

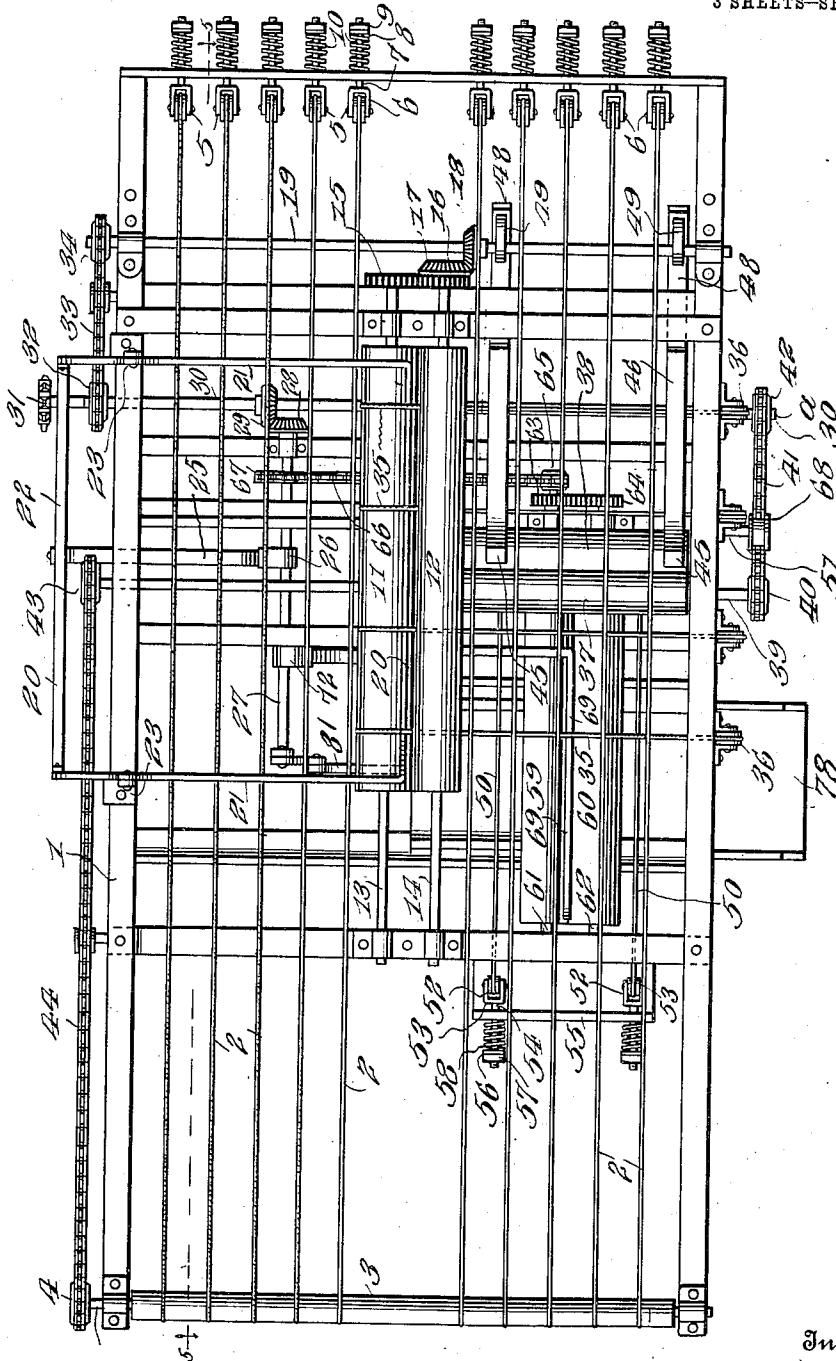
B. P. NEHER.
 NEWSPAPER FOLDING APPARATUS.
 APPLICATION FILED DEC. 16, 1911.

1,057,872.

Patented Apr. 1, 1913.

