

(No Model.)

2 Sheets—Sheet 1.

J. C. CORAM & F. D. HUNTOON.
PAPER FEEDING DEVICE.

No. 475,723.

Patented May 24, 1892.

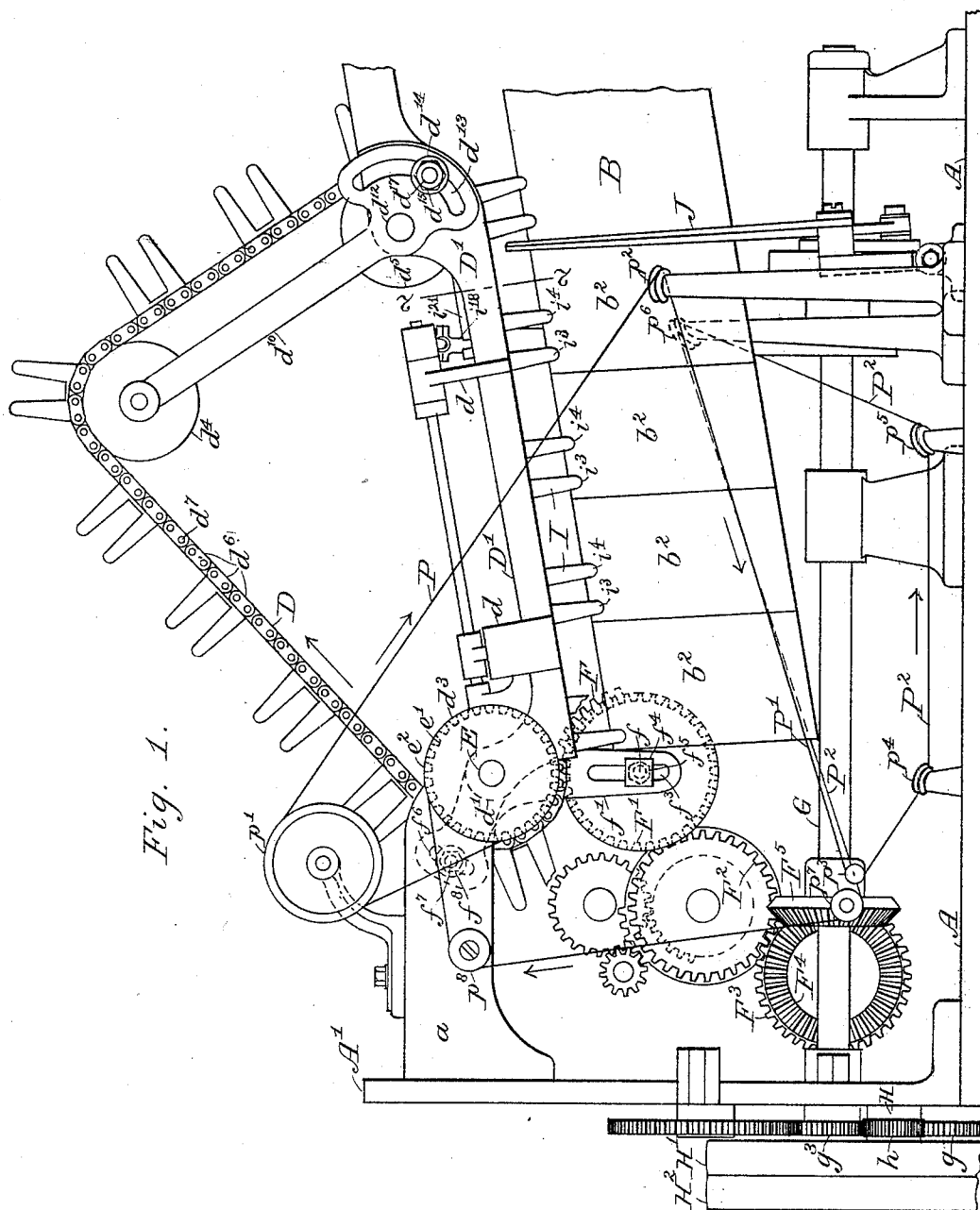


Fig. 1.

