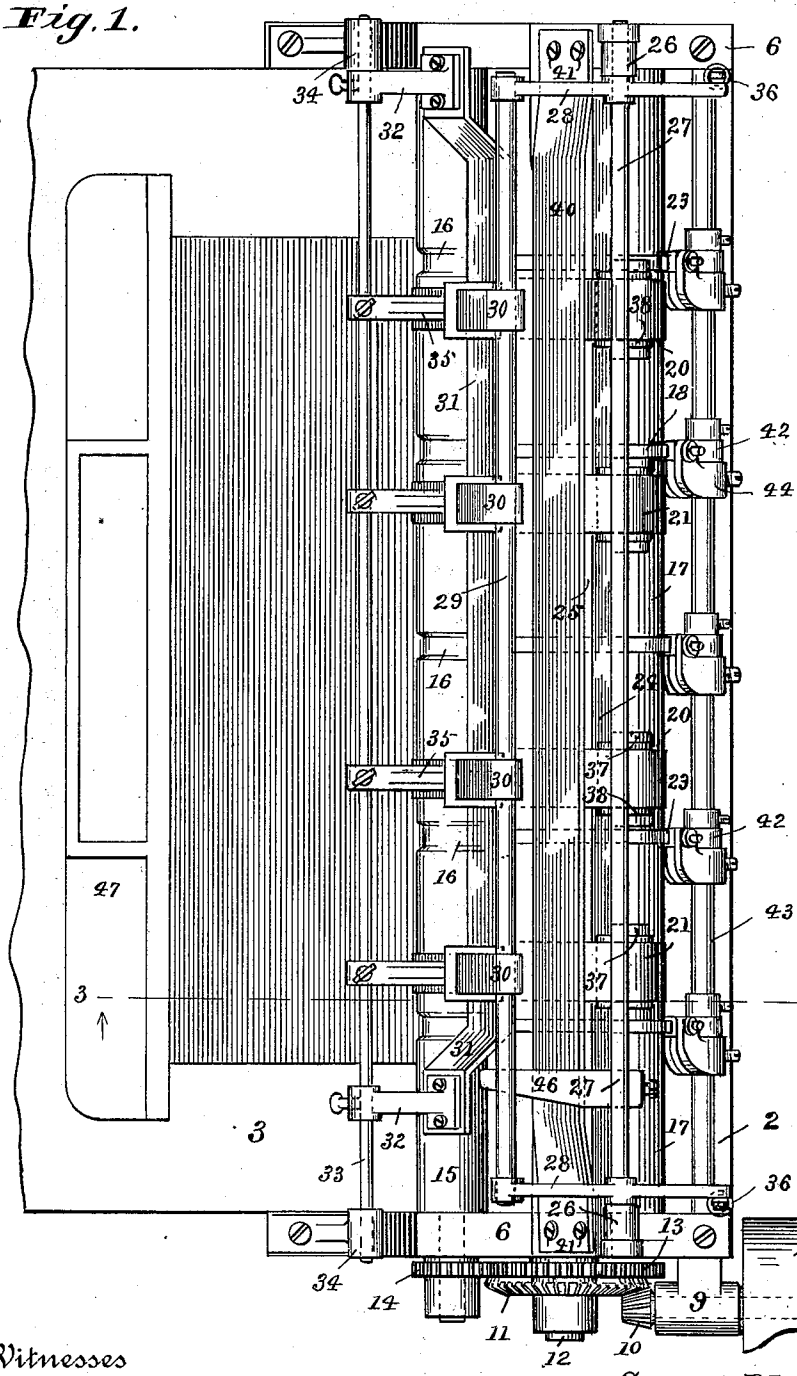
G. M. GRISWOLD.

PAPER BOX STACKER AND DRIER.

(Application filed May 11, 1901.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



Witnesses

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Fig. 2.

