Oct. 30, 1962 T. M. MURPHY 3,061,309

COMBINED BUMPER AND GUIDE FOR AUTOMATIC BOWLING PIN SETTING MACHINES

Filed Aug. 12, 1960 3 Sheets-Sheet 1

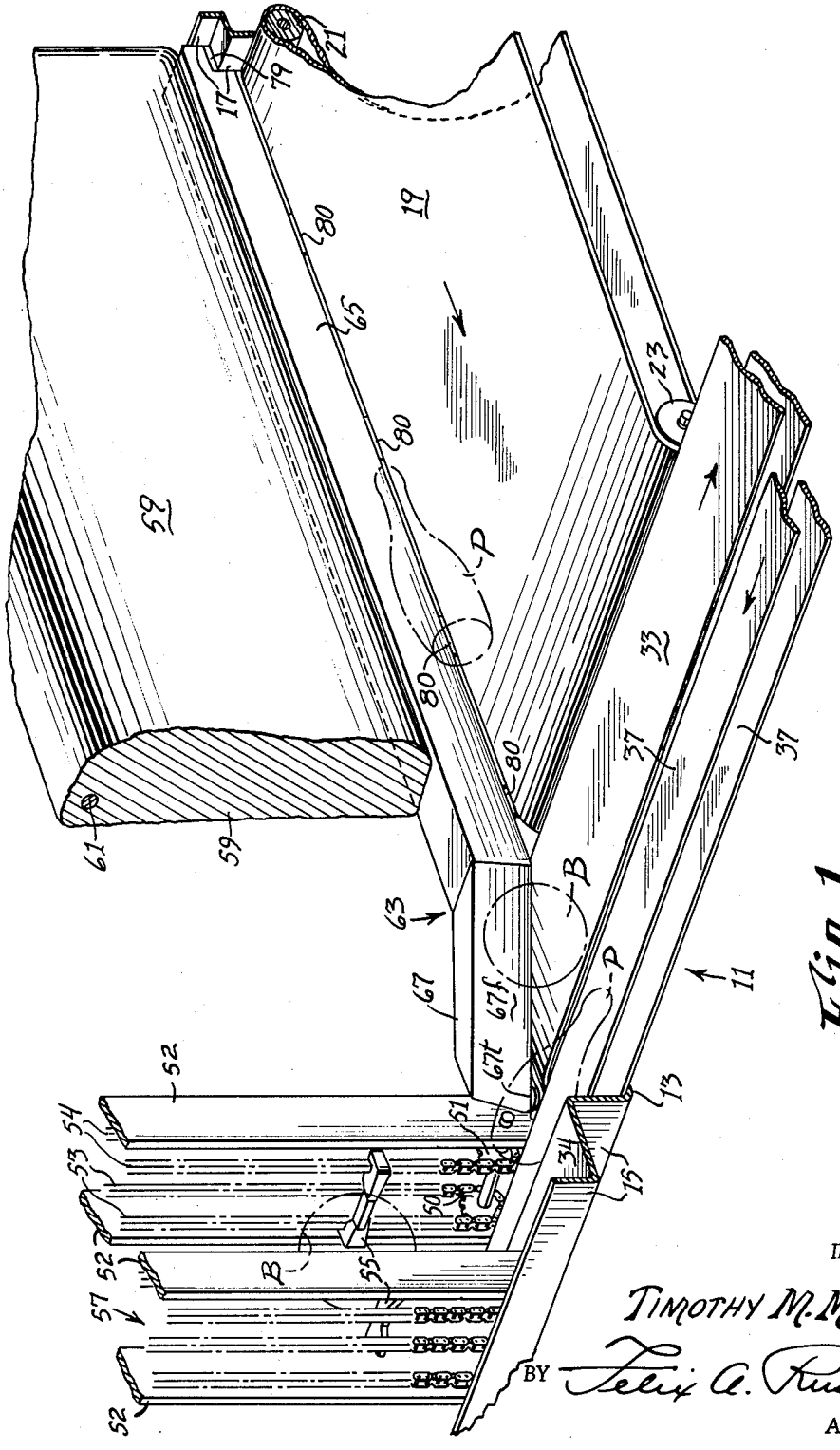

Fig. 1

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Oct. 30, 1962 T. M. MURPHY 3,061,309

