J. W. PERTZ.

PAPER OR FIBER BOARD MACHINE.

APPLICATION FILED JULY 25, 1917.

1,272,847.

Patented July 16, 1918.

3 SHEETS—SHEET 1.

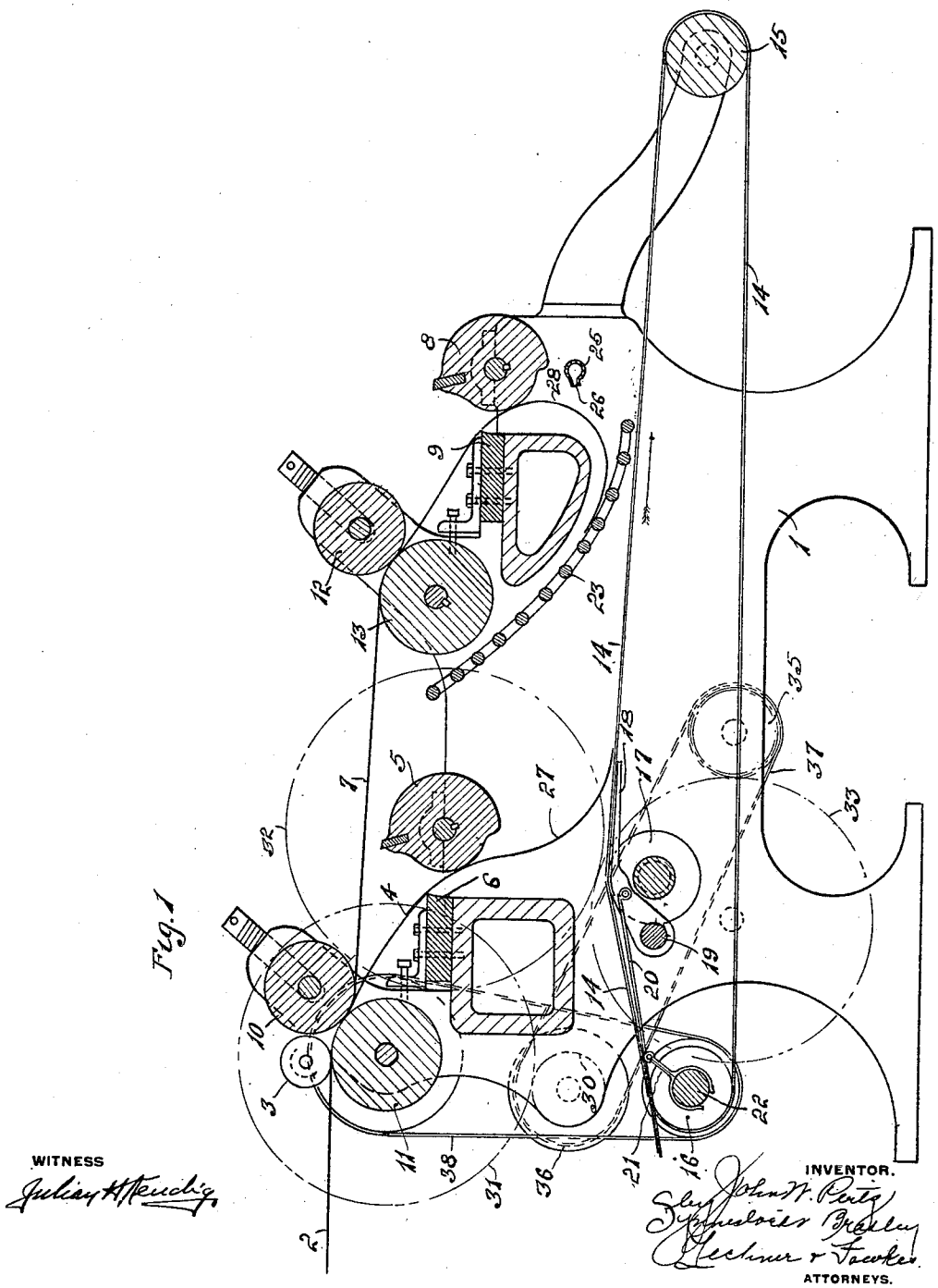


Fig. 1

WITNESS

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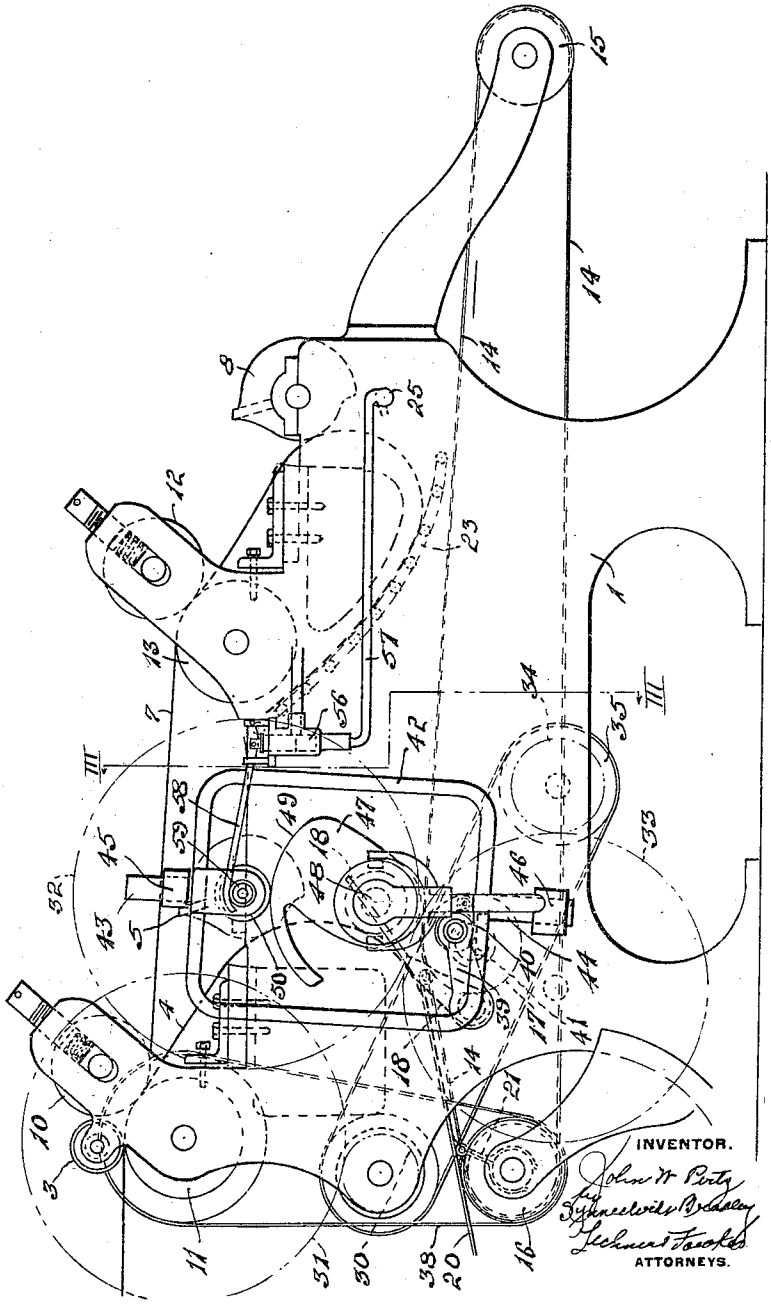


