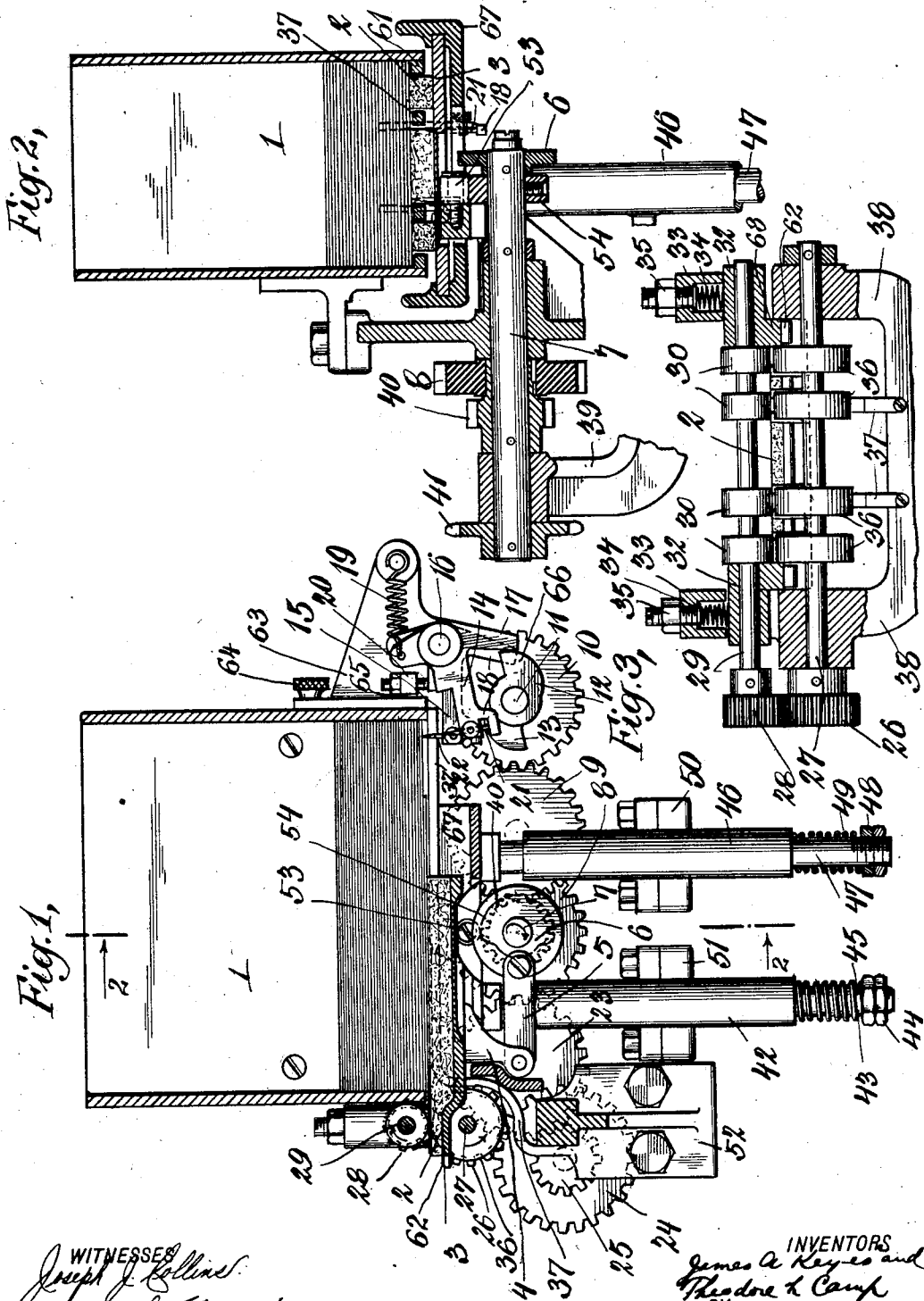


J. A. KEYES & T. L. CAMP.
PAPER FEEDER.
APPLICATION FILED SEPT. 3, 1908.

998,012.