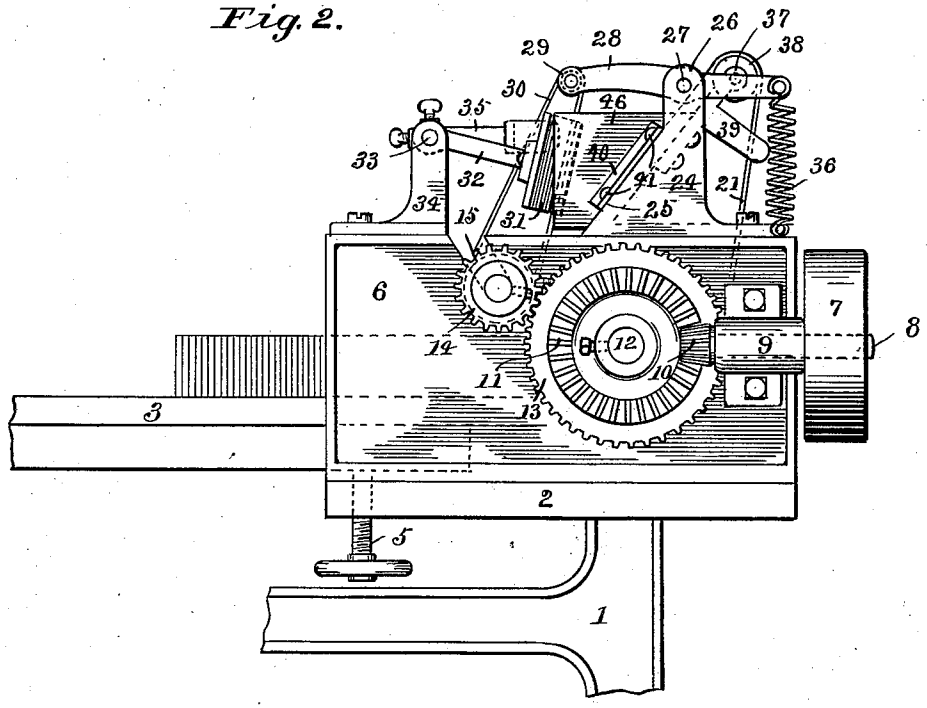
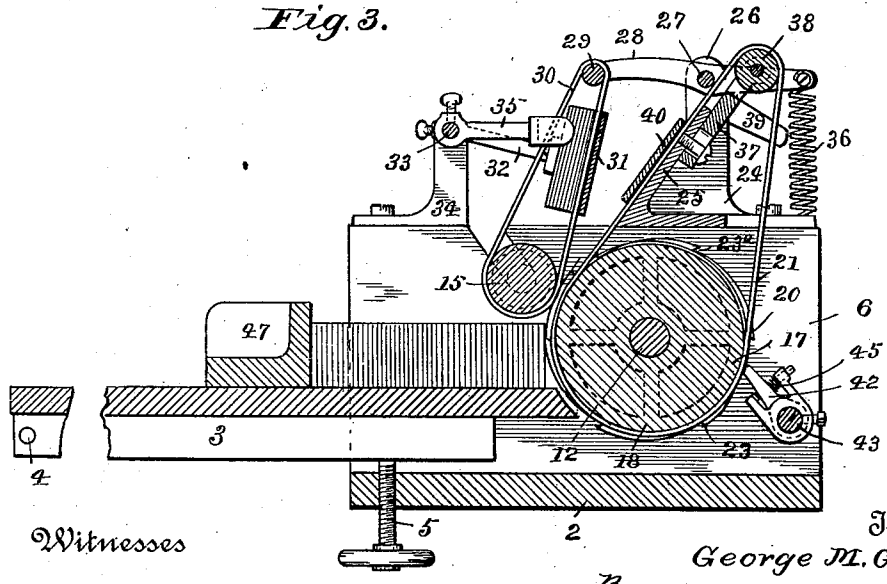


Fig. 3.



Witnesses

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Fig. 4.

