

[54] **ASSEMBLY MACHINE**

[72] Inventor: **David I. Cropp**, 501 Chestnut St., Meadville, Pa. 16335

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[58] Field of Search.....29/203 R, 203 B, 583, 25.19, 29/208 F; 65/154, 155

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*Primary Examiner*—Thomas H. Eager

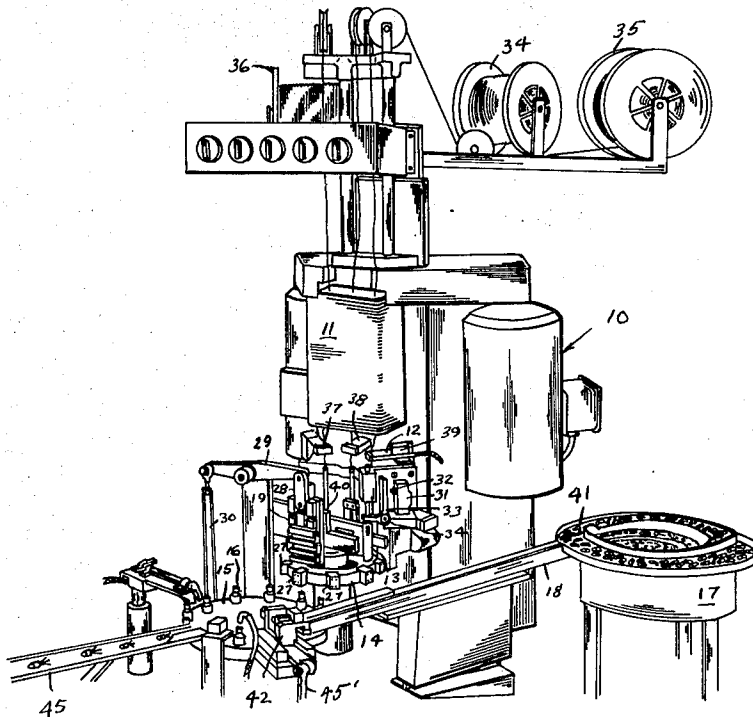
*Attorney*—Charles L. Lovercheck

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**ABSTRACT**

The specification describes a machine for inserting several pieces of wire of a predetermined length through a small disk which may be of plastic material at a high rate of production. The wire is taken from rolls, straightened, measured to length, cut off, and forced through the holes in the disk and the disks with wire inserted in them are moved along a trough conveyor where they can be visually inspected.

