March 8, 1932. F. GROVER 1,849,005

WRAPPING MACHINE

Filed Aug. 10, 1931 5 Sheets-Sheet 1

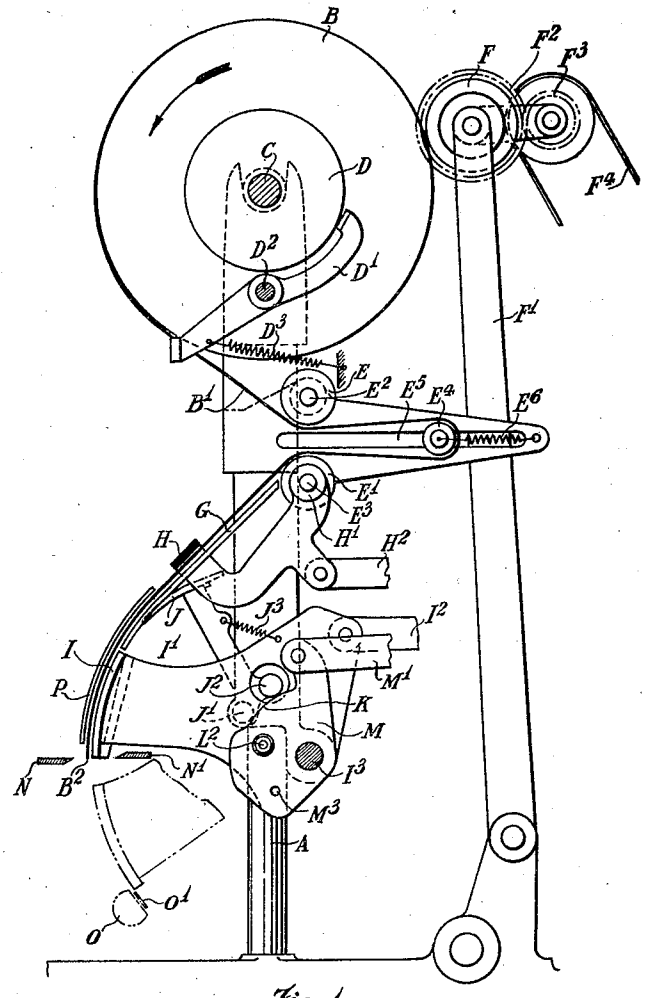


Fig. 1.

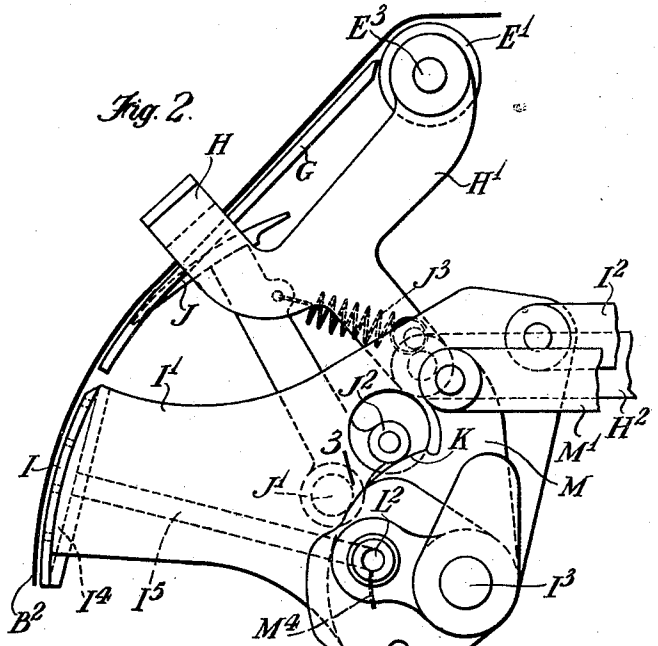
Frederick Grover
Inventor
By Chas. Lamb Atty

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WRAPPING MACHINE

Filed Aug. 10, 1931 5 Sheets-Sheet 2

Fig. 2.