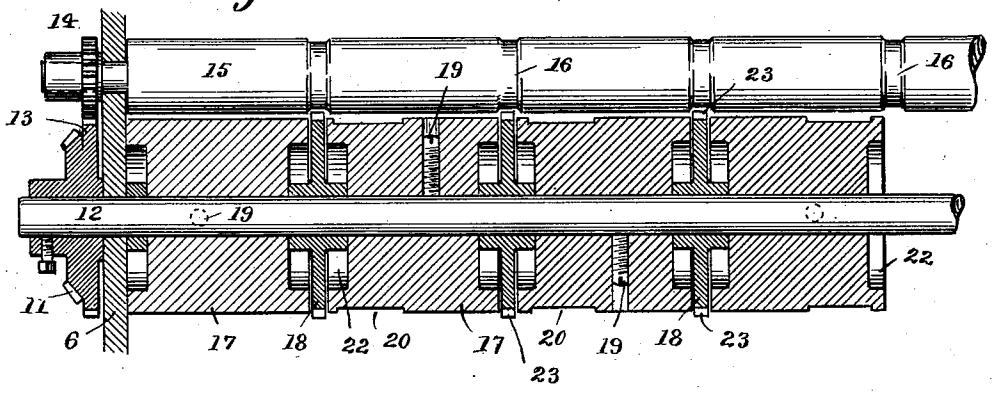


Fig. 6.

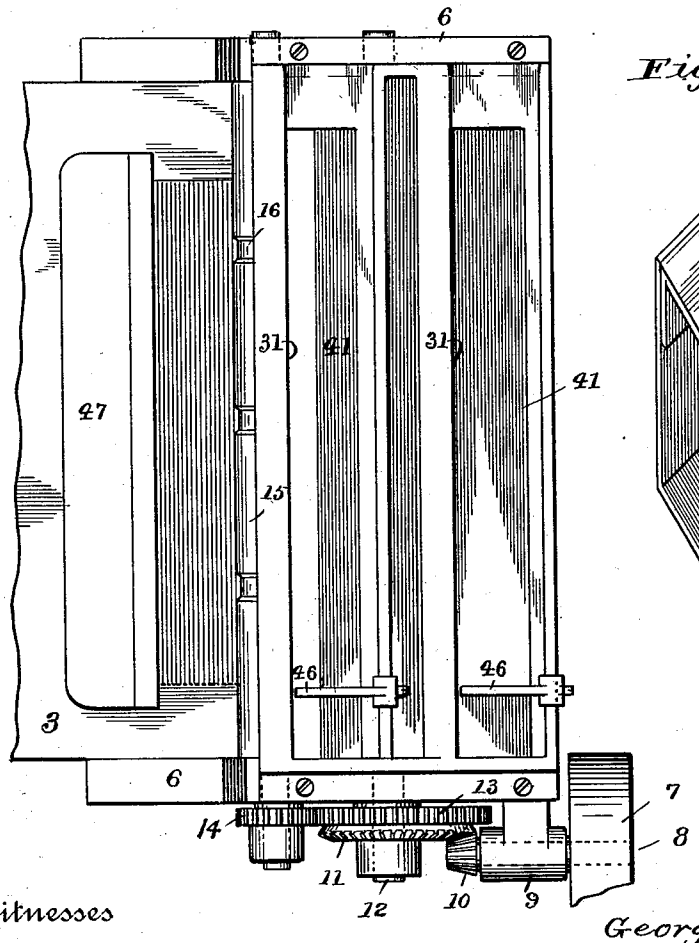
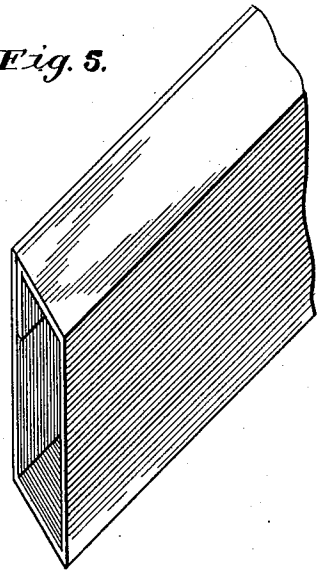


Fig. 5.



Witnesses

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(No Model.) 4 Sheets—Sheet 4.

Fig. 7.

