Sept. 26, 1933. J. C. DONNELLY 1,928,199

MACHINE FOR FILLING MATCH BOXES

Filed Oct. 30, 1931 2 Sheets-Sheet 1

Fig. 1.

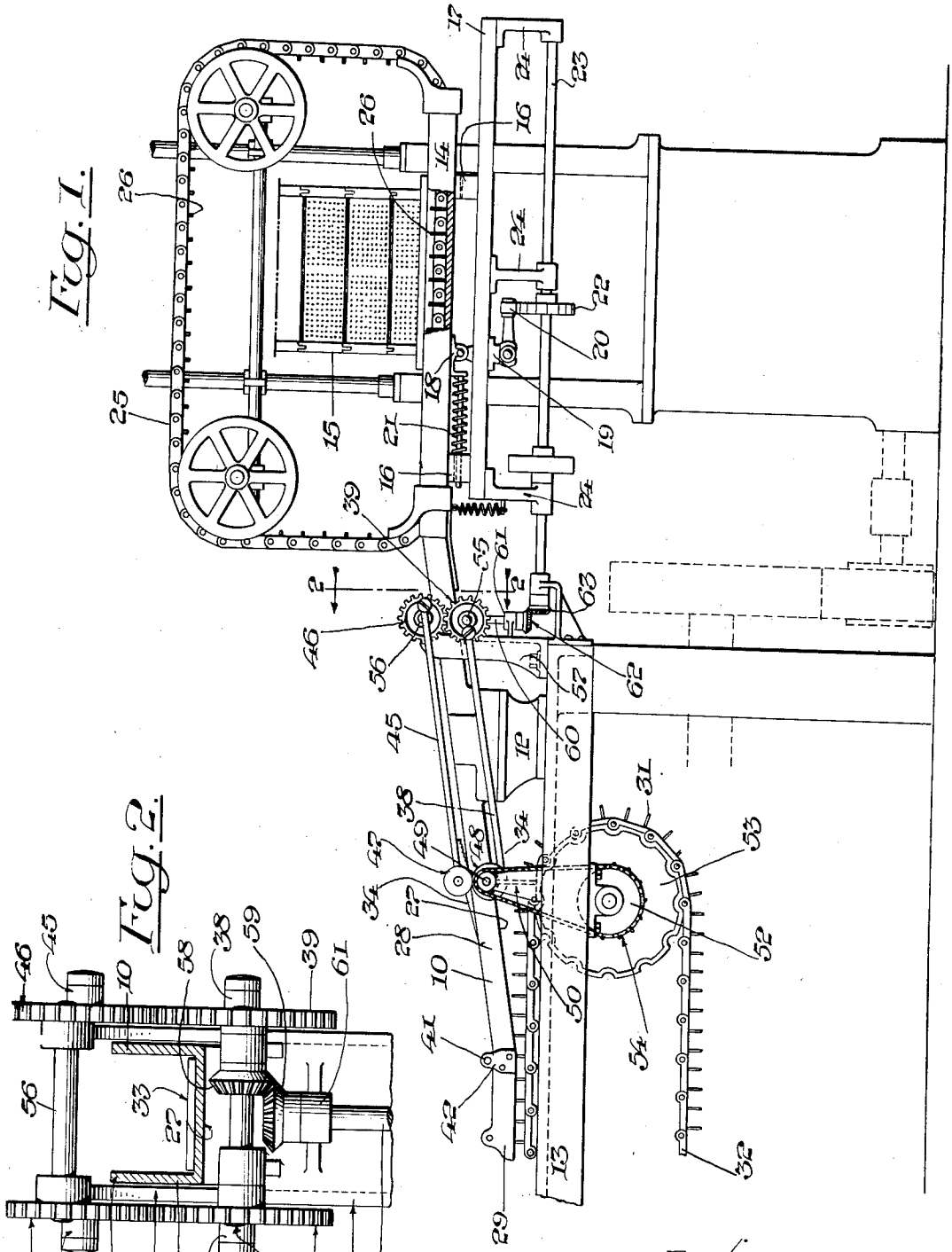


Fig. 2.