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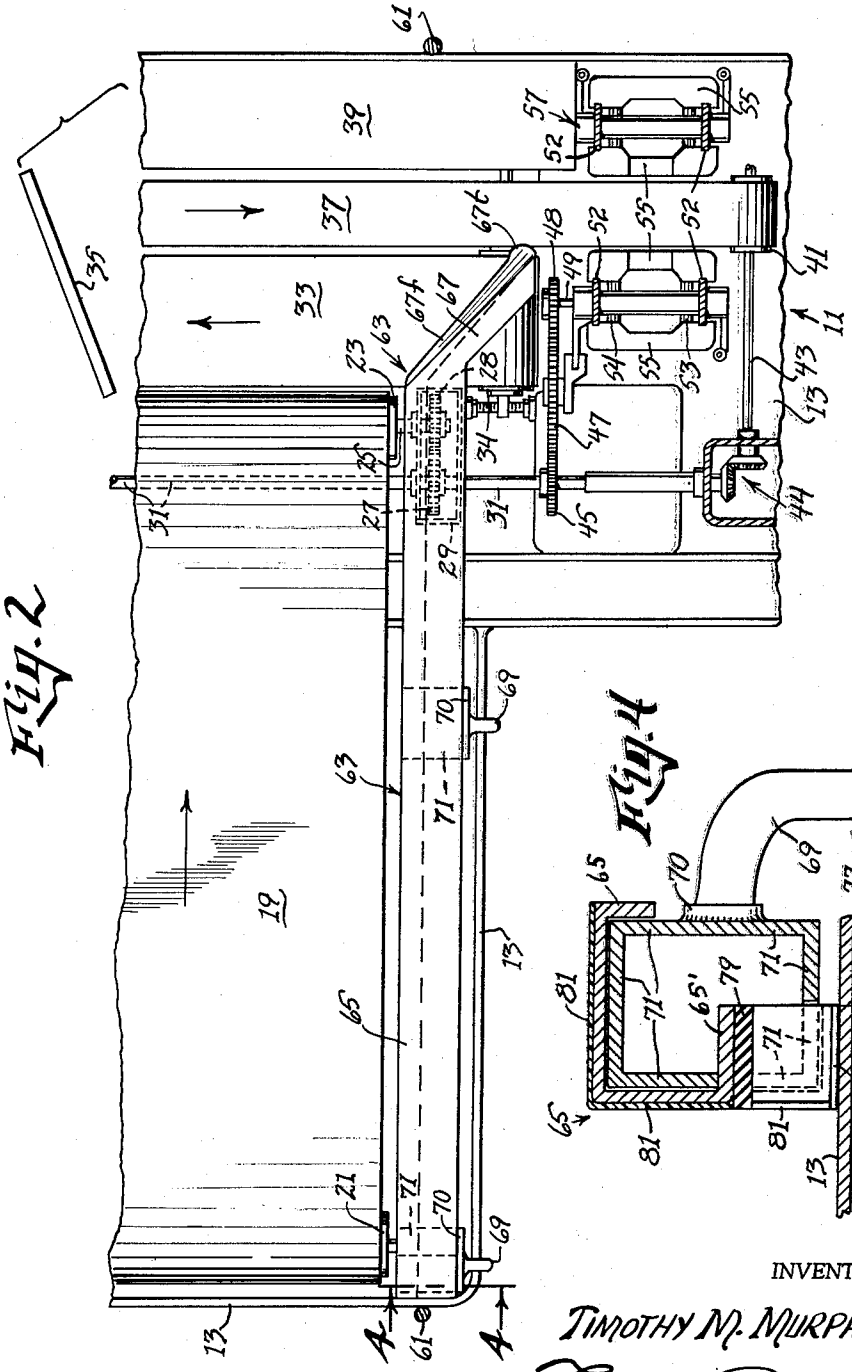