**18 Claims, 7 Drawing Figures**



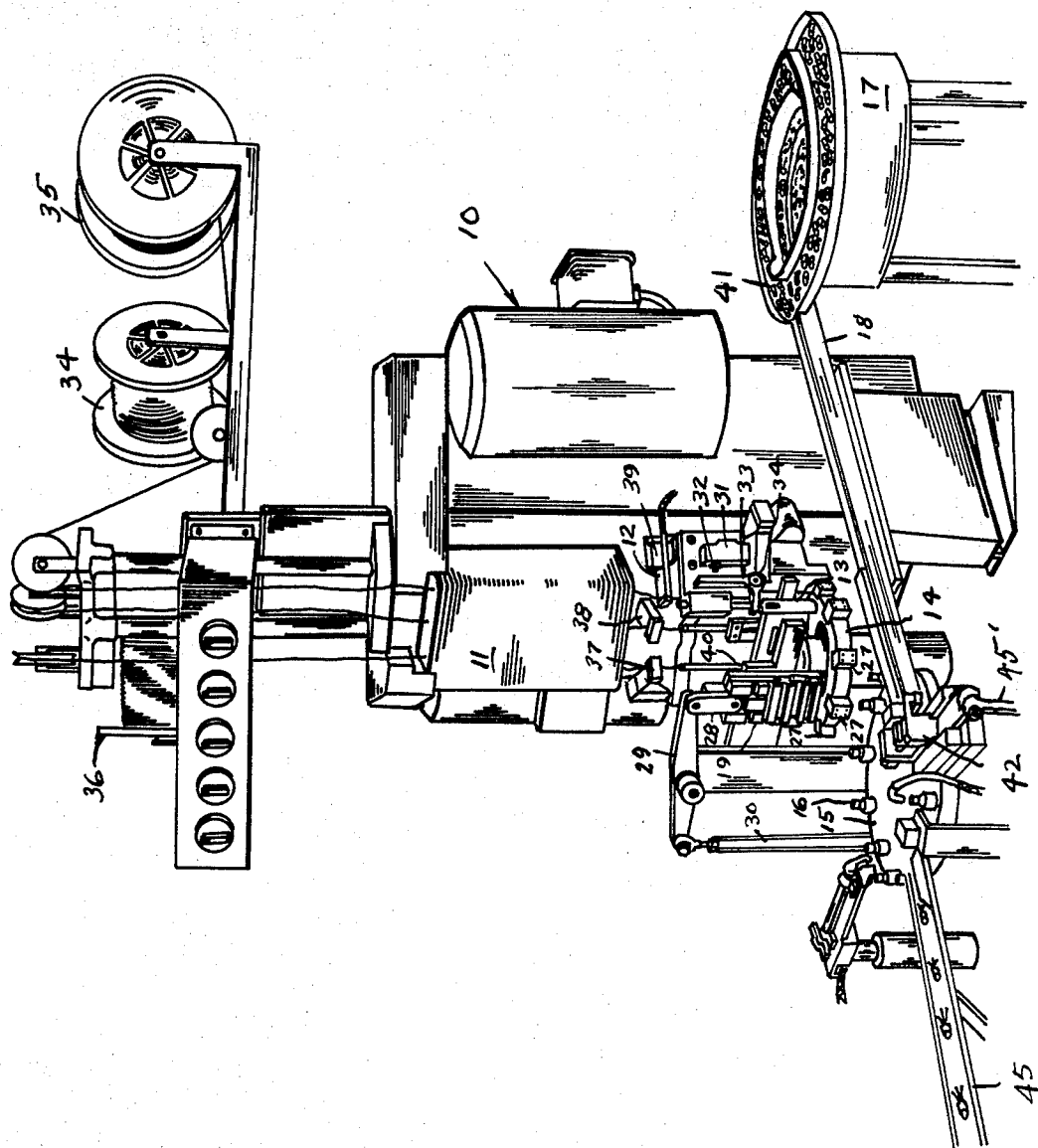


FIG. 1.