Inventor:
Joseph C. Donnelly
by his Attorney
John P. Nolan

Sept. 26, 1933. J. C. DONNELLY 1,928,199

MACHINE FOR FILLING MATCH BOXES

Filed Oct. 30, 1931 2 Sheets-Sheet 2

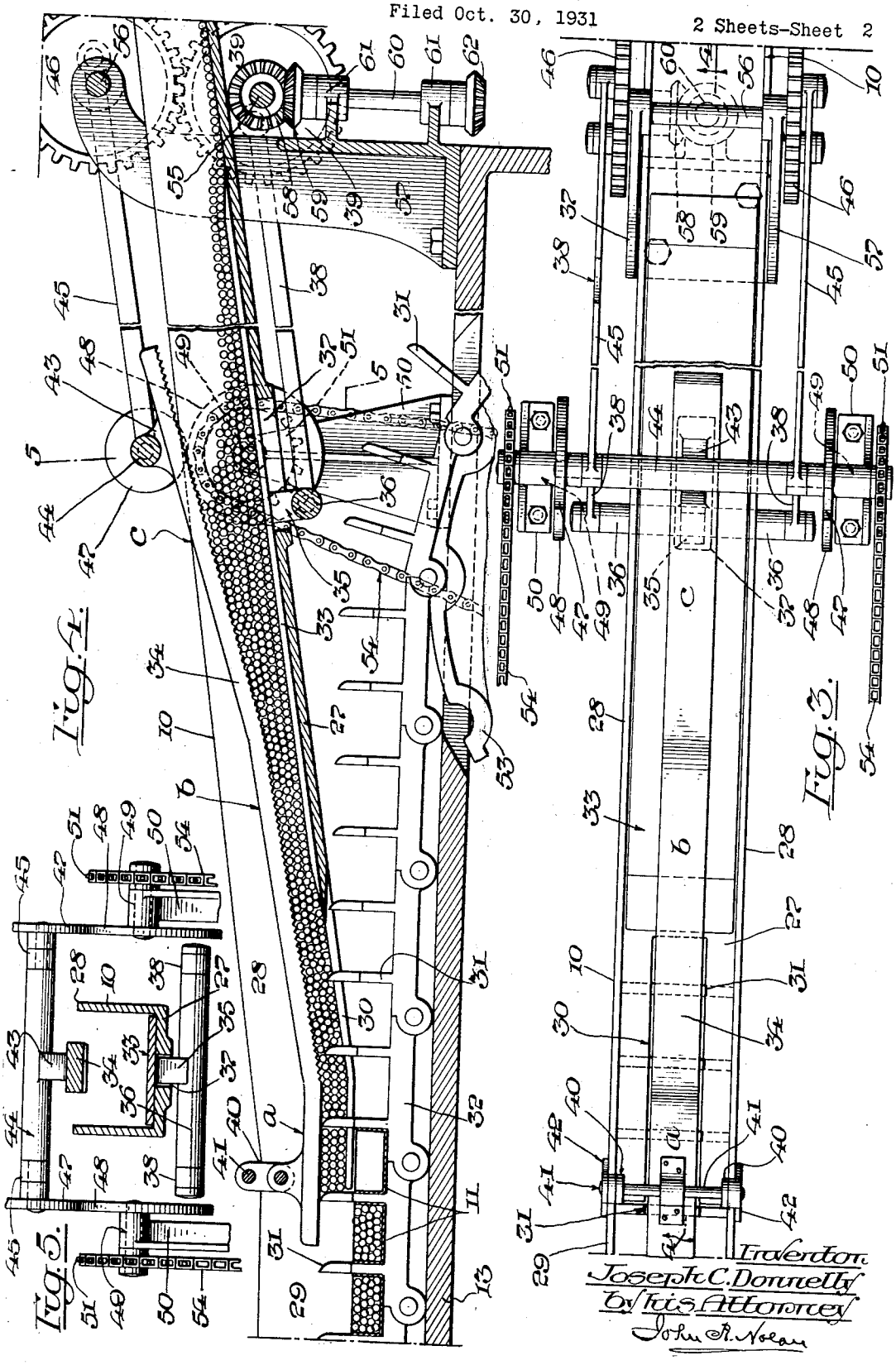


Fig. 1.

Fig. 3.

Fig. 5.