WITNESSES.

Saml. G. Stephens.
Myrtle C. Beale.

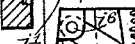
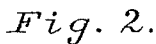
INVENTORS.

John C. Coram &
Frank D. Huntoon,
By Albert M. Moore,
Their Attorney.

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John C. Coram &
Frank D. Huntoon,
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Their Attorney.

UNITED STATES PATENT OFFICE.

JOHN C. CORAM AND FRANK D. HUNTOON, OF LOWELL, MASSACHUSETTS,
ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO THE AMRAYTOON
PAPER TUBE COMPANY, OF SAME PLACE.

PAPER-FEEDING DEVICE.

SPECIFICATION forming part of Letters Patent No. 475,723, dated May 24, 1892.

Application filed January 31, 1891. Serial No. 379,773. (No model.)

To all whom it may concern:

Be it known that we, JOHN C. CORAM and FRANK D. HUNTOON, both citizens of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Paper-Feeding Devices, of which the following is a specification.

Our invention relates to paper-feeding devices, more especially for machines for making paper tubes; and it consists in the combinations and devices hereinafter described and claimed, the general object of which is to hold a strip of pasted paper by its upper edge and to carry it along to the proper place to be operated upon to form a tube or other article.

In the accompanying drawings, on two sheets, Figure 1 is a front elevation of parts of a machine for making paper tubes, showing a strip of paper, a feed-chain provided with grippers, guide-cords, a pair of shears for cutting off blanks from said strip of paper, and the driving mechanism which gives to said chain, grippers, and guide-cords an intermittent motion; Fig. 2, a right-side elevation of the cutting-off shears, their operating mechanism, and the mechanism which opens the grippers, the feed-chain and its guides being in section on the line 2 2 in Fig. 1, and the shaft which operates to open said grippers and to operate said shears being also in section in the same plane, showing also a right-side elevation of some of the grippers; Fig. 3, a right-side elevation of the lower part of the cam-rod of the gripper-opening mechanism and of its operating-cam; Fig. 4, a front elevation of a part of the feed-chain, its guide, its grippers, means of opening and closing the grippers, the sprocket-wheel which drives the feed-chain, and a part of the adjustable arm by means of which the feed-chain is tightened. Figs. 5 and 6 are side elevations of a gripper and a section on the line 5 5 in Fig. 4 of the feed-chain, its guide, and the gripper-opening shaft, showing in side elevation the arm on said shaft which opens the gripper, the gripper being closed in Fig. 5 and open in Fig. 6; Fig. 7, a plan of a part of the feed-chain and its guide, two grippers and the cam which operates to close them, and the means of securing the grippers to the chain.

The devices herein described may be used

in a variety of machines where pasted paper is to be carried from a paste-box to the mechanism which operates to convert the paper into a box or tube; but said devices are specially adapted to be used with the appliances shown and described in another application, Serial No. 322,944, filed September 4, 1889, for patent for machines for making paper tubes.

A is the bed of the machine, and A' a standard secured on said bed, these parts being of sufficient strength to support the operative parts of the mechanism.