DAVID I. CROPP *Inventor*

By *Charles L. Lumbard* *Attorney*

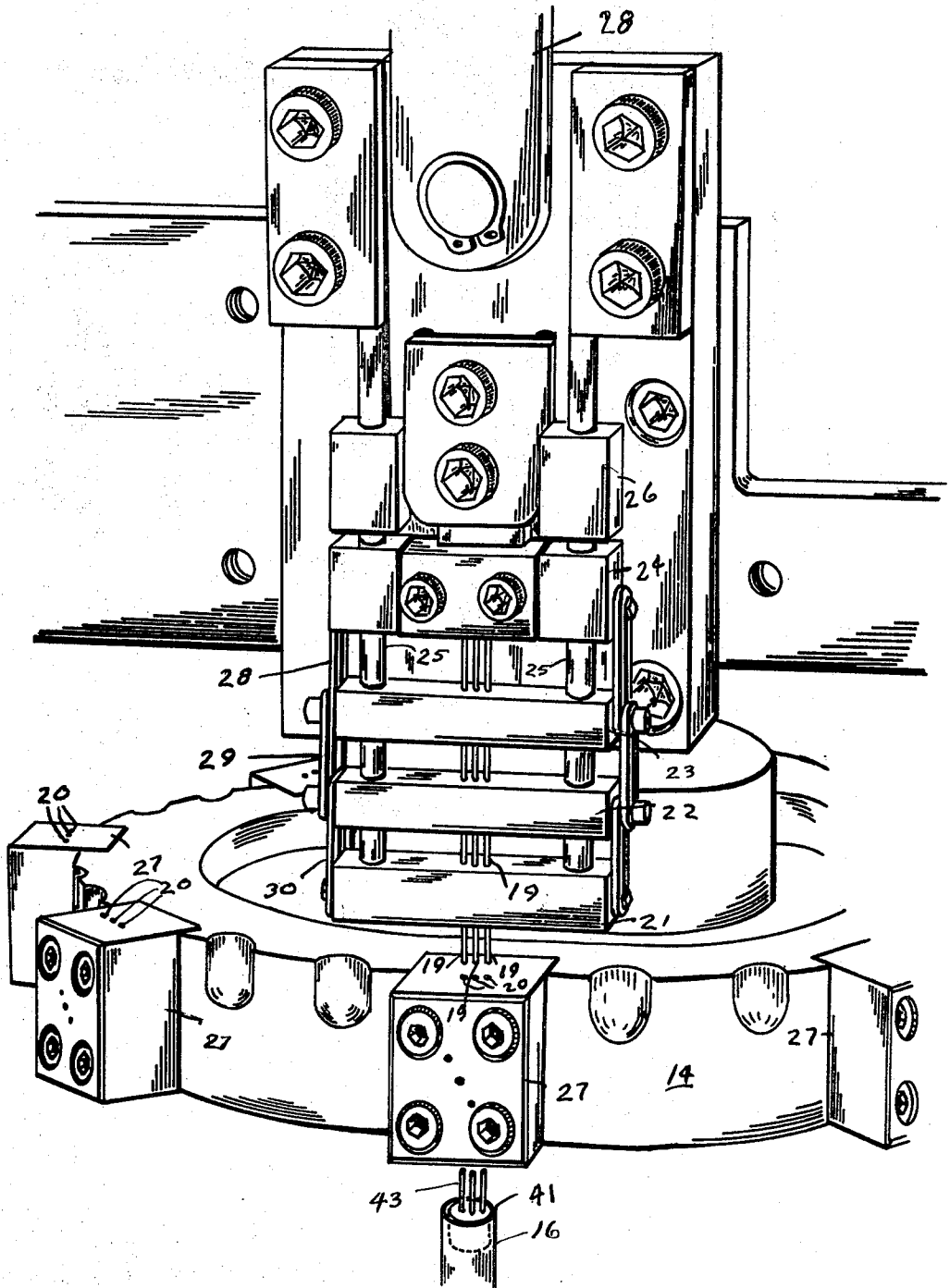


FIG. 2