Fig. 2

WITNESS

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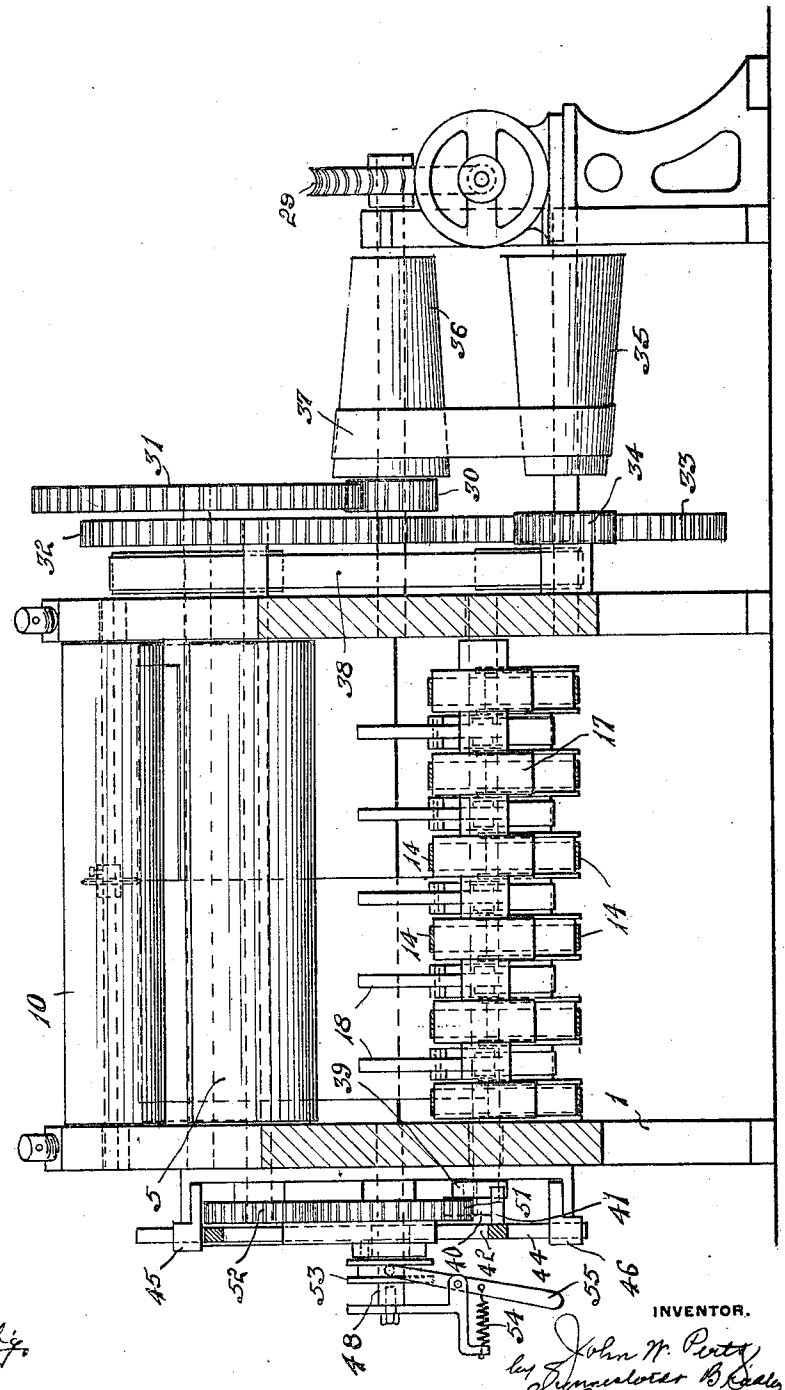


Fig. 3

WITNESS

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PAPER OR FIBER BOARD MACHINE.

1,272,847. Specification of Letters Patent. Patented July 16, 1918.

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To all whom it may concern:

Be it known that I, JOHN W. PERTZ, a citizen of the United States, residing at Lafayette, in the county of Tippecanoe and State of Indiana, have invented certain new and useful Improvements in Paper or Fiber Board Machines, of which the following is a specification.

The invention relates to mechanism or apparatus for taking care of or handling the cut up sections of the continuous band or strip of strawboard or the like as it comes from the forming mechanism. This strip or band may be any one of the paper or pulp boards going under the names strawboard, cardboard, pasteboard, boxboard, or other similar designation. This band or strip as it comes from the forming and drying rolls and is cut up, gives sheets or sections which are all slightly curved in the same direction, that is concave on the upper side.

In order to make a flat compact package for storage, and to make the sheets themselves flat, it is necessary to take the sheets as they come from the machine and turn every other one upside down before placing upon the pile for packing, the curvature in one set of sheets opposing that of the other set and producing a substantially flat package and causing a flattening of the individual sheets. This turning of alternate sheets as they come from the machine is a matter of difficulty because of the rapidity with which the sheets are received, and because of the size of the sheets and the air resistance incident to the necessarily rapid turning, which must be accomplished before the next sheet arrives.