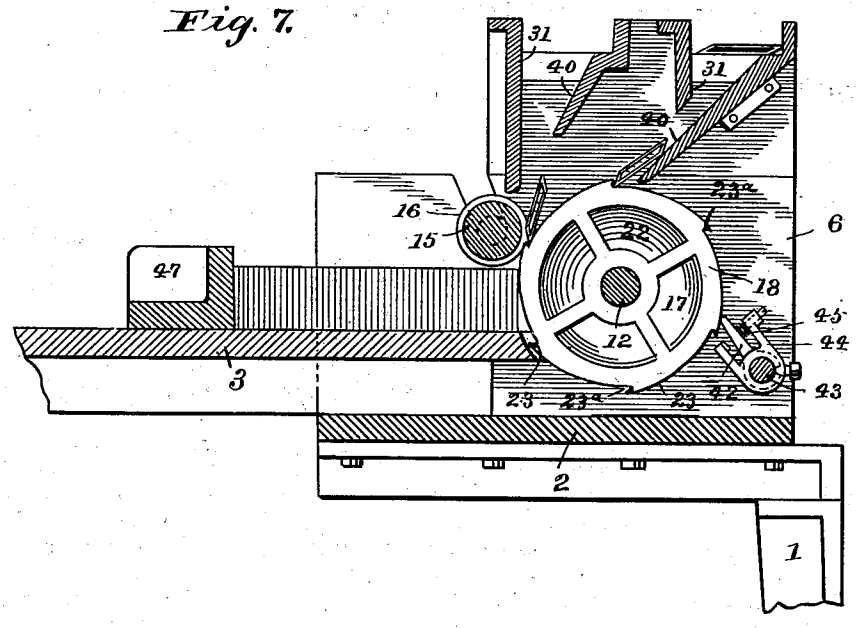
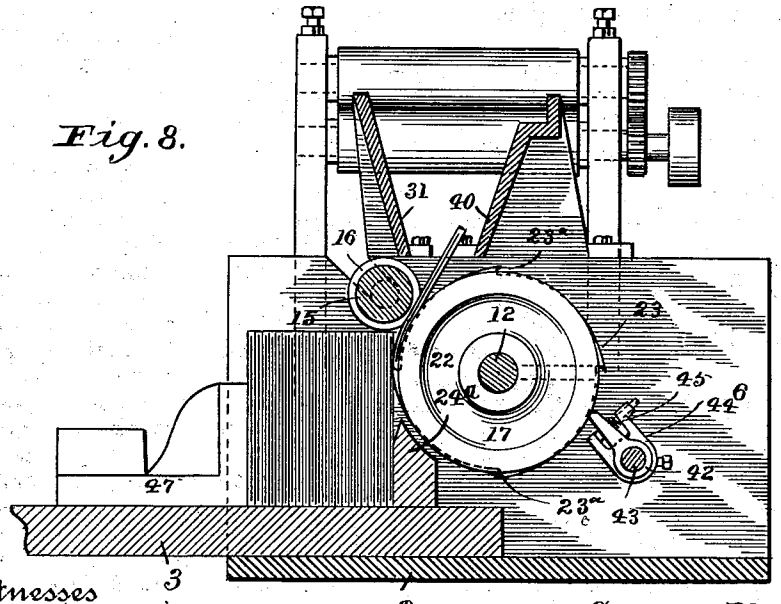


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE M. GRISWOLD, OF NEW HAVEN, CONNECTICUT.

PAPER-BOX STACKER AND DRIER.

SPECIFICATION forming part of Letters Patent No. 694,634, dated March 4, 1902.

Application filed May 11, 1901. Serial No. 59,823. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. GRISWOLD, a citizen of the United States, and a resident of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Paper-Box Stackers and Driers, of which the following is a specification.

My invention relates to new and useful improvements in paper-box machinery, and especially to that class known as "stackers" or "driers," the same being designed to receive various styles of square and rectangular boxes or tubes of boxes as they are delivered from their respective styles of box-forming machines and to successively close and stack them one against the other in a uniform line and in a manner to retain the folded and glued edges together to insure their drying.

Heretofore the more complete types of square-paper-box machinery have been provided with belt conveyers or other complicated and bulky drying mechanism which retains the glued edges of the boxes in their folded position while drying, so as to prevent them from opening when finally discharged from the machine. The drying apparatuses, and particularly those employing conveyers, have been of an objectionably large construction, consuming a great amount of floor-space in the shops where they are employed, and, furthermore, do not perform the work for which they are intended as perfectly as desired.

It is therefore the object of my invention to provide a machine, which shall be of a compact, simple and durable construction adapted to be set up adjacent to various styles of box-forming machinery, in a manner to receive the successive boxes as they are delivered from such machinery in a folded and glued state; to retain the glued edges of the said boxes in their relative position; to produce a machine which does not have to be operatively connected or timed with the box-machine with which it is to operate; and further to provide a device for stacking the boxes one against the other in a compressed form so as to prevent any opening of the seams and to insure the proper drying of said seams. Finally, to do this sufficiently rapid to receive the entire product of any of the modern types of machines, including those known as the double-tube machines employed in the production of cigarette-boxes.