Inventor:
Joseph C. Donnelly
by his Attorney
John R. Nolan

Patented Sept. 26, 1933 1,928,199

UNITED STATES PATENT OFFICE

1,928,199

MACHINE FOR FILLING MATCH BOXES

Joseph C. Donnelly, Barberton, Ohio, assignor to The Diamond Match Company, Baltimore, Md., a corporation of Maryland

Application October 30, 1931. Serial No. 571,958

9 Claims. (Cl. 226—12)

The object of this invention is to provide simple and efficient mechanism for feeding, levelling and straightening matches and other splint-form objects, in bulk, which mechanism is especially though not exclusively designed for use in connection with the elongated feed trough or hopper of a match-box filling machine, such as illustrated in Letters Patent of the United States No. 1,300,763, dated April 15, 1919.

The invention, generally stated, comprises a trough for the reception of a mass of matches or the like, lying transversely of the trough, and two oppositely-reciprocating members extending longitudinally of the trough and arranged respectively to support and bear upon the contents of the trough in such manner as to exert upon the top and bottom of the mass counteracting forces effective to level and straighten the matches, etc.

The invention also comprises means whereby the upper levelling and straightening member is actuated in a manner to ensure the uniform and orderly advancement of the matches, etc., from the receiving to the delivery portion of the trough.

The invention also comprises features of construction and combinations of parts which will be hereinafter described; the scope of the invention being expressed in the following claims.

In the drawings—

Figure 1 is a side elevation of a part of a typical match-box filling machine whereof the feed trough embodies a form of my invention, a part of the associated match machine being shown.

Fig. 2 is a transverse vertical section through the feed trough, as on the line 2—2 of Fig. 1.

Fig. 3 is a plan, enlarged, of a portion of the feed trough, showing the oppositely-reciprocating levelling and straightening members and the actuating mechanism therefor.

Fig. 4 is a sectional elevation of the feed trough and adjuncts, as on the line 4—4 of Fig. 3.

Fig. 5 is a transverse vertical section through the said trough, as on the line 5—5 of Fig. 4.

Referring to the drawings, 10 designates an elongated match receptacle adapted to contain a mass of matches lying transversely of the receptacle. In the present instance this receptacle comprises an inclined trough to the upper end of which the matches are delivered from a suitable source of supply and directed thence to the discharge end of the trough where they are deposited in an orderly manner in underlying match boxes 11.

The trough 10 is slidably mounted for longitudinal reciprocation on a suitably-disposed bracket 12 on a bed or table 13, the upper or receiving end of the trough being connected to a horizontal trough 14 which is positioned adjacent the carrier 15 of a match making machine to receive the matches row by row as they are ejected from the carrier.

The trough 14 is slidably supported on brackets 16 on a bed 17, and is pivotally connected to one arm of a crank lever 18 which is fulcrumed on a bracket 19 on the bed 17. The other arm of the lever has a roll 20 which is maintained by the action of a suitably-disposed spring 21 in operative contact with a peripherally serrated wheel 22 fast on a driven shaft 23 having its bearings in hangers 24 on the bed 17. Hence during the rotation of the shaft 23 and wheel 22, the crank lever is rapidly actuated and a longitudinal jarring motion is imparted to the two troughs 14, 10, thus settling the matches in the troughs and at the same time contributing to the descent of the matches in the inclined trough. The matches are progressively fed from the horizontal to the inclined trough by means of an endless take-off conveyer 25 which is provided with spaced blades 26 that travel within and along the horizontal trough in the usual manner.

The form of trough 10 illustrated comprises a bottom 27 having parallel sides 28 affording between them a space slightly greater in width than the length of a match. The lower ends of the sides are horizontally extended, as at 29, and the adjacent bottom portion 27 is provided with a longitudinal opening or slot 30 for the free passage into and from the trough of the spaced apart blades 31 of a travelling conveyer 32, which blades support box trays 11 that are carried under and beyond the slotted portion of the trough. Hence the upper parts of the blades within the trough separate the mass of matches into suitable divisions for delivery to individual match trays and advance such divisions along the slotted end of the trough until they are discharged into the succeeding trays at the delivery end of the trough.

The mechanism thus far described is or may be of the construction disclosed in Letters Patent

of the United States No. 1,300,763, hereinbefore referred to.