The paper from which the tubes or other articles are to be manufactured is at first in the form of a strip B, of a suitable width to form one or more blanks, and is placed on a paper-reel (not shown) of the usual form, and from said reel the paper is subsequently drawn through a slit in a paste-box, (not shown herein, but fully shown and described in said other application,) or paste or glue may be applied to said paper by any usual means, such means forming no part of the invention herein described. The shaft E has an intermittent rotary motion, a spur-gear e' , fast on said shaft, engaging a mutilated spur-gear F, which turns on a horizontal stud f (supported on a bracket a , secured to the stand A') and has a continuous uniform rotation by any suitable means. As represented, the mutilated gear F is secured to a spur-gear F', and the latter is actuated through a train of gears, consisting of the spur-gears F² F³, a bevel-gear F⁴, concentric with said gear F³, another bevel-gear F⁵, fast on the transverse shaft G, another spur-gear g^3 , fast on the shaft G, and a spur-pinion h , engaging said gear g^3 and being secured concentrically to and turning with the driving-pulley H' of the machine on a horizontal stud H, on which turns also the loose pulley H². The feed-chain guides, Figs. 2, 4, and 7, are mounted in parallel bars D' D², connected by arches d and capable of swinging in a vertical plane, one end of each of said bars being a sleeve d' , which surrounds and turns on the shaft E. The feed-chain is carried on the sprocket-wheel d^3 and on the idle-rolls d^4 d^5 , said sprocket-wheel d^3 being secured on said shaft E, so that the feed-chain has an intermittent motion. The feed-chain D, in fact, consists of two chains or parallel series of equal links d^6 , the bars or pivots d^7 ,

which connect adjacent links of one series also connecting the opposite links of the other series, so that said bars are parallel with each other, as shown in Fig. 7, and the adjacent inner faces of the feed-chain guides D' D^2 are provided with straight parallel longitudinal grooves d^8 d^9 , one in each of said inner faces, to receive and guide one series of links of the feed-chain in a straight line, Figs. 2, 4, and 7.

To the feed-chain D are adjustably secured the grippers I , each having a plate i , adapted to rest against the outer surface of the bars d' of the feed-chain and held in place against said bars by a clamp i' and cap-screw i^2 , running through said clamp into the top of said plate i . The top of the plate is provided with a pair of down-hanging fingers i^3 i^4 , the rear faces of which lie in a vertical plane. To an ear i^5 on the plate i is pivoted at i^6 another plate i^7 , provided with another pair of down-hanging fingers i^8 i^9 , the front faces of which are normally held against the rear faces of the fingers i^3 i^4 by one or more springs i^{10} , compressed between the plates i i^7 , said last-named plate i^7 having an arm i^{11} , which extends upward to said ear i^5 , the pivot i^6 passing through the upper end of said arm i^{11} . To the arm i^{11} is pivoted a latch i^{12} , reaching upward through a slot in the plate i and having a notch i^{13} to engage with the top of an upward projection i^{15} on the top of said plate i , and immediately above said notch having a bevel or incline i^{14} , extending upward and backward, so that throwing the upper end of said latch backward causes the latch to be raised by its incline riding up over said projection and the rear edge of the plate i^7 to be raised and the fingers i^8 i^9 to swing back away from the fingers i^3 i^4 into the position shown in Fig. 6, where they are retained by said notch i^{13} , engaging or hooking over the top of said upward projection i^{15} until the upper end of the latch is again thrown forward to the left in Fig. 6, when the fingers will be closed or brought together by the spring i^{10} . The grippers are caused to open by the upper end of the latch being struck by a finger i^{16} on the shaft I' , said shaft turning in the arches d , supported on the feed-chain guides and being rocked by an arm i^{22} , reaching backward from the shaft and being jointed to a vertical rod i^{17} , made in two parts for purposes of adjustment, the upper part i^{18} of said rod being a straight round rod and the lower part of said rod i^{17} having a split sleeve i^{19} , which clamps the part i^{18} , said sleeve being closed by a screw i^{20} in an obvious manner. The lower end of the rod i^{17} is slotted, as shown, to receive and be guided by the shaft G , and said rod is given a reciprocating motion by a pin i^{23} , projecting from said rod, being struck by a cam G' , secured on said shaft G . (See Fig. 3.) The gripper remains open until it again passes over the idle-pulleys and strikes the stationary cam i^{21} , secured to the top of the bar D^2 , which stationary cam throws the upper end of the latch forward and closes the