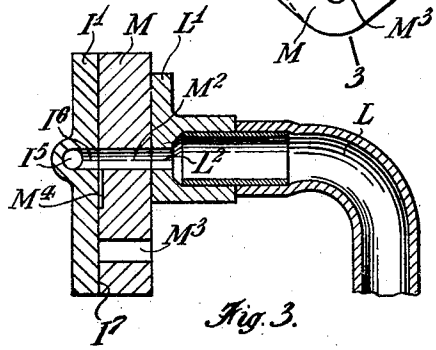


Fig. 3.

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WRAPPING MACHINE

Filed Aug. 10, 1931 5 Sheets-Sheet 3

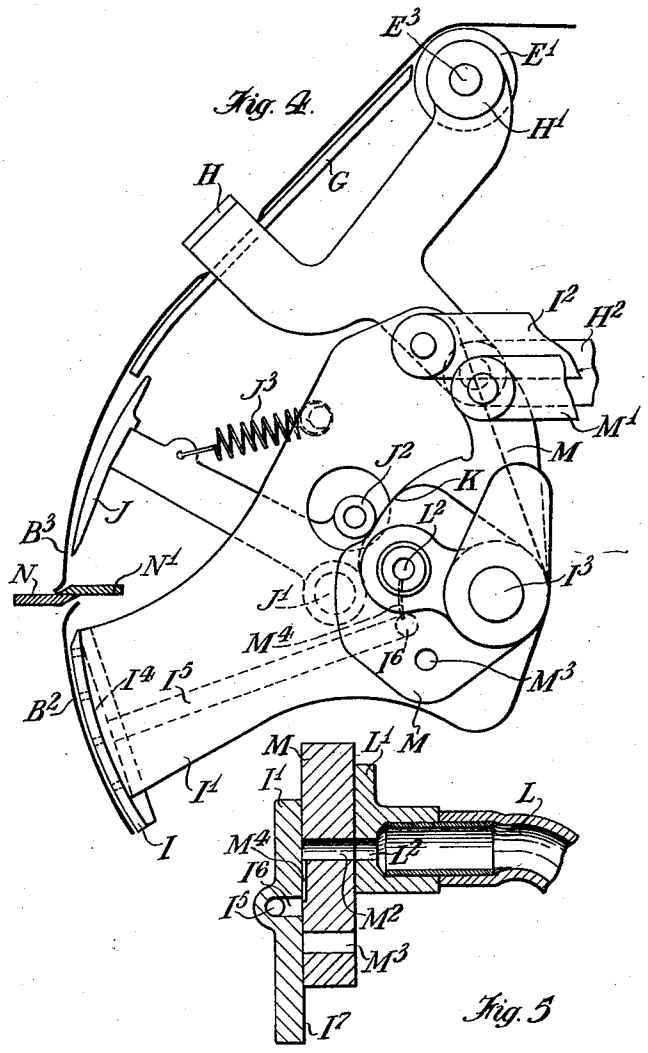


Fig. 4.

Fig. 5

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WRAPPING MACHINE

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Fig. 6.