Patented July 18, 1911.



WITNESSES
Joseph J. Collins
Albert L. Thayer

INVENTORS
James A. Keyes and
Theodore L. Camp
BY

Almeida & Almeida ATTORNEYS

UNITED STATES PATENT OFFICE.

JAMES A. KEYES AND THEODORE L. CAMP, OF NEW YORK, N. Y.

PAPER-FEEDER.

998,012.

Specification of Letters Patent. Patented July 18, 1911.

Application filed September 3, 1908. Serial No. 451,486.

To all whom it may concern:

Be it known that we, JAMES A. KEYES and THEODORE L. CAMP, citizens of the United States, and residents of the city, county, and State of New York, have made certain new and useful Inventions Relating to Paper-Feeders, of which the following is a specification, taken in connection with the accompanying drawings, forming part of the same.

This invention relates to paper feeders and relates especially to feeders comprising a supply box having a slotted support against which the sheet stack rests and a plurality of intermittently acting separating needles cooperating with the outer sheet of said stack, a reciprocating feeder having sectional gripping members projecting through the slots in said support to engage and withdraw the outer sheet from the stack and deliver the same to intermittently acting delivery rolls which grip and deliver the sheet as the feeder withdraws.

In the accompanying drawings showing in a somewhat diagrammatic manner an illustrative embodiment of this invention and in which the same reference numeral refers to similar parts in the several figures, Figure 1 is a longitudinal vertical section. Fig. 2 is a transverse vertical sectional view taken substantially along the line 2—2 of Fig. 1. Fig. 3 is an enlarged transverse sectional view through the delivery rolls.

In the illustrative embodiment of this invention shown in the drawing the supply box 1 may as indicated be vertically arranged and provided with a slotted support against which the sheet stack lies, this support being if desired at the bottom of the supply box and formed of a series of separated support bars 61, 37, having intervening longitudinal slots through which the outer sheet of the stack is exposed. A plurality of intermittently acting separating needles are mounted to cooperate with the sheet stack, one of these needles being always in engagement with the stack so as to perforate several of the outer sheets thereof. In this way the outer sheet may be withdrawn by the feeder, the needle tearing through the same while retaining the other sheets in normal position in the box. As the next sheet is withdrawn another needle comes into action and the first is withdrawn so as to release any accumulation of fuzz or paper on the needles and

keep them in proper operating condition. This may be accomplished by mounting a plurality of needle arms 14, 15, on the transverse shaft 16 mounted in a suitable supporting frame 63 detachably secured to the supply box 1 by the bolts 64 or otherwise so that this frame and needles may be bodily removed for inspection or adjustment. The needles 21, 22 are detachably secured in the ends of the needle arms and are normally forced upward with the desired pressure by suitable springs 19 which tend to draw the needle arms up against adjustable stops 65 in a transverse member 20 in the frame 63. The cam shaft 11 carries a plurality of cams 13, 66 to cooperate with the needle levers 17, 18 on the arms, the cam 66 as indicated throwing the lever 17 outward and thereby swinging the needle arm 14 and needle 21 downward about the shaft 16 so as to withdraw this needle from engagement with the sheet stack. The cam shaft 11 may be operated from the drive shaft 7, driven by the sprocket 41 or otherwise, by the pinion 40 on the drive shaft which meshes with the idler gear 9 in mesh with the gear 10 fixed on the cam shaft 11 so as to operate the cam shaft at half the speed of the drive shaft so that one needle is withdrawn at each revolution of this drive shaft. A gear 8 on the drive shaft is in mesh with the idler 23 engaging the pinion 25 on the same shaft as the gear 24. The latter engages the gear 26 on the shaft 27 carrying the sectional delivery rolls 36 as indicated and the gear 28 on the shaft 29 carrying the upper sectional delivery rolls 30 is in mesh with the gear 26 so that both sets of rolls are driven at substantially the same surface speed. The shaft 29 is mounted in the bearing blocks 32 normally pressed downward by the springs 34 in suitable apertures in the yokes 33, the intensity of action of these springs being adjusted by the set nuts and bolts 35. In this way the upper delivery rolls may be moved out of engagement with the lower set of rolls 36 or when in contact therewith these rapidly rotating rolls serve to quickly feed forward a sheet located between them. The bracket 67 may be mounted on suitable rods 47 operating in apertures in the vertical members 42, 46 secured to the main frame which comprises the various members 38, 39, 50, 51 and 52. This bracket and the attached rods may be normally held downward by suitable springs 43, 49, the action