Fig. 2

Fig. 4

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Filed Aug. 12, 1960 3 Sheets-Sheet 3

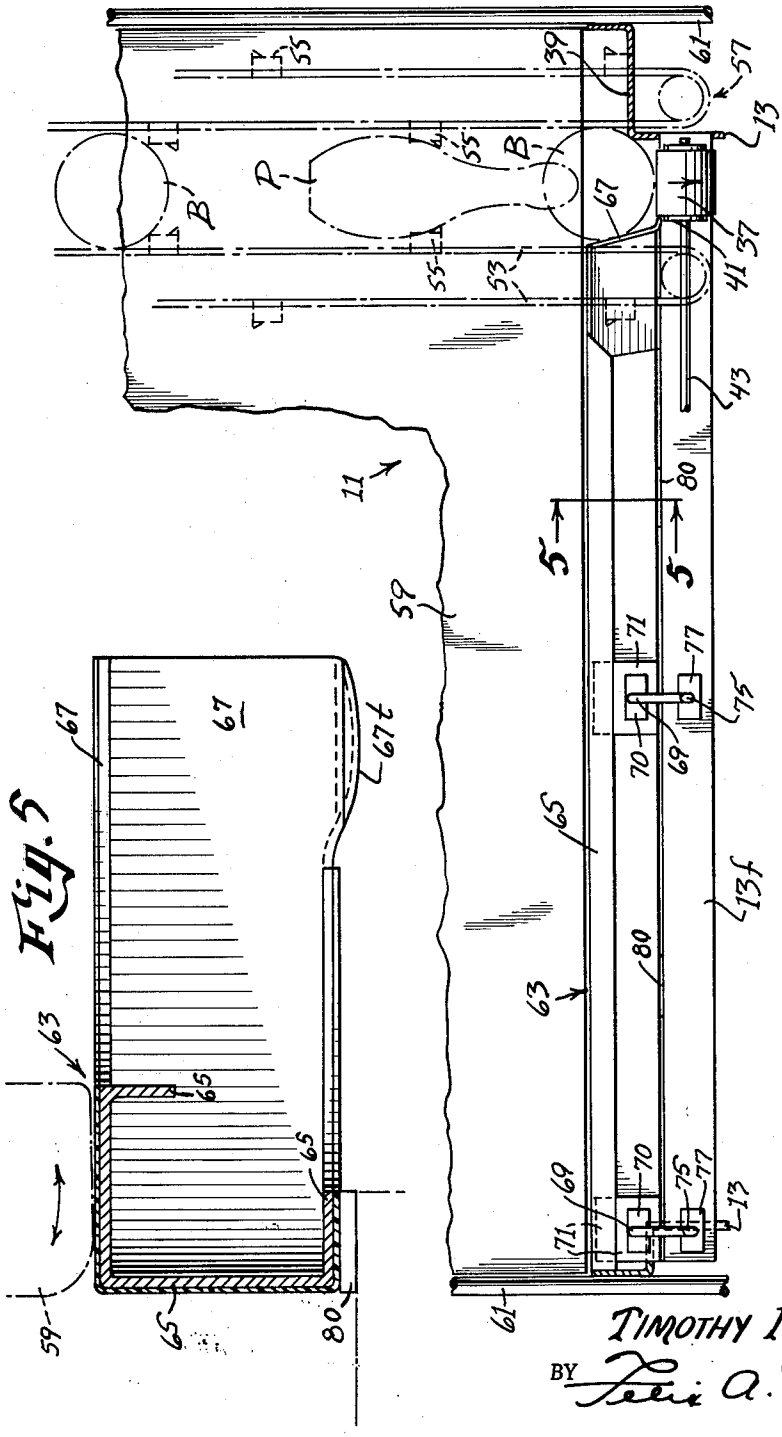

Fig. 3

Fig. 5

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3,061,309

COMBINED BUMPER AND GUIDE FOR AUTOMATIC BOWLING PIN SETTING MACHINES

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3 Claims. (Cl. 273—43)