The work of turning the sheets manually is very exhausting, requiring frequent shifts of operators and in so far as I know no mechanical means for satisfactorily accomplishing this work has ever been put in operation, all the turning at the present time being by hand. The labor cost is thus not only high, but the capacity of the machines is much less than would otherwise be possible if the sheets could be handled faster, thus permitting the speeding up of the machines.

It is the purpose of my invention to provide means for turning the alternate sheets in the machine thus avoiding the necessity of the hand manipulation and permitting the machine to be speeded up to its maximum producing capacity.

In its preferred embodiments, this object is accomplished by turning the advance end of the continuous strip or band backward periodically and before the cutting off operation, so that alternate sheets are fed backwardly in the machine thus turning them upside down. They are then fed forwardly so that they alternate with sheets which are not turned. My invention contemplates broadly the feature of turning a part of the sheets in a reverse direction as they emerge from the cutting device, and I believe it is new to secure such reversal of the sheets by periodically turning the advance end of the continuous band before the cutting off operation. The method of transferring the sheets after the cutting off operation is not vital, as the turned and unturned sheets might be transferred and collected into bundles in many different ways. Preferably, however, the two sets of sheets are fed forwardly upon the same transferring mechanism made in the form of an endless belt device. One embodiment of the invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a longitudinal section through the machine; Fig. 2 is a side elevation; and Fig. 3 is a section on the line III—III of Fig. 2 looking to the rear.

The construction will be best understood by a brief review of the parts as shown in Fig. 1, wherein 1 is the framework of the machine; 2 is the strip or band of paper board as it comes from the forming and drying rolls; 3 is a slitting roll for dividing the strip or band 2 into two sections, a part of which 4 passes between the cutting roll 5 and the block 6, and another portion of which 7 passes between the cutter roll 8 and the cutter block 9; 10 and 11 are one pair of calendering rolls, while 12 and 13 are another similar pair of rolls; 14 is an endless belt made up of a set of strips as will be seen by reference to Fig. 3, and passing over the three pulleys 15, 16 and 17; 18 is a set of fingers pivoted on the shaft 19 and carrying a set of metal strips 20 pivoted at their rear ends to the clip members 21 pivoted on the shaft 22; 23 is a guideway made of smooth transverse bars; and 25 is a pipe provided with a plurality of rearwardly directed nozzles 26.

Considering first the operation with respect to the section 4 of the strip of paper board, such strip passes between the cutter roll 5 and the block 6, and upon the rotation of such roll a section or sheet 27 with its lower end engaging the belt 14 is cut off. This sheet falls upon the belt and is carried forwardly and discharged over the roller 15 at the front end of the machine. The next section of the band 4 fed between the rolls does not follow this same course, however, since the mechanism is arranged so that when the end of the band approaches the fingers 18, these fingers lift to the position shown in dotted lines in Fig. 2, engaging the end of the band and turning it to the rear. This upward movement also raises the bars 20 above the level of the belt 14, so that when this strip is cut off it falls upon the bars and fingers. Upon the lowering of the bars and fingers, the sheet engages the belt 14 and is fed along in the same manner as the preceding sheet. It will be seen that by feeding the sheet to the rear by means of the guide fingers 18, the sheet was turned upside down. The fingers and cutter mechanism are so arranged that every alternate sheet is thus fed to the rear and turned upside down, being subsequently dropped upon the belt 14. In this manner the cut off sheets of paper board are delivered to the front of the machine with the alternate sheets bent reversely so that there is no necessity of turning the sheets as is the case where the sheets are all bent in the same direction.