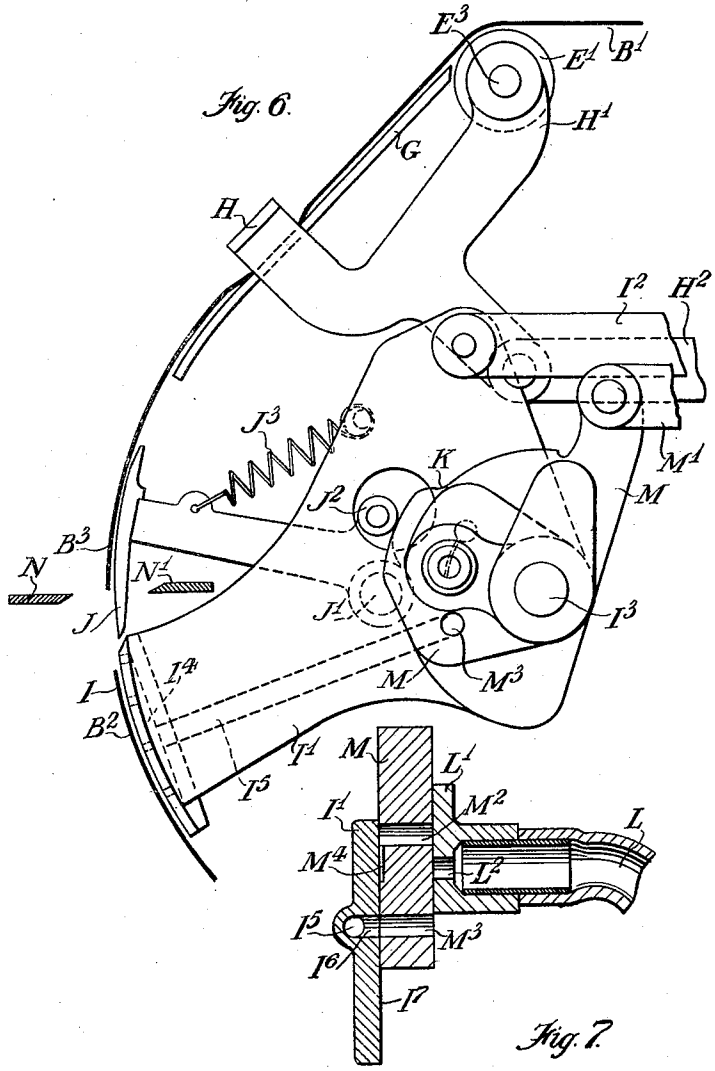


Fig. 7.

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WRAPPING MACHINE

Filed Aug. 10, 1931 5 Sheets-Sheet 5

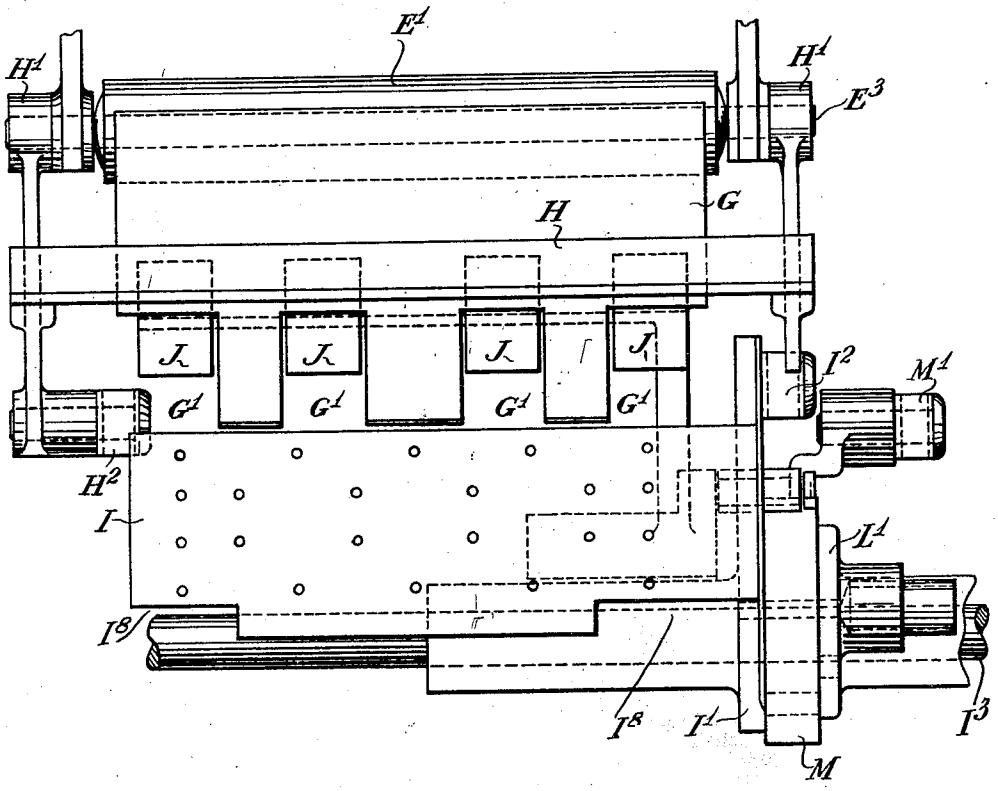


Fig. 8.