This invention relates to a combined bumper and guide for automatic bowling pin setting machines of the type comprising a pit for receiving out-of-play bowling pieces, a horizontally and laterally moving belt forming the bottom of the pit and moving said pieces onto a second rearwardly moving belt that begins the alignment of said pieces, a third narrower belt beside the second belt to receive pieces from the delivery end of the second belt and to further the alignment of the pieces in single file thereon and coaxially in the direction of movement thereof and piece-elevator structure at the delivery end of the third belt.

While presently known machines of the herein disclosed type have been generally satisfactory, I have found therein an objectionable tendency of the pins and balls to jam up at the entrance to the elevator zone. Also the conventional wooden bumper member below the kick back cushion tends to split or break. The present invention overcomes these objections by providing an unbreakable metallic bumper member faced and refaceable with sheet plastic material and having an angled and beveled end extension that guides the pins and balls into the elevator zone so as to prevent the above-mentioned jamming, while also eliminating the need of a floor-mounted shield or guide heretofore considered necessary.

It is accordingly a principal object of this invention to provide a combined bumper and guide for automatic pin setting machines.

It is another object to provide such a device made of sheet metal bent into self-rigidifying cross section and bent at one end to define an angled and beveled guide portion.

It is a further object to provide such a device in which the surface is covered and is easily and inexpensively refaceable with sheet plastic material.

Other and further objects of the invention will become apparent from a reading of the following specification taken in conjunction with the drawings, in which:

FIGURE 1 is a perspective view of a preferred embodiment of the invention,

FIGURE 2 is a plan view of the disclosure of FIGURE 1,

FIGURE 3 is an elevational view from the rear of the FIGURE 1 showing,

FIGURE 4 is an enlarged fragmentary elevation in section taken on the line 4—4 of FIGURE 2, and

FIGURE 5 is an enlarged fragmentary elevational view in section taken on the line 5—5 of FIGURE 3.

With reference now to the drawings, the numeral **11** generally designates the herein disclosed and modified portion of an automatic pin setting machine of known construction. Apparatus **11** comprises a pin- and ball-receiving pit member **13** formed of heavy-gauge sheet metal and having integral stepped flanges **15** and **17** defining the side walls thereof.

A major portion of the pit defined by member **13** is floored by a continuous horizontally disposed belt **19**, stretched around parallel rollers **21** and **23** and driven by the latter. Roller **23** is fixed to shaft **25** which is driven by the gear train **27—28** housed in the gear box **29**. Gear **27** is fixed to shaft **31** which extends forwardly to another gear box and train (not shown) for driving the gutter-mounted belts of the herein undisclosed

portion of the apparatus, and the follower (also not shown) by which the pin- and ball-moving belt **33** is driven. Belt **33** moves the pins and balls forwardly to the deflector **35** which deflects them one-by-one onto the narrower belt **37**. Belt **37**, because of its narrow width and its relatively depressed position relative to belt **33** and the ledge **39**, tends automatically to align the axes of the pins P in the direction of travel of belt **37** so that they will not block the entrance to the elevator zone by getting cross-wise thereof, which would still happen with objectionable frequency in the absence of the guide forming an essential part of the present invention and hereinafter described.

Belt **37** is driven by roller **41** mounted on a shaft **43**, in turn, driven by the gear train **44** coupled to shaft **31**.

Shaft **31** also mounts gear **45** which drives the gear train **47—48**. Gear **48** is fixed to shaft **49**. Shaft **49** has fastened thereto a pair of sprockets **50** and **51** for driving the continuous sprocket chains **53** and **54** on which are evenly spacedly fixed the pin- and ball-engaging cleats **55**.