3 SHEETS-SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

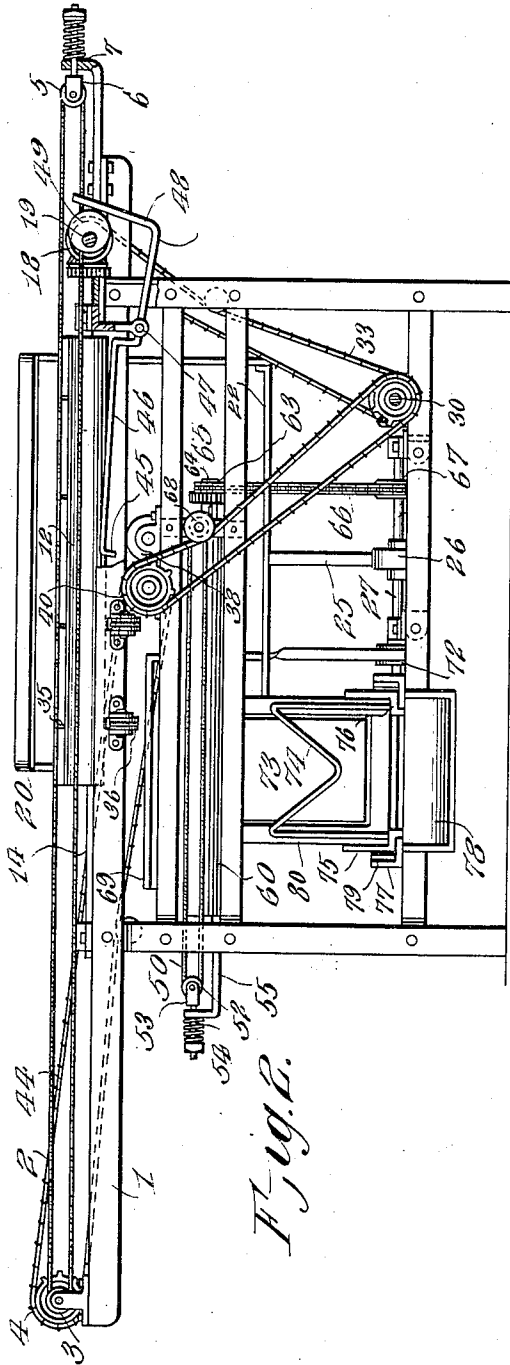


Fig. 2.