of which may be adjusted as by the set nuts 44, 48 on the lower ends of the rods. The bracket serves to support and guide the feeder 3 mounted in suitable guides therein as indicated in Fig. 2 and carrying the gripping members or sectional grip 2 adapted to project through the slots in the support and engage the outer sheet of the stack. These grips may be formed in any desired way to properly engage and hold the exposed sheet of the stack as the feeder withdraws the same from the stack, blocks of sponge rubber or other material being suitable for this purpose. The bracket and feeder may be projected at the proper time into coöperation with the sheet stack by any desired means such as the cam 54 mounted on the drive shaft 7 coöperating with a suitable cam follower or roll 53 secured to the bracket so that for each revolution of the drive shaft the bracket, feeder and grips are held upward in the operative position indicated in the drawings for approximately half a revolution. The feeder may also be simultaneously reciprocated by any desired means, such as the crank 6 on the drive-shaft pivotally connected with the link 5 pivoted to the lug 4 on the feeder. In this way the feeder and grips are moved upward together with the yieldingly mounted supporting bracket until the grips engage the exposed sheet of the stack throughout substantially its entire length and width, then the feeder is moved forward carrying with it the outer sheet of the stack which has been lifted clear of the support by the grips. The lower sheet tears through the needle 22 in engagement therewith at the time, this needle serving to prevent the other sheets from being fed forward and in this way the sheet is fed into the bite of the delivery rolls 30, 36, between which the feeder grips pass, the feeder itself being formed with suitable apertures in its forward portion to pass between these sectional delivery rolls. The front portion of the feeder is also provided with suitable lateral cam portions 62 adapted to wedge under the depending lugs 68 of the shaft bearing blocks 32 so as to wedge up these bearings and the shaft 29 carrying the upper delivery rolls 30 so that at this time the delivery rolls are out of action and cannot feed forward the sheet lying loosely between them. When, however, the drive shaft 7 has rotated far enough to bring the reduced portion of the cam 54 in engagement with the follower 53, the bracket and feeder are thereby lowered, allowing the springs 34 to force the delivery rolls 30 into gripping engagement with the lower rolls 36, thereby rapidly delivering the sheet during the rearward movement of the feeder which has been lowered clear of the same. Then when the feeder has reached its rear position it is once more raised until the sec-

tional grip engages the lower sheet of the stack, lifting the stack of sheets clear of the supporting bars 37, 61 and feeding forward the lowest sheet of the stack which tears through the needle 21, at this time in engagement therewith, the needle 22 having been withdrawn by the cam 13 so that any fuzz or portions of paper between this needle and the sheet are carried away by the sheet and the needle kept free.

Having described this invention in connection with an illustrative embodiment thereof, to the details of which disclosure the invention is not of course to be limited, what is claimed as new and what is desired to be secured by Letters Patent is set forth in the appended claims.

1. In sheet feeders, a supply box, a slotted support formed of a plurality of longitudinally separated support bars, a detachable supporting frame carrying a shaft and adjustable stops adjacent thereto, a plurality of needle arms loosely mounted on said shaft and spring-pressed into engagement with said stops, needles removably mounted in said needle arms, needle levers secured to said needle arms, a cam shaft and a plurality of angularly displaced cams on said shaft to engage said needle levers and alternately operate said needle arms and needles to withdraw the same from engagement with the sheet stack coöperating with said support, a bracket having yieldingly mounted guide rods secured thereto, a drive shaft carrying a cam, a follower on said bracket projecting the same intermittently toward said sheet stack, a feeder slidably mounted in said bracket and carrying grips projecting through the slots in said support to engage the outer sheet of said stack when said bracket is in active position, and move said stack substantially evenly out of active engagement with said support, a crank on said drive shaft connected with said feeder to reciprocate the same, sectional delivery rolls rotated from said drive shaft, springs normally pressing said delivery rolls into coöperation and cam portions on said feeder to force said delivery rolls out of engagement while a sheet is being fed between the same, said rolls coming into engagement to deliver said sheet when said feeder moves downward out of engagement therewith.