My invention is equally well adapted to compress and stack tubes as they are received from any of the practical styles of refolders—that is, machines which refold tubes to insure the easy access thereto of the drawer or inner member.

With the above objects in view my invention resides and consists in the novel construction and combination of parts shown upon the accompanying four sheets of drawings, forming a part of this specification, and upon which similar characters of reference denote like or corresponding parts throughout the several figures, and of which—

Figure 1 shows a plan view complete of a machine embodying my invention. Fig. 2 is an end view as seen from the bottom of Sheet 1, the legs being broken away. Fig. 3 is a transverse cross-section taken on line 3 3 of Fig. 1, illustrating the feed-rolls, belts, and trough operating in conjunction therewith. Fig. 4 is a detail horizontal sectional plan view through the two sets of feed-rolls, as will be later more fully described. Fig. 5 shows a perspective view of an end of a tubular member of a box such as is refolded by the refolding-machines referred to and such as my machine is designed to stack. Figs. 6 and 7 show a plan view and transverse cross-section of a modified form of my invention, the same being a double stacker adapted for use in connection with a double-tube machine and is designed to stack practically double the number of boxes as the previously-described construction. Fig. 8 is a transverse cross-section of another form of my invention, the same being adapted for use in stacking larger boxes, such as one-pound starch-boxes, and in which the employment of belts is dispensed with.

Referring in detail to the characters of reference marked upon the drawings, 1 indicates a suitable frame upon which the main bed 2 of my machine is mounted; 3, the table upon which the boxes are successively stacked one against the other and retained until dried. The outer edge of this table may be pivoted, as at 4, and the inner portion supported on

adjustable screws 5, located adjacent to either side of the base-plate 2, before mentioned. The purpose of this adjustable construction is to permit the table to be raised and lowered to or from the top roll 15 in a manner to accommodate different widths of boxes, as will be apparent.

Upon either end of the base-plate 2 are mounted vertically-disposed plates 6 6, which are substantially alike in construction and upon which all of the operative parts of my mechanism are mounted. These plates may be located at any desired distance apart and the intervening train of mechanism lengthened or shortened to better accommodate different lengths of boxes, as will later be more apparent.

Power is applied to the machine through the medium of the belt-wheel 7, mounted upon the short shaft 8, journaled on the bearing 9, secured to the plate 6, and having a beveled pinion 10 upon its opposite end, as clearly appears in Figs. 1 and 2. This beveled pinion meshes with the bevel-gear 11, mounted upon a shaft 12, extending longitudinally of the machine and journaled in the two end plates 6, before mentioned. The bevel-gear 11 has secured thereto a plain gear 13, which meshes with a smaller gear 14, mounted upon the reduced end of the roll 15, arranged parallel with the shaft 12, before mentioned, and likewise journaled in the end plates 6. These rolls are provided with a series of grooves 16 at equal distances apart, the purpose of which will be later described.

Referring to Figs. 3 and 4, it will be seen that upon the shaft 12 is mounted a series of pulleys and disks 17 and 18, respectively, which comprise the main features of my feeding device. These pulleys are substantially alike in construction and are provided with a set-screw 19, by means of which they are secured to the shaft 12, and are further provided with a suitable annular recess 20 to accommodate one of the series of feeding-belts, which will again be referred to. The opposite ends of said pulley are further recessed, as at 22, to accommodate the hubs on the disks 18, before mentioned. These pulleys are, as before mentioned, firmly secured to the shaft 12 and are spaced at an equal distance apart to permit the free rotary movement of the disks 19 therebetween, which latter in practice are preferably formed of aluminium and as light as possible to insure their free movement. This series of pulleys when assembled as shown form the main feeding-roll, the length of which is determined only by the size of machine desired. Said disks 18 are provided with a series of cams 23, having notches 23^a on one side. There may be any desired number of these cams, six being shown in the main figure, while but four are shown in Fig. 8. Said cams project out slightly beyond the main body of the roll and in practice freely pass through the grooves 16 in the coacting roll 15. The notches of said cams serve to form a pocket, into which the lower edge of the box rests to insure the proper alinement thereof and to retain and guide it against the stack. As the boxes are moved down the disks are automatically turned thereby, and their projecting cam-surface serves to shove said stack outward, making room for the successive boxes as they are delivered, and the notches 23^a simultaneously guide the lower edge of the box on between the stack and roll or vertically-disposed stripper 24^a. (See Fig. 8.)