According to my invention the bottom of the trough 10 is provided with a longitudinally reciprocable plate 33 having a smooth upper surface upon which the matches or similar articles contained in the trough are supported, and an overhanging longitudinally reciprocable bar 34, preferably serrated on its lower or acting surface as shown, is mounted and arranged to extend lengthwise of the trough in spaced relation to the plate 33.

In the present instance the plate 33 is secured midway between its ends to a central lug 35 on a cross-bar 36 underlying the trough 10, the bottom 27 of which trough has a longitudinal slot 37 therein for the free passage of the lug 35. The ends of the cross-bar are pivotally connected by means of parallel links 38 with a pair of crank gear wheels 39 adjacent the upper end of the trough 10, and hence during the rotation of said wheels the plate 33 is longitudinally reciprocated.

The bar 34 is preferably of the form shown, that is to say, it comprises a lower horizontal portion *a* which lies between the extended sides 29 of the trough and directly above and parallel with the path of the adjacent blades of the box conveyer 31 so as to provide a measuring member for the matches delivered to the boxes; an upwardly and rearwardly inclined portion *b* which extends in parallelism, or substantially so, with the bottom of the trough and overhangs the lower part of the plate 33, so as to provide a levelling and feeding member for the matches, and an upwardly and rearwardly inclined portion *c* of greater angularity which extends toward the rear of the plate and terminates adjacent the top of the trough, so as to provide a guiding and feeding member for the matches.

The lower end of the bar 34 is pivotally suspended by means of a pair of links 40 from a cross-rod 41 which is supported by brackets 42 on the side extensions 29 of the trough, and the upper end of the bar is secured to a lug 43 on a cross-bar 44 which overlies the trough and is pivotally connected by means of parallel links 45 with a pair of crank gear wheels 46 in mesn with the gear wheels 39. Hence during the rotation of the wheels 46 the bar 34 is longitudinally reciprocated. The crank connections of the links 45 are diametrically opposite to those of the links 38, and consequently as wheels 39 and 46 are intergeared and the same diameters, the concurrent strokes of the bar and plate are in opposite directions to each other.

On the respective ends of the cross-bar 44 are loosely mounted rolls 47 which rest on cams 48 fast on short shafts 49 having their bearings in standards 50 at the respective sides of the trough. These shafts are provided with sprocket wheels 51 which are connected with and driven from similar wheels 52 on the shaft of the adjacent conveyer wheel 53 by means of chains 54, thus rotating the cams 48. The contour of these cams is such as to effect a relatively slow upward and downward motion of the upper end of the bar 34 during the longitudinal reciprocation of the latter. In the present instance eccentric cams are employed but if desired cams having lobes may be used. As these cams are open cams they allow the bar to settle down on the underlying matches by its own weight.

The crank gears 39 and 46 for actuating the links 38 and 45 are fast on lower and upper parallel shafts 55, 56, respectively, having their bearings in a suitably-disposed frame 57 on the table 13. The lower shaft 55 is provided with a bevel gear 58 in mesh with a similar gear 59 on the upper end of a vertical shaft 60 having its bearings in brackets 61 on the frame 57, and the shaft 60 is provided at its lower end with a bevel gear 62 in mesh with a similar gear 63 on the driven shaft 23. In this way motion is transmitted from the shaft 23 to the shaft 60 and in consequence the crank gear wheels 39 and 46 are concurrently actuated to effect the requisite movements of the plate 33 and bar 34.

From the foregoing it will be seen that the plate 33 and bar 34 are reciprocated longitudinally in opposite directions to each other independently of the vibration of the trough, (that is to say, when the bar is moving forward the bottom plate is moving rearward, and the converse,) and hence such plate and bar exert on the top and bottom of the interposed mass of matches effective counteracting forces; the serrated inclined faces of the bar engaging the top of the mass of matches and exerting thereon a positive feeding and straightening effect, and the smooth upper surface of the bottom plate 33 moving freely beneath the load of matches, and by virtue of the superposed weight, acting to straighten irregularly disposed matches.

As the mass of matches advances down the trough the relatively slow upward vertical movement of the upper end of the longitudinally reciprocating bar 34 allows the matches at the receiving end of the trough to pass under the bar, and the downward movement of such end tends to straighten the opposing matches and advance them along the trough to the portions *b* and *a* of the bar which are respectively parallel to the bottom of the trough and the path of the boxes at the filling station. In the downward movement of the bar the excess matches at the upper or receiving end of the bar are crowded back up the trough until the succeeding upward motion of the bar.