Inventor

DAVID I. CROPP

By

Charles L. Lounsbury Attorney

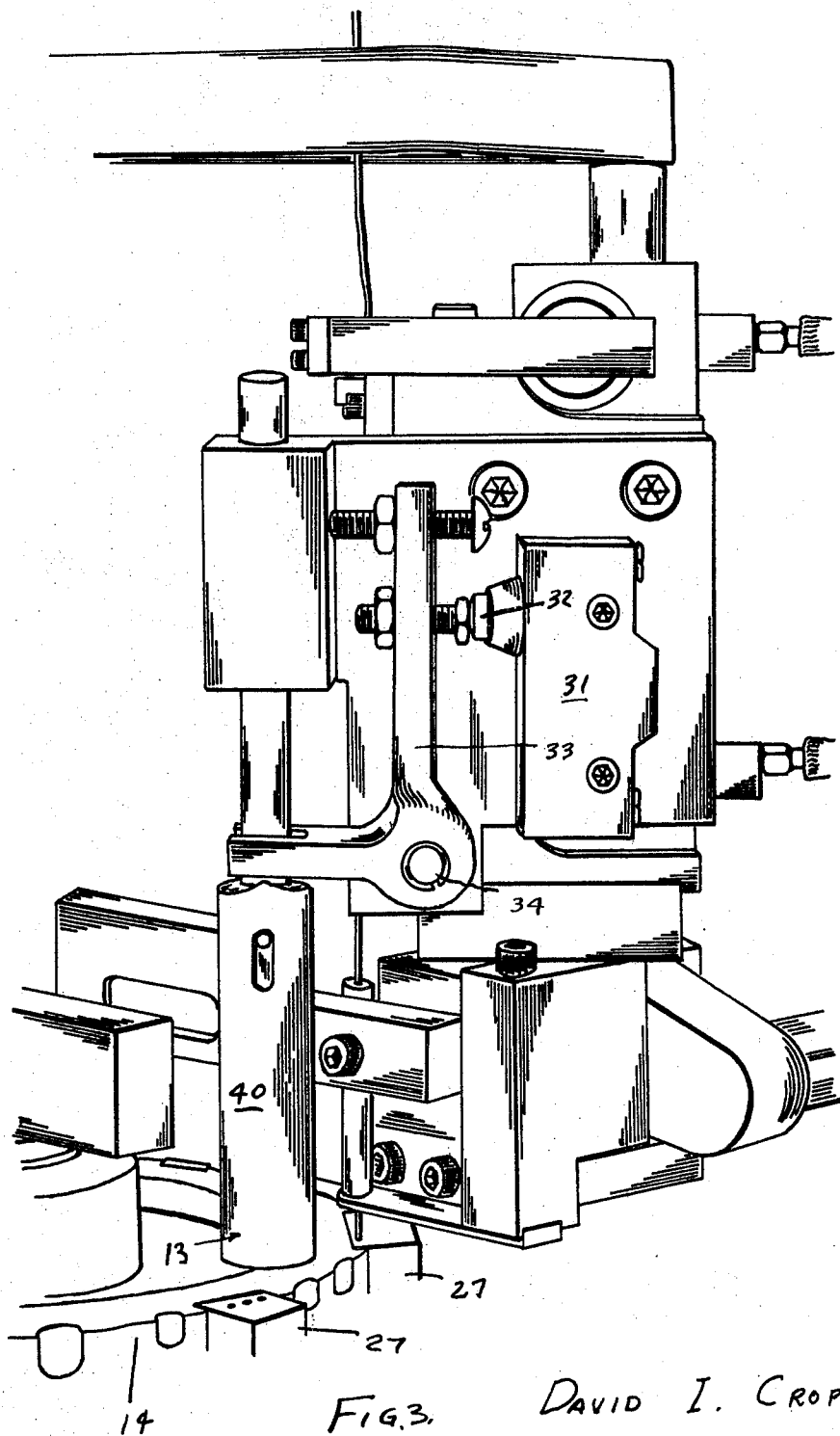


FIG. 3.