gripper just after its fingers have reached down on opposite sides of the paper—that is, just before the gripper reaches the cutting-off shears J . As soon as the paper is grasped by the grippers nearest the idle-roll d^5 the paper stops—that is, the feed-chain and the feed-rolls stop—and a blank b^2 or piece of paper is cut off from the end of the strip of paper by the vertical cutting-off shears J , which form no part of the invention described herein, being described and claimed in another application, Serial No. 379,771, filed herewith. As represented, however, said shears consist of two blades j j' , pivoted near their lower ends at j^2 upon a post or standard a^4 , supported on the bed A of the machine, each blade being provided with a segment of a gear j^3 j^4 , concentric with its pivot j^2 , which takes into the gear-segment on the other blade, and one of said blades having an arm j^5 , which reaches down below the pivot j^2 and is adjustably jointed to a cam-rod J' , which is provided with a slot j^6 to receive and be guided by the shaft G , above named, and is also provided with a projecting pin j^7 , which enters a cam-groove g^2 in the cam G^2 , secured on said shaft G , so that when said last-named cam makes a half-revolution from the position it occupies in Fig. 2 the pin j^7 is drawn nearest to said shaft G and draws the cam-rod J' and the arm j^5 of the blade j' backward and closes the cutting-off shears.

As the shaft G has a constant motion when the machine is in operation and the feeding devices have an intermittent motion, it is necessary to vary the speed of the feeding devices or to operate them for a greater length of time when it is desired to increase and for a shorter time when it is desired to decrease the horizontal length of the blank. To vary the horizontal length of the blank b^2 , the gears F and e' , either or both, may be changed for others, the mutilated gear F only for a mutilated gear of the same diameter and pitch, but having a longer or shorter row of teeth, and therefore engaged for a longer or shorter time with said gear e' , or for a mutilated gear of different diameter to vary the speed of said gear e' , or the gear e' may be replaced by one of a different diameter and number of teeth, or both of said gears may be changed for others of different diameter in such a manner as to vary the speed of the shaft E . When by any such change the combined length of the radius of the gear F or its substitute and the radius of the gear e' or its substitute is changed, it becomes necessary to alter the distance between the centers of the shaft E and the center of the gear F or its substitute. The stud f , on which the gear F turns, is therefore not directly secured to the bracket a , above mentioned, but is adjustably supported in an arm f' , pivoted to said bracket a , said arm f' being provided with a nearly-vertical slot f^3 , and said stud f being movable in said slot and retained in any desired position by an enlarged head f^4 on one end of said stud, and a nut f^5 , (shown in dotted lines in Fig. 1), turning on

said stud f against the rear face of said arm f' in a well-known manner to clamp said arm between said head and nut. The arm f' is pivoted on the shaft E, or concentrically therewith, and at its upper end is provided with an arc-shaped slot f^6 , arranged concentrically with said shaft E, and a bolt f^7 passes through said slot f^6 into said bracket a , and a nut f^8 turns on said bolt and clamps said arm f' in any desired position. The stud f is raised or lowered in the slot f^3 to bring the mutilated gear F into engagement with the gear e' and the arm f' is turned on its pivot to bring the gear F' into engagement with the gear F², above mentioned.