The part 7 of the band or sheet is handled similarly, although the specific means for accomplishing this purpose is different. After passing the rolls 12 and 13 and the cutter roll 8 and block 9, the alternate sheets 28 are fed to the rear by means of an air blast from the nozzles 26 on the pipe 25 which causes the end of the band to engage the guide 23 after which the sheet is cut off and moved along the guide 23 until its front end clears the roll 8 and the pipe 25, at which time the sheet is free to slide to the right engaging the belt 14 and being carried forwardly thereby. When the air blast is not operated the sheet is not turned to the rear, its front end passing adjacent to the pipe 25 and engaging the belt 14, so that the alternate sheets have reversed positions just as with the mechanism operating upon the portion 4 of the band. The occasion for dividing the band 2 into the two strips 4 and 7 is to give opportunity for cutting one part into sheets of a different length from the other part, this feature of longitudinally dividing the band or strip being an old feature in the art.

The mechanism by which the parts as just described are operated is a matter of detail and will be readily understood by reference to Figs. 2 and 3 in connection with Fig. 1. The driving means of the apparatus is the worm wheel 29 (Fig. 3) which drives the gear 30 engaging the gear 31 carried on the end of the shaft on which the roller 11 is mounted. The cutter roll 5 carries at its end the gear 32 meshing with a gear 33 (Fig. 3) and this gear is driven by a spur gear 34 carried on the shaft which carries the tapering roller 35, this latter roller being driven from the roller 36 by means of the belt 37.

The belt 14 is driven from the pulley 16, the other two pulleys 17 and 15 on which the belt is mounted being idlers. The shaft of the roll 11 is provided with a pulley and a belt 38 which engages a pulley on the shaft 22. The driving mechanism for the rolls 13 and 8 is not shown and may be of any desired form.

The mechanism for oscillating the fingers 18 up and down and simultaneously raising the bars 20, will be best understood by reference to Fig. 2 in connection with Fig. 3. The shaft 19 carries at its end a crank 39 (Fig. 2) provided with a roller 40, and this roller is engaged by an inwardly projecting step 41 (Fig. 3) carried by the rectangular frame 42, which frame is provided with guide arms 43 and 44 slidably mounted in sleeves 45 and 46 carried by the frame. The frame 42 is reciprocated by a cam 47 mounted upon a stub shaft 48. The cam surface 49 of this cam engages a roller 50 carried by the frame 42 so that on each rotation of the stub shaft 48 and the cam carried thereby the frame 42 is reciprocated, and such reciprocation causes the oscillation of the shaft 19 and the guide fingers 18 carried thereby. The shaft 48 which carries the cam is provided with a gear 51 (Fig. 3) and this gear is engaged by another gear 52 carried on the end of the shaft which carries the cutter roll 5, and the gear 52 is one-half the diameter of the gear 51, so that two rotations of the cutter roll 5 produce one oscillation of the frame 42 and guide fingers 18.

The cam 47 is preferably mounted loosely on the stub shaft 48 but is caused to rotate with such shaft by means of the clutch member 53 which is splined on the shaft and normally held in engaging position by means of the spring 54 and lever 55. This arrangement permits the cam to be thrown out of operation when desired, as for instance, when the machine is first starting and before the paper strip is in good condition for cutting, at which time it is undesirable to have the alternate sheets reverse.

The reciprocation of the frame 42 by the cam 49 also governs the admission and cutting off of air to the pipe 25, which secures the turning back of the sheets in that portion of the mechanism which operates upon

the part 7 of the band or strip. A valve is provided in the casing 56 (Fig. 2) for controlling the supply of air through the pipe 57 to the pipe 25, and this valve is operated from a handle 58 extending over the end of the shaft 59 on which the roller 50 is mounted. The valve is so arranged that the up and down movement of the frame 42 causes the opening of the valve at the proper interval for securing the turning back of the ends of alternate sheets, as heretofore described. For simplicity in illustration the valve is shown as controlled from the movement of the frame 42, so that the single cam causes the actuation of both turning back devices, but it will be understood that other arrangements are contemplated and that the valve may be controlled from an independent cam operated preferably from the cutter roll 8.