Upon the end plates 6 6 is secured a casting 24, having a longitudinal inclined surface 25 and a vertically-disposed post 26 at either end, in which a rod 27 is mounted. Adjacent to the bearings of this rod is pivoted an arm 28, the forward end of which has journaled therein a roller 29, serving as an idler, over which a series of belts 30 travel. These belts also connect with and are driven by the roll 15, before mentioned, adjacent to the inner operative faces of this series of belts. A guide-plate 31 is provided and forms one side of the receiving-trough. Said trough serves to deflect the boxes as they are received down between the belts and rolls. This guide-plate extends through the length of the machine, its opposite ends being secured to arms 32, attached to a rod 33, the latter being mounted in post 34 at each end of said rod and secured to end plates 6. Upon this rod 33 I also mount a series of arms 35, having suitably-divided free ends to straddle the belt 30, before mentioned, and serve as a guide for the same to retain them in their proper relative positions. The tension for these belts is secured by springs 36 between the rear ends of the arms 28 and the plate 6, before mentioned.

To the inclined portion of the castings 24 (see Figs. 1 and 3) I attach a series of adjustable brackets 37, with rolls 38 mounted in their upper ends. The series of belts before mentioned as operating in the grooves 20 of the pulleys 17 travel over the above-mentioned rolls and serve to operate, in connection with the belt 30, to feed the boxes down between the rolls and into their respective positions. The slack of this belt may be taken up from time to time by means of the adjustable construction of the bracket 37, before mentioned, as will be clearly apparent from Fig. 3. Said brackets 37 are each further provided with a pair of guides 39, which extend rearward to either side of the belt and retain the same properly upon the roll, as will be obvious from Figs. 2 and 3 of the drawings. A second guide-plate 40 is mounted in front of the belts 21 and, with the guide-plate 31, forms the receiving-trough, which extends throughout the length of the machine and serves to deflect the boxes downward in between the belts. This plate is secured at either end by means of screws 41 to the casting 24, and the intervening portion of said plate is bent upward

slightly to form a space between it and the inclined portion of the casting 24 to permit the belt and pulley to freely pass therethrough.

The disks 18 are each provided with a frictional pawl 42, mounted upon a rod 43, secured to the end plate 6. Adjacent to each of these pawls and secured to said rod is a bracket 44, having a pair of arms straddling said pawl and a spring 45 interposed between said arm and pawl to force the latter downward against the periphery of the disk. These pawls impart a slight resistance to the disks, serving as a brake to prevent a too free rotation of the same, insuring their alinement one with the other, and prevent any backward movement.

In practice my machine would be set up with its rear end against a box-machine with which it is to work, so that the boxes as delivered from the said machine would be fed into the trough of my machine lengthwise. With this location the forward ends of the boxes would be thrust forward between the guide-plates 31 and 40 so as to strike against the adjustable stop 46 located in the trough, see Figs. 1 and 2 and 6, whereupon said box would drop down upon the plate 40 and with the assistance of the plate 31 be deflected in between the belts.

In Fig. 7 of the drawings I have shown a machine adapted to take care of the product of a double-tube machine. This form of my invention contains two sets of guide-plates or troughs side by side instead of one, as in the other construction, one trough being adapted to feed the boxes between the rolls slightly in advance of the other, thus making it substantially practicable for each series of notches to take care of a box as it is fed in.

In Fig. 8 I have shown another slight modification, the same being adapted for shorter but wider boxes wherein a fewer number of cams and a stripper 24^a which is located adjacent to the lower feed-roll and comprises a plain vertical wall with a sharp top edge. In this view the use of belts is also entirely omitted.

Each of the forms of construction shown in these drawings is perfectly practicable, being to-day in operation, and consequently I do not wish to limit myself in the use of belts or any other details of construction of the apparatus.