A change in the horizontal length of the blank would in most cases necessitate the moving of the grippers nearer together or farther apart on the feed-chain, which is accomplished by removing the cap-screws i^2 and clamps i' and again securing the grippers to the chain at proper intervals, which intervals must be equal, and this fact may require the chain to be lengthened or shortened by the insertion or removal of one or more links. It is therefore necessary that means be furnished for taking up the slack of the chain when the chain is lengthened. Accordingly one of the idle-rolls d^1 is supported upon an arm d^{10} , and said arm is pivoted near its lower end at d^{12} upon the feed-chain guide D', near the upper end of said guide, and is provided with an arc-shaped slot d^{13} , arranged concentrically with the pivot d^{12} , through which slot projects a stud d^{17} from said guide D', and on said stud is arranged a washer d^{14} and a nut d^{15} , so that turning up said nut holds said arm d^{10} in any desired position and keeps the feed-chain taut. The other idle-roll d^3 is stationary relative to the feed-chain guides, being supported and turning on a horizontal shaft between said guides. The paper blanks, supported at their upper edges by the grippers above described, will naturally hang vertically by their own weight; but to make this more certain and to prevent the paper being blown out of place or being wrinkled by contact with parts of the machine, the guide-cords P' P² are used, represented in Fig. 1 as a single continuous cord P, passing from the under side of a grooved pulley e^2 , fast on the shaft E, thence over guide-rolls or idle-rolls p^1 p^2 , thence at P' nearly in the direction the paper runs, but at a greater downward inclination and in front of the paper blanks, thence over other guide-rolls p^3 p^4 p^5 , thence to the guide-roll p^6 back of the paper blanks, thence substantially parallel at P² to the part P' and separated from said part P' only by the thickness of the paper to the guide-roll p^7 , thence over the guide-roll p^8 and over the pulley e^2 . The guide-cords P' P², or parallel parts of the cord P, run in the same direction as the paper blanks travel, except that the cords descend faster than the blanks, and therefore not only hold the blanks in a verti-

cal position, but by downward friction on the sides of the blanks prevent wrinkling of the same and tend to remove any wrinkles that might be therein. The guide-cords have an intermittent motion, moving when the feed-chain moves, being driven from the same shaft E.

We claim as our invention—

1. The combination of the traveling feed-chain and the grippers secured thereto, said grippers being arranged to open and close in planes at right angles to the path of travel of said chain and adapted to hold a strip of pasted paper by its upper edge and to carry said paper edgewise and to allow said paper to hang by its own weight in a vertical position, as and for the purpose specified.

2. The combination of the traveling gripper, adapted to hold a strip of paper by its upper edge, and guide-cords arranged on opposite sides of said paper and traveling therewith to guide said paper and to hold the same in a vertical position, as and for the purpose specified.

3. The combination of the traveling feed-chain, the grippers secured thereto and adapted to hold a strip of paper by its upper edge, and guide-cords arranged on opposite sides of said paper and traveling therewith to guide said paper and to hold the same in a vertical position, as and for the purpose specified.

4. The gripper consisting of two plates, each provided with one or more fingers, said plates being hinged to each other, and a spring arranged between said plates to press a finger of one plate against a finger of the other plate, and a latch pivoted to one of said plates and having an incline adapted and arranged to ride over a portion of the other of said plates in one direction to open said gripper and in the other direction to allow said gripper to be closed by the expansion of said spring, as and for the purpose specified.

5. The gripper consisting of two plates, each provided with one or more fingers, one of said plates being hinged to the other, and a spring arranged between said plates to press a finger of one plate against a finger of the other plate, and a latch pivoted to one of said plates and having a notch to engage a projection with which the other of said plates is provided, said latch having also an incline above said notch, adapted and arranged to ride over said projection in one direction to open said gripper and to engage said notch with said projection to hold said gripper open and to be drawn over said projection in the other direction when said notch is disengaged from said projection and the gripper is closed by the action of said spring, as and for the purpose specified.

6. The combination of feeding devices adapted to carry a paper blank by its upper edge, and guide-cords arranged to travel below said feeding devices on opposite sides of said blank and in contact therewith and sub-

stantially parallel with each other laterally to hold said blank flat, as and for the purpose specified.

7. The combination of feeding devices
5 adapted to carry a paper blank by one of its edges, and guide-cords arranged to travel on opposite sides of said blank in contact therewith and in a direction which diverges from the path of the edge so held to hold said blank
10 flat, as and for the purpose specified.

In witness whereof we have signed this specification, in the presence of two attesting witnesses, this 10th day of January, A. D. 1891.

JOHN C. CORAM.
FRANK D. HUNTOON.

Witnesses:

ALBERT M. MOORE,
FRANK D. GALE.