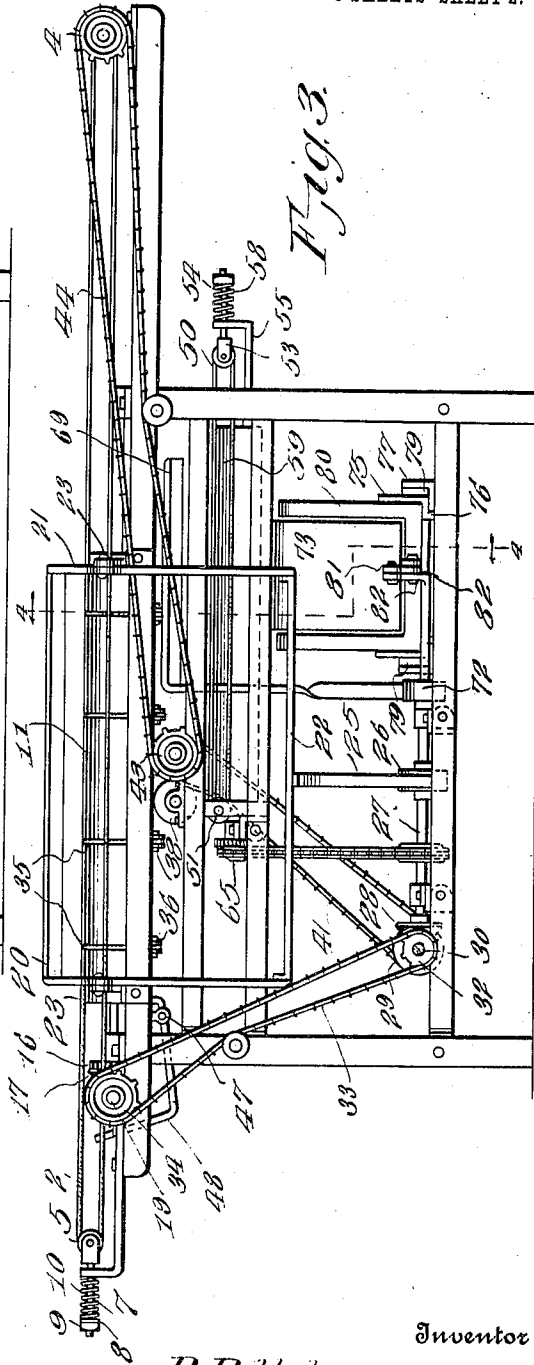


Fig. 3.

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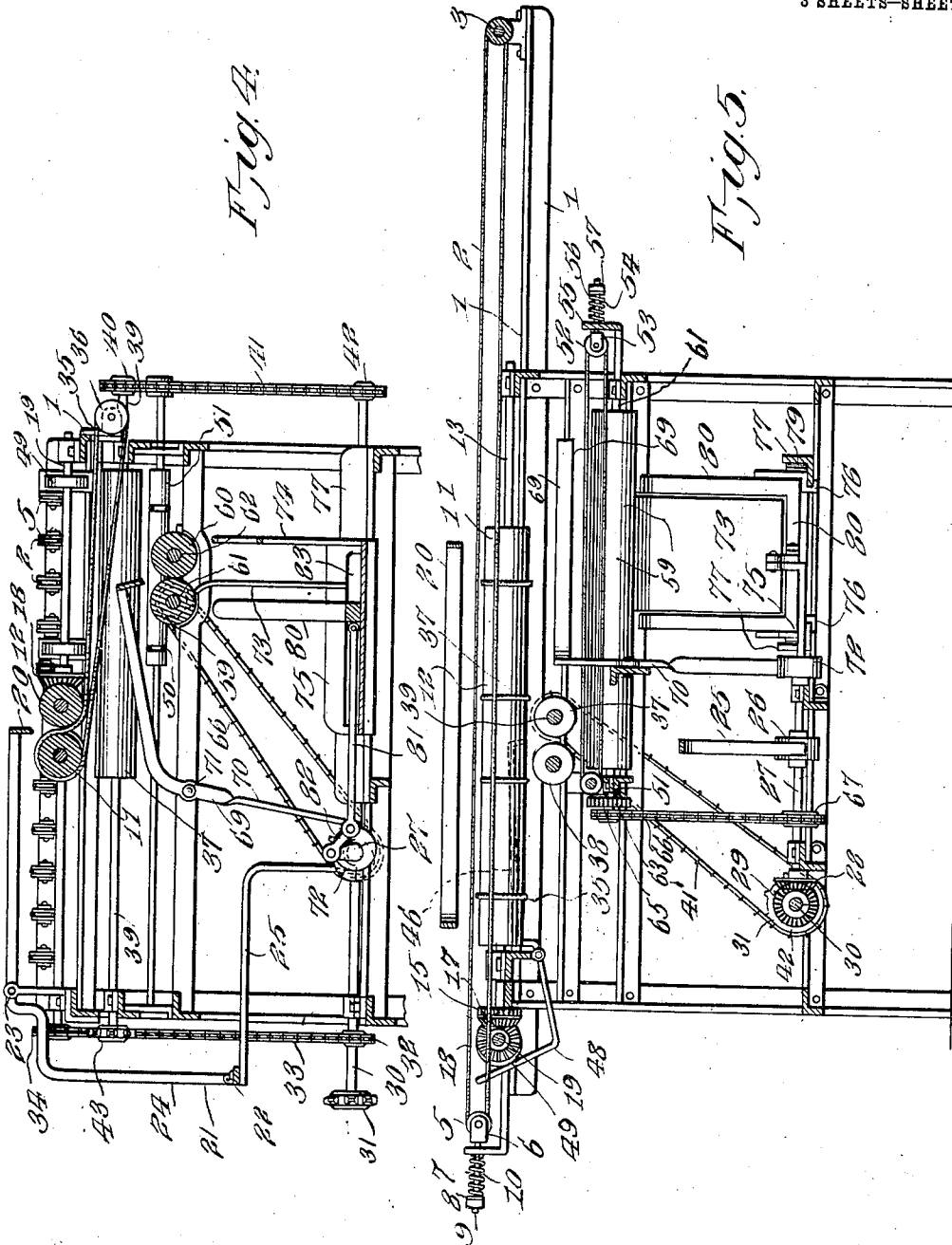
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UNITED STATES PATENT OFFICE.