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Patented Mar. 8, 1932 1,849,005

UNITED STATES PATENT OFFICE

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WRAPPING MACHINE

Application filed August 10, 1931, Serial No. 556,280, and in Great Britain November 7, 1930.

In machines for wrapping articles in cellulose or other similar smooth, transparent sheets, hereinafter termed "cellulose sheets"; it is convenient to carry the cellulose sheet in a continuous roll and to feed the leading edge of the sheet to wrapping mechanism, where it is received by grippers, and then the length of wrapper required for the wrapping operation may be severed by shears from the continuous length.

Cellulose sheet is extremely difficult to handle mechanically owing to its instability when drawn from a roll into a single layer. The sheet cellulose is extremely sensitive to atmospheric conditions of temperature and humidity, which results in unforseen local distortions. The disturbing effect of these distortions must be prevented by the mechanism controlling the cellulose during the processes of drawing the sheet from the roll, cutting it and feeding it to the wrapping mechanism.

In such wrapper feeding apparatus, especially when the material forming the wrapper is in cellulose sheets and is liable to crumple or warp or to slip during the feeding operation, it is necessary to hold the leading portion of the strip so that the cutting may take place without freeing the leading portion of the strip and leaving this leading portion in an uncontrolled state.

The object of this invention is to provide a method of and apparatus for feeding such material, which will prevent the defects set out above occurring in the material during the feeding operation.

This is effected by a method of feeding continuous cellulose sheet, which consists in holding the leading portion of the sheet by suction, feeding said leading portion while it is held by the suction, and causing a further length of sheet to be drawn from a roll, severing the leading portion of the sheet so fed from said further length of sheet and supporting said further length of sheet while returning the devices for holding and feeding the sheet to a position ready for feeding said further length of sheet.

The apparatus for carrying out the method according to this invention comprises a suction feed member adapted to hold the leading portion of continuous wrapping material and adapted to reciprocate in order to feed the leading portion so held to the wrapping mechanism and to draw a further length of cellulose sheet off its roll, means for severing the length of cellulose sheet thus fed to the wrapping mechanism from said further length of sheet, and means for supporting said further length of cellulose sheet while said feed member returns to a position in which it can take hold of this further length of cellulose sheet ready for feeding it and drawing the next length of cellulose sheet off its roll.

The suction feed member is so shaped as to support and maintain control over almost the entire surface of the leading portion of the wrapper.

The invention will now be described with reference to the embodiment illustrated upon the accompanying drawings, in which:—

Fig. 1 illustrates diagrammatically the apparatus for feeding cellulose sheet according to this invention.

Fig. 2 is a fragmentary view of part of the apparatus shown in Fig. 1, but drawn to an enlarged scale, and illustrates the feed member in the same position as Fig. 1, which is the initial position of the feeding operation.

Fig. 3 is a cross-section on the line 3—3 in Fig. 2 showing the arrangement of the inlet ports for the suction apparatus.

Figs. 4 and 5 show similar views of the same mechanism as shown in Figs. 2 and 3, but showing the feed member in a position in which it has fed the cellulose sheet to the wrapping mechanism, and in which the leading portion of the cellulose sheet which has been fed is severed.

Figs. 6 and 7 are similar views of the same mechanism as shown in Figs. 4 and 5, illustrating the apparatus in the position in which the feed member is in the same position as in Fig. 4, but in which a control for the suction of the feed member has been moved to relieve the suction of the feed member.

Fig. 8 is a front elevation of the feed member and associated parts, with the cellulose sheet removed in order to show the form of said member and parts.

In the example of construction shown in the drawings, the whole of the cellulose wrapping material feeding mechanism, with the exception of the cams for effecting movements of the various parts of the mechanism, are carried on the vertical rods A which are fixed to the main body of the machine. The roll B of wrapping material is mounted upon an axle C. A disc D is fixed to the axle C and is engaged by a brake lever D^1 pivoted at D^2 which is held in contact with the disc D by means of a tension spring D^3, in order to resist movement of the roll B.

The rollers E and E^1 are free to rotate on spindles E^2 and E^3 and act as guides for the web B^1 of wrapping material. A jockey roller E^4 slidably mounted in horizontal slots E^5 and having a tension spring E^6 acting on each end of its spindle ensures that the wrapping material is kept taut while feeding.