A parallel and synchronously driven elevator structure generally designated **57** cooperates with the first-described elevator structure. A conventional padded kick-back cushion member **59** swingingly supported on a bail-shaped rod **61**, completes the part of the pin setting machine into which the herein disclosed and claimed bumper and guide generally designated **63** is incorporated.

Novel device **63** comprises a bumper portion proper **65** and a (desirably integrally) joined angularly disposed guide portion **67**. Both parts are preferably formed of sheet metal bent (or extruded) to have the cross sections and shapes disclosed (enlarged in FIGURES 4 and 5). Bumper portion **65** is supported on the bottom of the pit member **13** adjacent its rear edge by a pair of bracket arms **69** fixed (as by welding of their bases **70** to the rear walls of box-beam sections **71** snugly fitted therein and welded in place). Sections **71** serve both as arm-anchoring means and as bumper-rigidifying and strengthening elements.

Arms **69** are desirably connected by pivot pins **73** to brackets **75** the bases **77** of which are welded to a downturned flange **13***f* at and on the rear edge of the pit member **13**. The far end of bumper portion **65** (FIGURE 1) is undercut to form a notch for seating on the step defined by the side flange **17** of pit member **13**. Hard but not brittle blocks **79** and **80** of rubber or like material are attached to the under surfaces of portion **65** to serve as somewhat resilient supports therefor.

The pin and ball guide portion **67** of member **63** is bent horizontally at an angle of the order of 45° relative to portion **65**, and has its front face **67***f* sloping downwardly toward the belt **37** at an angle of about twenty degrees from the vertical. The lower rear corner of face **67***f* has a downwardly and laterally curved tongue portion **67***t* which prevents the tip of a pin entering the depression behind the left end of the roller **34** over which the belt **33** passes. The top and front faces of the portions **65** and **67** are covered by sheets **81** of vinyl or other tough and resilient plastic or equivalent materials. The vinyl sheet material can be easily and economically replaced so that the life of the member **63** can thus be indefinitely extended.

While but one form of the invention has been shown and described herein, it will be readily apparent to those skilled in the art that many minor modifications may be made without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. In an automatic bowling pin setting machine comprising a pit structure for receiving out-of-play bowling pieces, a continuous horizontally moving belt adapted

to begin alignment of said pieces into single file, means in said pit structure for moving said pieces onto said belt, a second narrower horizontally moving belt positioned to receive pieces from the delivery end of said first belt and to substantially further the alignment of said pieces in single file and coaxially with the direction of movement thereof, and piece-elevator structure having a piece-receiving portion at the delivery end of said narrower belt, the improvement comprising: a transversely disposed bumper member adjacent and above the bottom portion of said pit, and horizontally disposed guide means mounted at one end of said bumper member and integrally joined thereto so as to constitute an angularly disposed extension thereof, said guide means having a length greater than the diameter of any of said bowling pieces and terminating closely adjacent an edge of said narrower belt and being disposed at an angle thereto of the order of 45° to cammingly engage and guide pieces thereon into the piece-receiving portion of said elevator without danger of jamming, said bumper member and guide means being formed of sheet metal bent into self-rigidifying angled-faced bar shape and having the piece-engaging faces thereof covered with somewhat resilient sheet plastic removably and replaceably

adhered thereto, the front piece-engaging face of said guide means being downwardly and forwardly sloped at roughly twenty degrees to provide an automatic jam-preventing lifting of pieces pressed thereagainst.

2. The invention according to claim 1 additionally comprising supporting arms for said member fixed to said member and to said pit structure, said arms being medially articulated whereby said bumper is swingable between its bumper-forming position and an out-of-way position to the rear thereof to facilitate its repair or to facilitate access to other pit-contained structures.

3. The invention according to claim 1, said guide means having a tongue extension at its lower rear extremity adapted to prevent dropping of the tips of said pieces into the over-roller depression at the delivery end of said narrower belt.

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