BENJAMIN P. NEHER, OF ATKINSON, NEBRASKA, ASSIGNOR OF ONE-FOURTH TO JOHN P. McNICHOLS, OF ATKINSON, NEBRASKA.

NEWSPAPER-FOLDING APPARATUS.

1,057,872.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed December 16, 1911. Serial No. 666,089.

To all whom it may concern:

Be it known that I, BENJAMIN P. NEHER, a citizen of the United States, residing at Atkinson, in the county of Holt and State of Nebraska, have invented new and useful Improvements in Newspaper-Folding Apparatus, of which the following is a specification.

This invention relates to an apparatus for folding newspapers and other printed sheets, the object of the invention being to provide a simple, inexpensive and efficient type of apparatus, which may be driven from and used in conjunction with an ordinary printing press to receive and fold the sheets as they come from the press, thus obviating the necessity of employing an independently driven folding machine to which the sheets must be transported.

A further object of the invention is to provide a folding apparatus which will rapidly fold the sheets, and which will be reliable in use and not likely to get out of order.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a top plan view of a paper folding apparatus constructed in accordance with my invention. Fig. 2 is a view looking toward one side of the machine, partially broken away to show a feature of construction. Fig. 3 is a view looking toward the opposite side of the machine. Fig. 4 is a vertical transverse section on line 4—4 of Fig. 3. Fig. 5 is a vertical longitudinal section on line 5—5 of Fig. 1.

In carrying my invention into practice, I provide a frame 1, which may be of any preferred general construction. Running longitudinally at the top of this frame is a series of primary feed tapes or cables 2, which pass at the outer end of the frame around a grooved transverse guide roller 3 provided at one end with a sprocket wheel 4 and at the inner end of the frame around a series of guide pulleys 5. The pulleys 5 are carried by tension devices, whereby the tapes are maintained taut, each of said tension devices comprising a fork 6 in which the pulley is journaled, a stem 7 slidably mounted upon the adjacent cross bar of the frame, a washer 8 and adjusting nut 9 ap-

plied to the outer end of the stem, and a coiled spring 10 interposed between the washer and the cross bar, whereby the spring may be tensioned to hold the cable as taut as desired. In practice, the inner end of the frame is disposed in proximity to the press, to receive the sheets delivered from the printing mechanism thereof, said sheets falling in an outspread condition upon the upper stretches of the cables 2 and being moved thereby longitudinally of the folder frame in the direction of the roller 3.

Extending in parallel relation longitudinally of the frame is a pair of primary folding rollers 11 and 12 mounted on suitably journaled shafts 13 and 14. These shafts are provided at one end with intermeshing gears 15 and 16 for simultaneously rotating the rollers toward each other, in an inward and downward direction. On the shaft 14 is also a beveled gear 17 meshing with a similar gear 18 on a primary transverse transmission shaft 19.