A roller F carried on the upper end of the arm F^1 and rotated through gearing F^2, F^3 from a pulley by a belt or chain F^4, rests on the periphery of the roll B and serves to keep the roll continuously rotating at a slow speed. The gearing may include a ratchet device of known kind which will allow the roll B to rotate faster when required.

The plate G is fixed near to the roller E^1 and serves to support the web of wrapping material. A clamping bar H is provided with double arm bearings H^1 rotatably mounted on the spindle E^3 and is actuated by the link H^2 which is controlled by a cam movement (not shown). This clamping bar is adapted at certain times to retain the web of wrapping material stationary, but at other times the web slides under the bar with perfect freedom. The fixed plate G is formed with cut away parts G^1 as shown in Fig. 8 for a purpose which will be hereinafter explained. The web B^1 of the wrapping material extends downwardly beyond the fixed plate G and its leading portion B^2 rests against a plate I forming the front of a suction device mounted on an arm I^1. The suction arm I^1 is actuated by a link I^2 which is controlled by a cam movement (not shown) and which is capable of rocking about the centre I^3 from the position shown in full lines in Fig. 1 to the position shown in chain dotted lines. The plate I is adapted when in the position shown in full lines in Fig. 1, to draw and hold uniformly the leading portion B^2 of the web of wrapping material to its outer surface and carry it down to the position shown in chain dotted lines. The plate I is perforated and the perforations communicate with an air chamber I^4 in the arm I^1, to which a source of suction is connected through the passage I^5 in the arm. The passage I^5 in the arm I^1 terminates in a suction port I^6 in the face I^7 of the arm. The suction pipe is marked L. The suction is controlled by a ported valve M which is actuated by a link M^1 from a cam (not shown), said valve M being capable of rotation about the pivot I^3 and is positioned between the face I^7 of the suction arm I^1 and the bracket L^1 of the suction pipe L. The valve M has a suction port M^2 and a relief port M^3 which are adapted to move into and out of register with the port I^6 in the arm I^1. A small groove M^4 leading from suction port M^2 serves to retain the suction while the suction arm I^1 is moving from the position shown in Figs. 2 and 3 to the position shown in Figs. 4 and 5; the valve M being stationary during this period. The bracket L^1 has a suction port L^2 only, and this is connected by the suction pipe L directly to a continuous suction pump (not shown). The bracket L^1 is fixed so that the suction ports I^6, M^2 and L^2 are in register in the position shown in Figs. 2 and 3, thereby completing a passage from the air chamber I^4 in the suction arm I^1 to the continuous suction pump. As the arm I^1 moves downwardly, the suction will be maintained by the groove M^4 until the position shown in Figs. 4 and 5 is reached, so that the web of wrapping material will have been drawn down until a further length of the web of wrapping material indicated by the reference B^3 in Fig. 4 will now occupy the position originally occupied by the leading portion B^2 in Figs. 1 and 2. In this position the clamping bar H clamps the web of wrapping material against the plate G. The leading portion B^2 has now been moved against the former O of the wrapping mechanism ready to be gripped by the gripper O^1, as indicated by chain dotted lines in Fig. 1.

A pair of shears N, N^1 now cut the web at a point adjacent the trailing edge of the plate I, as shown in Fig. 4, separating the leading portion B^2 from the further length of wrapper B^3. The movement of the arm I^1 is discontinued but the ported valve M is now moved by its link M^1 upwardly from the position shown in Fig. 4 into the position shown in Fig. 6. In this movement the groove M^4 is moved out of register with the port I^6 and the port I^6 is brought into register with the relief port M^3 which relieves the suction acting on the leading portion B^2 and allows this leading portion, which has now been gripped between the former O and a gripping device O^1 indicated diagrammatically in Fig. 1, to be removed by the wrapping mechanism. From

this position shown in Fig. 6 the arm I^1 is then moved upwardly back into the position shown in Fig. 2.

As the roll B is continuously rotated to wind off the cellulose sheet, and as the cellulose sheet is fed intermittently by the feed member, the sheet would become slack if it were not taken up by the jockey roller E^4.