The operation of my machine is as follows: Power is applied to the belt-wheel 7, which through its shaft and gear imparts a rotary movement to the series of pulleys upon shaft 12. From this shaft and through the gears 13 and 14 the small roll 15 is operated. This roll in turn operates its series of belts, while the pulleys upon the main shaft are likewise driving their series of belts. With this continuous and rapid movement of the parts the boxes are successively dropped down in between the guides and belts, striking the notches 23^a upon the disks. As the box engages these notches it is straightened out and automatically moves said disks forward until said box is grasped by the rolls, which compress and guide said box against the near side of the previously-stacked boxes. It will be apparent that after the box passes through the rolls the outward edge leaves the notch in the cam of the disk and strikes the top of the table, where its further progress is retarded. The boxes are thus landed one against the other, the series being gradually shoved outward against the resistance of the block 47, as shown in the several figures of the drawings. This stack of boxes may be allowed to accumulate to as great a proportion as is necessary to insure their proper drying before removal, the removal of said boxes being at all times effected from the outer edge.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a box stacking and drying machine, the combination of a pair of feed-rolls, means for guiding the boxes thereto and means for adjusting the boxes to a uniform position as they are guided to the feed-rolls, and mechanism for stacking them one against the other in successive order.

2. The combination in a machine for stacking boxes, of a suitable box-receiving trough, means for guiding boxes from said trough to feed-rolls in a line substantially parallel to said rolls, rolls for compressing such boxes and means for delivering the boxes one against the other and retaining the same in a compressed position.

3. In a paper-box stacking and drying device the combination with a pair of feed-rolls, of notched disks for guiding boxes thereto, a table upon which the boxes are received and cams for guiding the boxes from said rolls to the table and shoving the previously-stacked boxes outward to make room for the boxes to be delivered.

4. In a box-stacking device of the class described, the combination with a pair of feed-rolls and means for guiding boxes thereto, of a device upon the roll-shaft to be engaged by the boxes, to guide it uniformly into said rolls and provided with means to shove the previously-stacked boxes outward making room for and leading the new boxes into position where they are successively stacked.

5. The combination in a box-stacking device, of means to receive and deflect the boxes into the path of operation, a pair of feed-rolls to receive said boxes and compress the same, a disk upon the roll-shaft adapted to deliver the boxes from the rolls to a table in their successive orders.

6. The combination in a box-stacking device, of means to receive and guide boxes into the path of operation, of a pair of feed-rolls to receive, compress and deliver the boxes, a disk in line with one of the rolls having notched cam-surfaces thereon to engage and aline the boxes and to guide the succes-

sive finished boxes forward and deposit them against the stack.

7. In a box stacking and drying machine, the combination with a pair of feed-rolls, of means to receive and deliver boxes thereto, disks on the axial line of one of said rolls and having notches therein to receive and aline the boxes as they are fed through the rolls, cam-surfaces upon said disks to engage and force the previously-stacked boxes outward to make room for the additional boxes as they are guided to and delivered against said stack.

8. The combination in a box stacking and drying device, of a pair of feed-rolls one of which is formed in sections, disks intermediate of the sections having notched cam-surfaces thereon to automatically receive and guide a box through its line of operation.

9. The combination in a box drying and stacking device, of a pair of feed-rolls, disks having notches for alining and feeding boxes to said rolls, a table upon which said boxes are delivered and means for successively shoving the boxes outward with each delivery.

10. A paper-box stacking and drying machine, comprising a pair of feed-rolls, means for guiding glued boxes thereto, a series of disks operating in conjunction with said rolls having a series of notches thereon to be engaged by the boxes as they are fed to the rolls, a cam-surface upon the disk adjacent to the notches adapted to travel in advance of the box and shove the stack out to form a space for delivery and a table upon which said boxes are stacked.

11. The combination in a box stacking and drying apparatus, of a table upon which the boxes are delivered and stacked, a pair of rolls adjacent thereto, means for adjusting the table to and from the rolls to accommodate different heights of boxes, means for feeding the boxes to said rolls mechanism for guiding and delivering boxes from the rolls to the table and arranging them snugly against one another.

12. The combination in a paper-box-stacking device, of a pair of rolls, a table adjacent thereto to receive the boxes as they are delivered from the rolls, means for adjusting the table to and from the rolls and mechanism for guiding the boxes through the rolls and delivering them one against the other in a uniform line upon the table.