Arranged above the rollers 11 and 12 is a primary feeder 20 comprising a bar or blade to engage and force the sheet centrally down between said rolls, said feeder being carried by a U-shaped frame embodying arms 21 connected at their outer ends by a cross bar 22 and pivotally mounted to tilt vertically at one side of the frame, as at 23. Connected with the cross bar 22 is an angular trip member or lever 25 adapted to be moved vertically by a cam 26 on a secondary longitudinal transmission shaft 27, whereby the feeder 20 will be rocked or oscillated in a vertical plane to force the successive sheets at proper intervals down between the primary folding rollers 11 and 12.

The shaft 27 is provided at one end with a beveled gear 28 meshing with a similar gear 29 on a transverse main drive shaft 30, which extends at its ends beyond the sides of the machine and is provided at one end with a sprocket wheel 31 adapted to receive motion through a sprocket chain from some portion of the operating mechanism of the printing press. Adjacent to said sprocket wheel 31 the shaft 30 carries a sprocket wheel 32 connected by a chain 33 with a sprocket wheel 34 on the adjacent end of the primary transmission shaft 19, whereby the latter is driven.

The roller 11 is annularly grooved to receive and form a drive member for a sec-

ondary series of feed tapes or cables 35 which run beneath the roller 12 and laterally toward the side of the machine opposite that to which the arms 21 are pivotally connected, said tapes passing at the latter-named side of the frame over suitable guide pulleys 36. These tapes operate to feed the primarily folded sheet toward a second pair of transversely arranged folding rollers 37 and 38, which are suitably journaled upon the frame structure. The outer end of the shaft 39 of the roll 37 carries a sprocket wheel 40 which is connected by a sprocket chain 41 with a sprocket wheel 42 on the adjacent end of the main drive shaft 30, whereby the roll 37 is positively driven, the roll 38 turning in unison therewith by its frictional engagement with the printed sheet. The opposite end of the shaft 39 extends to the opposite side of the frame and carries a sprocket wheel 43 which is connected by a chain 44 with the sprocket wheel 4 on the roll 3, whereby the latter is driven. The rolls 37 and 38 rotate inwardly and downwardly and operate to give a second fold to the sheet at right angles to the fold formed by the primary rolls 11 and 12. Feeders 45 are provided to force the sheet down between the rolls 37 and 38, said feeders comprising blades mounted upon the inner ends of a pair of longitudinally extending lever arms 46 pivotally supported upon the frame, as at 47, and provided with upturned outer extremities or contact portions 48 engaging cams 49 on the shaft 19, whereby said feeders are periodically rocked or oscillated in a vertical plane.

The sheet folded by and passing downward between the rolls 37 and 38 engages and rests upon the upper stretches of a third series of longitudinally extending feed tapes or cables 50, which pass at one end around a grooved transversely arranged drive roll 51 and at their opposite ends around guide pulleys 52 journaled in forks 53 carried by stems 54 slidably mounted in a guide bar 55, the outer ends of which stems carry washers 56 and adjusting nuts 57 arranged to bear against tension springs 58, forming tensioning devices similar to those acting upon the tapes 2, whereby the tapes 50 may be maintained taut. The tapes 50 operate to convey the sheet delivered by the rolls 37 and 38 to a third or tertiary pair of longitudinally extending folding rolls 59 and 60, which impart a final fold to the sheet in a direction at right angles to the fold imparted by the said rolls 37 and 38. The rolls 59 and 60 rotate inwardly and downwardly and their shafts 61 and 62 are provided at one end with intermeshing gears 63 and 64, by which said rolls are adapted to operate in unison. The shaft 61 also carries a sprocket wheel 65 connected by a chain 66 with a sprocket wheel