Guiding fingers J are pivoted at J^1 on the suction arm I^1 so as to move with the arm I^1 but also be capable of movement independently of the arm I^1. The guiding fingers J are operated independently of the arm I^1 by means of the roller J^2 bearing on a cam-shaped piece K, the roller J^2 being maintained in contact with the cam-shaped piece K by means of a spring J^3. When the arm I^1 moves downwardly, the guiding fingers J move through the cut away parts G^1 downwardly into the position shown in Fig. 4, in which they occupy the same position as that occupied by the plate I in Fig. 2. These guide fingers therefore close the space that is left between the lower edge of the plate G and the upper or trailing edge of the plate I, when the plate I is moved downwardly, except at the part where the shears N, N^1 operate. When in this position shown in Fig. 4, the guiding fingers J support the further length B^3 of web which has been drawn off the roll B by the downward movement of the arm I^1. After the leading portion B^2 has been severed from the further length B^3 of web, the upward movement of the valve M upon which the cam-shaped piece K is formed, acts to move the guiding fingers J downwardly into the position shown in Fig. 6, in which they come with their leading edges against the trailing edge of the plate I. The guiding fingers J are then moved back by the arm I^1 in its upward movement. In this return movement, the guiding fingers J act to support the further length of sheet B^3 and retain it in the required position while the plate I is returning to the position shown in Fig. 2 ready for feeding this further length of sheet B^3. When this return movement has been completed, the valve M again communicates the suction pump to the plate I, the clamp H is released and the plate I is again moved downwards by the arm I^1 repeating the operation of feeding the wrapper and returning to its original position.

As shown in Fig. 1, a cover plate P is provided over the suction feed plate I. The suction feed plate I is constructed as shown in Fig. 8 of a width approximately equal to the width of the web, and it is formed with cut away portions I^8 for the formers O, against which the plate moves when feeding the wrapper, so that the area of the wrapper which is unsupported by the plate I is kept as small as possible while leaving a sufficient portion of the wrapper extending beyond the plate to enable the wrapper to be gripped by the grippers O^1 of the wrapping mechanism.

A gumming roller may be arranged to contact with the leading edge of the sheet while it is adhering to the plate I in the position shown in Figs. 1 and 4. While the wrapper is held by the suction plate, moisture from the gumming roller is prevented from causing the wrapper to curl. The curling of the wrapper when moisture is applied is especially noticeable when dealing with cellulose sheet.

What I claim as my invention and desire to secure by Letters Patent is:—

1. Method of feeding continuous cellulose sheet in a wrapping machine which consists in holding a leading portion of said sheet to a supporting surface by suction, feeding said leading portion of the sheet while this is so held by the suction and causing a further length of sheet to be drawn from a roll, severing the leading portion of the sheet so fed from said further length of sheet and supporting said further length of sheet while returning the device for holding and feeding the sheet to a position ready for feeding said further length of sheet.

2. A method of feeding continuous cellulose sheet in a wrapping machine which consists in drawing and holding a leading portion of said sheet on to a feeding device by suction, moving said leading portion while so held by said feeding device in order to feed said leading portion and to draw a further length of sheet from a roll, severing said leading portion from said further length of sheet, releasing said severed leading portion from said feeding device, supporting said further length of sheet in a position clear of the path of the feeding device, and returning said feeding device to a position in which it can draw and hold said further length of sheet ready for feeding.

3. In wrapping machines for wrapping articles in cellulose sheets a suction feed member adapted to hold a leading portion of continuous cellulose sheet and to release said leading portion and adapted to be oscillated in order to feed said leading portion and draw a further length of sheet off a roll while the leading portion is held and to return to its initial position after said leading portion has been released, means for severing said leading portion thus fed from said further length of cellulose sheet, and means for supporting said further length of cellulose sheet while said suction feed member returns to its initial position.

4. In wrapping machines for wrapping articles in cellulose sheets a suction feed member adapted to hold a leading portion of continuous cellulose sheet and to release said leading portion and adapted to be oscillated in order to feed said leading portion and draw a further length of sheet off a roll while the leading portion is held and to return to

its initial position after said leading portion has been released, means for clamping said further length of sheet after it has been drawn off the roll, means for severing said leading portion thus fed from said further length of cellulose sheet, and means for supporting said further length of cellulose sheet while said suction feed member returns to its initial position.