13. The combination in a paper-box-stacking device, of a pair of feed-rolls, a table adjacent thereto, disks for guiding boxes through the rolls and delivering them one against the other upon the table, a weight to ride against the outer side of the boxes adapted to slide outward with the successive accumulation of the boxes to the inner edge.

14. The combination in a paper-box stacker, of a pair of feed-rolls adapted to compress and move boxes forward for delivery, a series of disks operating in conjunction with said rolls having lugs thereon to insure the proper alinement of the box with the roll as it is fed to and from the same and means for guiding and delivering the said boxes one against another in a compressed manner.

15. In a paper-box machine of the class described, the combination of a pair of feed-rolls one of which is formed in sections, a series of disks interposed between said sections, notches upon said disks and cam-surfaces adjacent to said notches as and for the purpose set forth.

16. In a machine of the class described, the combination of a pair of feed-rolls one of which is formed in sections, disks loosely interposed between said sections having a series of peripheral projections thereon, annular recesses in the coacting roll to accommodate said projections, the whole arranged to operate as and for the purpose specified.

17. In a paper-box stacking device, the combination of a pair of feed-rolls, one of which is formed in sections, a series of disks loosely mounted between said sections, a series of peripheral cams with notches upon said disks extending out slightly beyond the surface of the main portion of the roll in a manner to be engaged by the boxes as they are fed over said roll, frictional pawls to engage the periphery of said disks in a manner to afford a resistance to the forward movement and to insure the proper alinement of the notches upon the several disks, the whole arranged to operate substantially as and for the purpose described.

18. The combination in a paper-box-stacking device of a pair of feed-rolls with means for guiding folded boxes thereto, a series of disks operating in conjunction with said rolls having notched lugs thereon to engage and guide the boxes through the rolls and against the previously-stacked boxes, a stripper to separate the box from the rolls as it is being delivered.

19. In a paper-box-stacking device, the combination with a pair of feed-rolls, of means for delivering compressed boxes therefrom to the stack, of a pair of belts for feeding the boxes to said rolls and shields to deflect boxes as they are received into said belt.

20. The combination with a pair of feed-rolls, of cams upon the feed-roll shafts for delivering boxes therefrom to the stack, a series of belts upon each roll to feed the boxes thereto, and means for adjusting the tension of said belts substantially as described.

21. The combination with a pair of feed-rolls, of cams upon the feed-roll shaft for delivering boxes therefrom to the stack, a series of belts upon each roll to feed the boxes thereto, means for adjusting the tension of said belts substantially as shown, and guides to retain the belts in their relative positions.

22. The combination with a pair of feed-rolls, of means for delivering boxes therefrom to the stack, a series of belts upon each roll to feed the boxes thereto, guides to retain the belts in their relative positions, inclined de-

flecting-plates between the belts to guide the boxes thereto.

23. The combination in a paper-box-stacking device, of a pair of feed-rolls, means for delivering compressed boxes therefrom to a stack, a trough to receive said boxes and guide them into the rolls, an adjustable stop arranged transversely of said trough to guide the end of the box to the rolls in a uniform line.

24. The combination in a paper-box-stacking device, of a pair of feed-rolls to compress and deliver the boxes to a stack, notched disks to insure a parallel position of the boxes with the rolls as they pass therethrough, a pair of troughs to receive glued boxes and deliver them to different sides of the feed-rolls, substantially as shown and described.

25. The combination of a feed-roll for paper-box stackers, of a shaft, a series of pulleys secured thereto at substantially an equal distance apart, a series of disks arranged loosely between said pulleys and provided with a series of peripheral notches having a forward cam-surface.

26. The combination in a paper-box-stacking machine, of a pair of feed-rolls, means for delivering folded boxes thereto, mechanism for delivering said boxes from said rolls to a stack, a pair of gears interposed between said rolls whereby one is operated from the other, a bevel-gear upon the shaft of one of said rolls, a second bevel-gear meshing with said gear, a shaft upon which said gear is mounted and a driving-pulley whereby the entirety is operated.

Signed at New Haven, in the county of New Haven and State of Connecticut, this 2d day of May, A. D. 1901.

GEORGE M. GRISWOLD.

Witnesses:
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H. J. HERMAN.