67 on the shaft 27, whereby said rolls are driven. The shaft of the roll 51 is provided with a pulley or sprocket wheel 68 driven by engagement with one of the stretches of the chain 41. A feeder 69 is arranged to engage and force the sheet down between the rolls 59 and 60 and is carried by an arm 70 pivotally mounted on the frame as at 71, the free end of which arm engages a cam 72 on the shaft 27, whereby said feeder is periodically rocked or oscillated for the purpose described. It will thus be seen that the sheets delivered from the press first fall upon the tapes 2 and are conveyed thereby to the rolls 11 and 12, pass downward between said rolls and are primarily folded, are then fed laterally by the tapes 35 over the rolls 37 and 38, by which they are folded a second time, and are thence conveyed longitudinally by the tapes 50 above the rolls 59 and 60, through which they pass and are folded a third time, the various feeders 20, 45 and 69 operating to press the central portions of the sheets into the spaces between the rolls of each pair, whereby the rolls are adapted to grip the sheets for a downward feeding and folding action. By this means the newspaper or other sheets printed by the press are taken directly from the press and folded in proper form for final delivery, the folder operating in timed accord with the press, whereby the sheets as rapidly as printed will be folded, such construction and operation of the folding device obviating the necessity of employing an independent folding machine to which the printed matter must be transported.

The folder may be used in conjunction with any ordinary type of cylinder press and delivery means and will be found of great convenience and advantage in small newspaper and printing offices for folding weeklies and various kinds of printed sheets upon their issue from the press.

Arranged to receive and guide the sheets as they drop from the rolls 59 and 60 are vertically disposed guiding and clamping members 73 and 74, the member 73 being suitably fixed to the frame of the machine to operate as a stationary guide to conduct the folded sheets to a traveling delivery tray or carriage 75, on the outer or forward end of which the member 74 is mounted. The tray or carriage is provided with guide-ways 76 engaging suitable supporting track rails 77, whereby said tray or carriage is adapted to be moved toward one side of the frame for the removal of the folded sheets and temporary support of the same upon a final receptacle 78. The carriage is adapted to be frictionally held in adjusted position by leaf springs 79 interposed between the same and the sides of the track rails, and is adapted to be periodically shifted outward or forward by a follower 80 receiving motion at

fixed intervals through a pitman or rod 81 from a driving crank 82 on the shaft 27. The sides of the carriage 75 are provided with guide slots 83 in which the base of the follower 80 is fitted to slide, said follower being U-shaped or apertured to permit it to pass the guide member 73 so as to engage the sheet or sheets disposed between the members 73 and 74 and feed the carriage 75 forward on each operation a distance equivalent to the thickness of each sheet. As the sheets drop onto the carriage it will therefore be apparent that the latter will be fed forward to permit the sheets to successively enter and hold the stack of sheets until the carriage is full, when they may be removed from the carriage or placed upon the support 78 on which they may be allowed to temporarily rest until it is desired to remove them. After the carriage has been moved outward to its fullest extent and is relieved of its supply of folded sheets, it may be slid backward to normal position again for the subsequent forward feeding action.

Having thus described the invention, what I claim as new is:—

1. A newspaper folding apparatus comprising a frame, a series of pairs of folding devices thereon, feeding means associated therewith, a sliding carriage, leaf springs arranged between the carriage and frame for instituting a frictional resistance to the movement of the carriage, guides upon the

frame and carriage for guiding the folded sheets to the latter, a reciprocating follower slidably mounted on the carriage and movable through the guide on the frame and toward the guide on the carriage for feeding the carriage forward on the reception of each sheet, an actuating shaft and a crank and pitman connection between said shaft and said follower.

2. A newspaper folding apparatus comprising a frame, a series of pairs of folding devices thereon, feeding means associated therewith, guides upon the frame, a carriage slidably mounted on said guides and having slots in its side walls and provided with a clamping member, leaf springs between the guides and carriage for instituting a frictional resistance to the movement of the latter, a guide upon the frame cooperating with said clamping member to guide the sheets to the carriage, a reciprocating follower engaging and movable in the guide slots in the carriage, said follower being movable through said guide member, an actuating shaft, and a crank and pitman connection between said shaft and said follower.

In testimony whereof I affix my signature in presence of two witnesses.

BENJAMIN P. NEHER.

Witnesses:

ROY SMITH,
ED TOMSIK.