5. In wrapping machines for wrapping articles in cellulose sheets a suction feed member adapted to hold a leading portion of continuous celluose sheet and to release said leading portion and adapted to be oscillated in order to feed said leading portion and draw a further length of sheet off a roll while the leading portion is held and to return to its initial position after said leading portion has been released, means for severing said leading portion thus fed from said further length of cellulose sheet, and guide fingers mounted on said suction feed member supporting the said further length of cellulose sheet while the said suction feed member returns to its initial position.

6. In wrapping machines for wrapping articles in cellulose sheets a suction feed member adapted to hold a leading portion of continuous cellulose sheet and to release said leading portion and adapted to be oscillated in order to feed said leading portion and draw a further length of sheet off a roll while the leading portion is held and to return to its initial position after said leading portion has been released, means for severing said leading portion thus fed from said further length of cellulose sheet, guide fingers pivotally mounted on said suction feed member adapted to move with said member and adapted to support the said further length of cellulose sheet in a position clear of the path of said suction feed member when the latter returns to its initial position, and means for moving said guide fingers independently of said suction feed member.

7. In wrapping machines for wrapping articles in cellulose sheets a suction feed member adapted to hold a leading portion of continuous cellulose sheet and to release said leading portion and adapted to be oscillated in order to feed said leading portion and draw a further length of sheet off a roll while the leading portion is held and to return to its initial position after said leading portion has been released, means for applying suction to said suction feed member, control means for controlling the suction applied to said suction feed member, means for severing said leading portion thus fed from said further length of cellulose sheet, and means for supporting the said further length of cellulose sheet while the said suction feed member returns to its initial position.

8. In wrapping machines for wrapping articles in cellulose sheets a suction feed member adapted to hold by suction a leading portion of continuous cellulose sheet and to release said leading portion and adapted to be oscillated in order to feed said leading portion and draw a further length of sheet off a roll while the leading portion is held and to return to its initial position after said leading portion has been released, a suction pipe, a ported valve controlling the communication between said suction pipe and said suction feed member adapted to maintain the suction during feeding movement of said suction feed member and to release the suction during the return movement of said suction feed member, means for severing said leading portion thus fed from said further length of cellulose sheet, and means for supporting the said further length of cellulose sheet while the said suction feed member returns to its initial position.

9. The combination with a wrapping machine of, continuous feeding means for feeding continuous cellulose sheet from a roll thereof, means for taking up slack in said sheet fed from said roll, means for alternately clamping and releasing the sheet so fed, a suction feed member adapted to suck the leading portion of said cellulose sheet against its surface, a connection for communicating said suction feed member to a source of suction, control means for releasing the suction from said suction feed member, actuating means for said suction feed member adapted when the leading portion is sucked against its surface to move said leading portion and to draw a further length of cellulose sheet off the roll and when the suction is released to return said suction feed member to its initial position, means for severing said leading portion from said further length of cellulose sheet after these have been fed, and means for supporting said further length of cellulose sheet after the leading portion has been severed and while the suction feed member is returning to its initial position.

10. The combination with a wrapping machine of, continuous feeding means for feeding continuous cellulose sheet from a roll thereof, means for taking up slack in said sheet fed from said roll, clamping means for alternately clamping and releasing the sheet so fed, a suction feed member adapted to suck the leading portion of said cellulose sheet against the surface, a connection for communicating said suction feed member to a source of suction, control means for releasing the suction from said suction feed member, actuating means for said suction feed member adapted when the leading portion is sucked against its surface and when the clamping means releases the sheet to move said leading portion and to draw a further length of cellulose sheet off the roll and when the suction is released to return said suction feed member to its initial position, means for severing

said leading portion from said further length of cellulose sheet after these have been fed, guide fingers adapted to move with said suction feed member for supporting said further length of cellulose sheet after the leading portion has been severed and while the suction feed member is returning to its initial position, and means for operating said guide fingers independently of said suction feed member.

In witness whereof I have hereunto set my hand.

FREDERICK GROVER.