It will be seen from the foregoing and by reference to Fig. 1 that every alternate sheet 27 is fed onto the belt 14 in the usual way and cut off with its concave side up, and that the other sheets have their ends intercepted by the fingers 18 and turned to the rear so that after the sheets are cut off and allowed to engage the belt 14 by the downward movement of the fingers, such sheets will have their concave portions down, the operation as just described securing the reversal of the sheet in a very simple and effective way. Similarly with respect to sheets formed from the part 7 of the band, the only difference being that in this portion of the apparatus the turning back means is different. This particular turning back means is desirable at this point since it is compact and can be more readily placed in the space above the belt 14 than the mechanically turning mechanism including the fingers 18. Many other means might obviously be employed for accomplishing this function of reversing the alternate sheets by periodically turning the end of the band to the rear, and it will be understood that my invention is generic in this particular. It will also be understood that my invention is not limited to the use of the particular transfer mechanism for carrying the sheets forward after cutting off. It is preferred that both sets of sheets be carried forward by the same transfer mechanism, which is preferably a belt device, but this is not necessarily the case in so far as the invention in its broadest form is concerned. Very little power is required to secure the turning of the sheets and the mechanism can be readily applied to existing types of machines thus eliminating the manual labor heretofore required, and permitting the machines to be run at the highest possible rate of speed instead of being limited by the speed at which it is possible to turn the alternate sheets as has heretofore been the case. Other advantages incident to the apparatus will be readily apparent to those skilled in the art.

I claim:

1. In a machine for manufacturing board from pulp in a continuous forwardly moving band or strip and including cutting means for cutting the band transversely into sheets or sections, means for turning the forward ends of alternate sheets backward and upside down and permitting the forward ends of the other sheets to feed forwardly, and means for feeding both sets of sheets forwardly.

2. In a machine for manufacturing board from pulp in a continuous forwardly moving band or strip and including a cutter for cutting the band transversely into sheets or sections, means for turning the forward ends of alternate sheets backward and upside down and permitting the forward ends of the other sheets to feed forwardly, and a common conveyer for receiving both sets of sheets which are cut off and feeding them forwardly.

3. In a machine for manufacturing board from pulp in a band or strip, a cutter for cutting the band transversely into sheets or sections, means for engaging the end of the band in advance of the cutter and turning it to the rear and upside down before the actuation of the cutter and then releasing such end, and a forwardly moving means in position to engage the sheet and carry it forwardly after its release.

4. In a machine for manufacturing board from pulp in a continuous forwardly moving band or strip, a cutter for cutting the band transversely into sheets or sections, means for engaging the end of the band in advance of the cutter and turning it to the rear and upside down before one actuation of the cutter, and permitting the end of the band to turn to the front before the next actuation of the cutter, and means for feeding both sheets forwardly to a common receiving point after they are cut off.

5. In a machine for manufacturing board from pulp in a continuous forwardly moving band or strip, a cutter for cutting the band transversely into sheets or sections, means for engaging the end of the band in advance of the cutter and turning it to the rear before one actuation of the cutter, means whereby the end of the band is turned to the front before the next actuation of the cutter, and a conveyer which receives both sheets and carries them forwardly.

6. In a machine for manufacturing board from pulp in a band or strip, a cutter for cutting the band transversely into sheets or sections, a forwardly moving endless conveyer in advance of the cutter, a guide movable to a position above the conveyer and adapted when raised to engage the end of the band and turn it to the rear, and means for

periodically raising the guide to cause the feed of the end of the band to the rear and then lowering it after the sheet is cut off to allow the sheet to engage the conveyer and be fed forwardly

7. In a machine for manufacturing board from pulp in a band or strip, a cutter for cutting the band transversely into sheets or sections, and means for engaging the end of the band in advance of the cutter and turning it to the rear before the actuation of the cutter to turn the sheet which is cut off upside down.

8. In a machine for manufacturing board from pulp in a band or strip, a cutter for cutting the band transversely into sheets or sections, and means for engaging the end of the band in advance of the cutter before the alternate actuations only of said cutter whereby the alternate sheets so engaged and cut off are turned upside down.

9. In a machine for manufacturing board from pulp in a band or strip, a cutter for cutting the band transversely into sheets or sections, a forwardly moving conveyer in advance of the cutter, means for moving the end of the band to the rear out of contact with the conveyer, and means for periodically actuating said means and periodically releasing it after the sheet is cut off to allow such sheet to engage the conveyer and be fed forwardly.

JOHN WM. PERTZ.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."