2. In sheet feeders, a slotted support, a supporting frame carrying a shaft and stops adjacent thereto, a plurality of needle arms loosely mounted on said shaft and normally pressed into engagement with said stops, needles mounted in said needle arms, needle levers secured to said needle arms, a cam shaft and a plurality of angularly displaced cams on said shaft to engage said needle levers to alternately operate said needle arms and needles to withdraw the same

from engagement with the sheet stack co-operating with said support, a yieldingly mounted bracket, means to intermittently project said bracket toward said sheet stack, a feeder slidably mounted in said bracket and carrying grips projecting through the slots in said support to engage the outer sheet of said stack when said bracket is in active position, means to reciprocate said feeder and intermittently acting delivery rolls engaging said sheet and delivering the same when released from gripping engagement with said feeder.

3. In sheet feeders, a slotted support, a supporting frame carrying a shaft and stops adjacent thereto, a plurality of needle arms loosely mounted on said shaft and normally pressed into engagement with said stops, needles mounted in said needle arms, means to alternately operate said needle arms and needles to withdraw the same from engagement with the sheet stack coöperating with said support, a yieldingly mounted bracket, means to intermittently project said bracket toward said sheet stack, a feeder slidably mounted in said bracket and carrying grips projecting through the slots of said support to engage the outer sheet of said stack when said bracket is in active position, means to reciprocate said feeder to withdraw the outer sheet from said stack, and intermittently acting delivery means engaging said sheet and delivering the same when said sheet is released from gripping engagement with said feeder.

4. In sheet feeders, a slotted support, a plurality of needle arms coöperating with said support, needles mounted in said needle arms and normally pressed into engagement with the outer sheets of a stack coöperating with said support, means to alternately operate said needle arms and needles to withdraw the same from engagement with said sheet stack, a feeder carrying separated longitudinal grips to project through the slots in said support, and engage the outer sheet of said stack and withdraw the same, means

to reciprocate said feeder and simultaneously project the same intermittently toward said sheet stack, delivery rolls having separate sections to allow said grips to pass between the same and delivering the withdrawn sheet when the same is released from gripping engagement with said feeder.

5. In sheet feeders, a support to be engaged by a sheet stack, piercing separating means engaging the outer sheet of said stack, a feeder intermittently engaging and withdrawing the outer sheet from said stack, delivery rolls having separated sections to allow said feeder to pass between the same, means to rotate and normally press said delivery rolls into coöperation and means on said feeder to hold said delivery rolls out of engagement while a sheet is being fed between said rolls, said rolls engaging and delivering said sheet when said feeder moves out of engagement therewith.

6. In sheet feeders, a slotted support to be engaged by a sheet stack, sharp piercing separating means coöperating with said sheet stack, means to alternately bring each of said separating means into piercing engagement with the outer sheets of said stack to simultaneously pierce a plurality of sheets, a feeder having a plurality of frictionally gripping sections projecting through the slots in said support and intermittently withdrawing the outer sheets from said stack, delivery rolls having separated sections to allow said feeder to pass between the same, means to rotate and normally press said delivery rolls into coöperation and means on said feeder to hold said delivery rolls out of engagement while a sheet is being fed between said rolls, said rolls automatically coming into engagement and delivering said sheet when said feeder moves out of engagement therewith.

JAMES A. KEYES.

THEODORE L. CAMP.

Witnesses:

HARRY L. DUNCAN,
W. E. PEARSE.