It is to be understood that my invention is not limited to the particular form of embodiment thereof herein disclosed, as the mechanism may be variously modified within the principle of the invention and the scope of the appended claims.

I claim—

1. In combination with a trough for the reception of splint objects lying transversely of the trough, two reciprocable straightening members extending longitudinally of the trough in spaced relation and arranged respectively to support and rest upon the objects contained in the trough, and intergeared means for concurrently reciprocating the said members in opposite directions to each other independently of the trough.

2. In combination with a trough for the reception of splint objects lying transversely of the trough, two reciprocable straightening members extending longitudinally of the trough in spaced relation and arranged respectively to support and rest upon the objects contained in the trough, the acting surface of the upper member being serrated and the acting surface of the lower member being smooth, and intergeared means for concurrently reciprocating the said members in opposite directions to each other independently of the trough.

3. In combination with a trough for the reception of splint objects lying transversely of the trough, a longitudinally-reciprocable straighten-

ing member to support the objects contained in the trough, a longitudinally-reciprocable straightening member overhanging the trough to rest upon the top of the contained objects, oppositely-acting intergeared crank elements, link connections between said elements and the respective straightening members, and means for simultaneously rotating said crank elements.

4. In a box filling machine having an inclined trough to receive at its upper end and to deliver at its lower end splint objects lying transversely of the trough, a longitudinally-reciprocable feeding and straightening member arranged to underlie and support the objects contained in the trough, a longitudinally-reciprocable feeding and straightening member mounted to overhang the trough and bear upon the contained objects, and intergeared means for concurrently reciprocating said members in opposite directions to each other independently of the trough.

5. In a box filling machine having an inclined trough to receive at its upper end and to deliver at its lower end splint objects lying transversely of the trough, a longitudinally-reciprocable feeding and straightening plate having a smooth upper surface and arranged to underlie and support the objects contained in the trough, a longitudinally-reciprocable feeding and straightening bar mounted to overhang the trough and bear upon the contained objects, said bar having a serrated acting surface, and intergeared means for concurrently reciprocating said plate and bar in opposite directions to each other independently of the trough.

6. In combination with a trough for the reception of splint objects lying transversely of the trough, a longitudinally-reciprocable feeding and straightening bottom member in the trough, a longitudinally reciprocable feeding and straightening member mounted to overhang the trough and bear upon the contained objects, intergeared means for concurrently reciprocating said members in opposite directions to each other independently of the trough, and means for raising and lowering the overhanging member at the receiving end thereof.

7. In combination with a trough for the reception of splint objects lying transversely of the trough, a longitudinally-reciprocable feeding and straightening bottom member in the trough, a longitudinally reciprocable feeding and straightening member mounted to overhang the trough to bear upon the contained objects, said latter member comprising a portion parallel to the bottom of the trough and an upwardly inclined portion extending toward the receiving end of the trough, means for concurrently reciprocating said members in opposite directions to each other, and means for raising and lowering the overhanging member at the receiving end thereof.

8. In a box filling machine having an inclined trough provided with a horizontal delivery extension at its lower end, said trough constructed and arranged to receive and deliver splint objects lying transversely of the trough, a reciprocable bar extending longitudinally of and overhanging the trough, said bar having a horizontal lower portion in the delivery extension, an inclined intermediate portion parallel with the bottom of the trough, and an upper portion inclined at a greater angle toward the receiving end of the trough, means for longitudinally reciprocating said bar, and means for raising and lowering the upper end of the bar during its reciprocation.

9. In a box filling machine having an inclined trough provided with a horizontal delivery extension at its lower end, said trough constructed and arranged to receive and deliver splint objects lying transversely of the trough, a longitudinally-reciprocable bottom plate in the trough, a reciprocable bar extending longitudinally of and overhanging the trough, said bar having a horizontal lower portion in the delivery extension, an inclined intermediate portion parallel with the bottom of the trough, and an upper portion inclined at a greater angle toward the receiving end of the trough, means yieldingly supporting the lower end of the bar, vertically movable supports for the upper end of the bar, means for raising and lowering said supports, and means for concurrently reciprocating said plate and bar in opposite directions to each other.

JOSEPH C. DONNELLY.