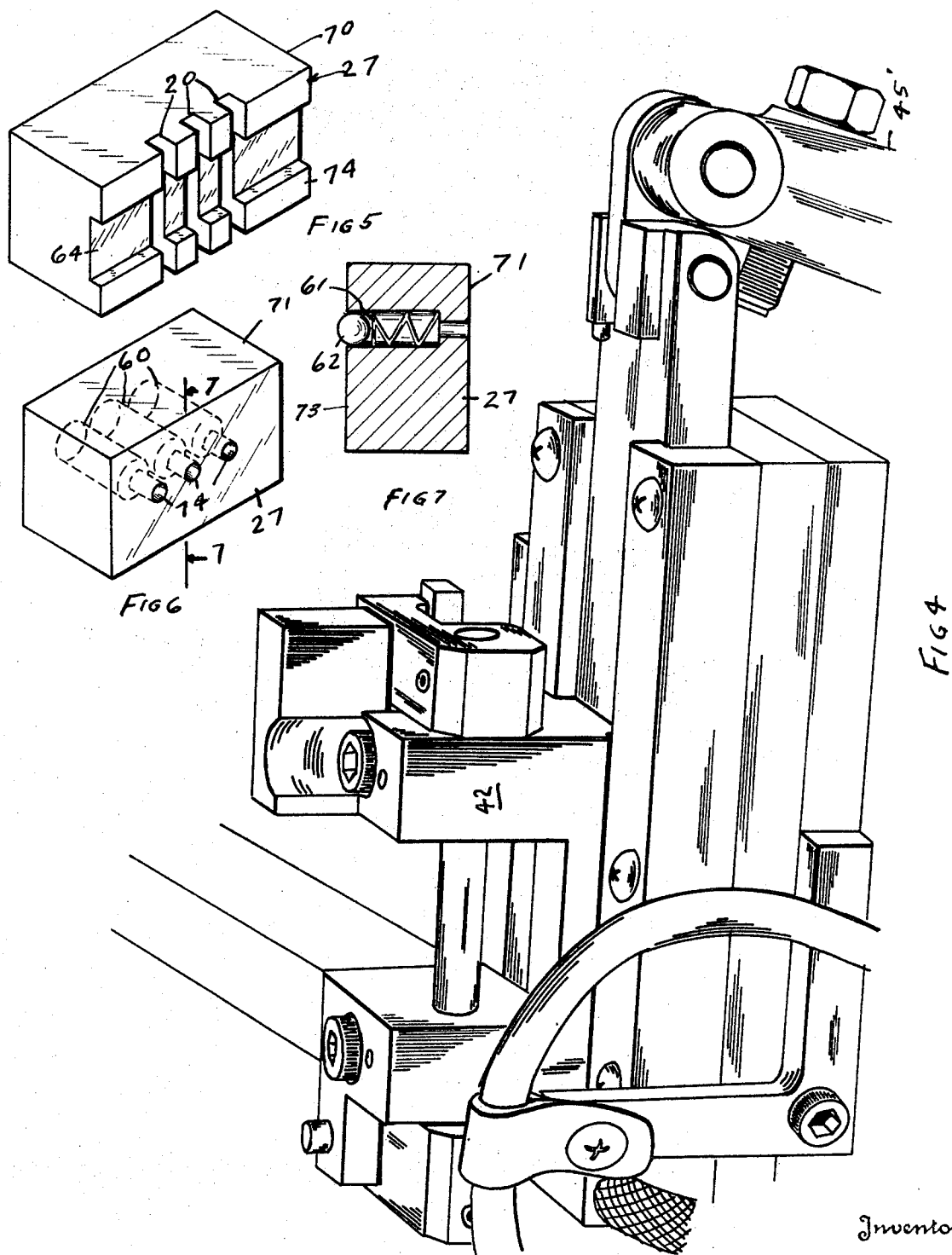
DAVID I. CROPP

Inventor

By

Charles L. Louchuk

Attorney



DAVID I. CROPP

By

Charles L. Louchard Attorney

## ASSEMBLY MACHINE

## OBJECTS OF THE INVENTION

It is an object of the invention to provide an improved machine for cutting and inserting wires into small holes.

Another object of the invention is to provide a machine for cutting and inserting wires at a high production rate.

Another object of the invention is to provide a machine for sorting and orienting disks and cutting and inserting wires into these disks.

Another object of the invention is to provide a machine which is simple in construction, economical to manufacture, and simple and efficient to use.

## DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of the machine according to the invention.

FIG. 2 is an enlarged partial view of the wire loading turret.

FIG. 3 is a partial enlarged view of the bent wire sensor.

FIG. 4 is a partial enlarged view of the disk loader.

FIG. 5 is an enlarged view of a part of the wire holder.

FIG. 6 is an enlarged view of another part of the wire holder.

FIG. 7 is an enlarged cross section view taken on line 7-7 of FIG. 6.

## DETAILED DESCRIPTION OF THE DRAWINGS

The machine shown is indicated at 10. It has a wire straightener 11, which is of a type having interfitting fingers supported on parallel rods which rotate and interfit with each other as they rotate and which is a type of wire straightener familiar to those skilled in the art. It could be any other suitable type of wire straightener. The wires come off of spools 34, 35 and 36 and pass down through the wire straightener 11, past the clamps 37, 38 and 39 to the wire cutoff mechanism. The wire clamps 37, 38 and 39 are actuated by air pressure.

The machine has a wire support turret 14 that has the spaced wire pockets 27 supported around its outer periphery. The wire support turret moves up and down and indexes in synchronism with the disk support turret 15. The disk support turret 15 has the nests 16 supported in spaced relation on its top adjacent its outer periphery. The disk turret 15 does not move up and down but indexes in a common plane in synchronism with the movement of the wire support turret.

The bodies of the disks 41 are fed from the vibratory feeder 17 down the track 18 to the escapement mechanism 42 more particularly shown in FIG. 4. The escapement mechanism is actuated through a link 45' which is connected to the drive mechanism on the underside of the table. A punch holder has three punches 19 more specifically shown in FIG. 2. The punches 19 are slidably received in holes in the bolster blocks 21, 22 and 23 and the bolster blocks are slidably received on the guide rods 25 and are fixed to the upper block 24. The links 28, 29 and 30 each have slots which loosely receive the pins on ends of the bolster blocks and limit the movement of the bolster blocks and keep them from falling off the guide rods when the punches are in the upper position.

The punch is actuated from link 30 which is connected to the synchronized drive mechanism under the table through the lever 29 and link 28 which is connected to the top of the punch mechanism. When the punch mechanism goes down, the punches 19 enter the holes 20 in the blocks 27 and engage the wire 43 forcing them from the block 27 into the plastic disk 41 in the nest 16. The punches are held against bending by the bolsters and as the punches 19 enter the holes 20, the bolsters move upward into engagement with each other thereby preventing lateral movement of the punches and preventing them from breaking.

The wires may be inadvertently bent over when first inserted in the wire holder blocks 27. The wires are checked by the wire checking mechanism 13 to make sure that this has not occurred. The wire checking mechanism is made up of a plunger which slides in a cylinder 40 and engages the top of

the wires in the blocks 27 as they move under it. If any of the wires are bent over, the bellcrank 33 will be lifted about its pivot 34. This will actuate the microswitch 31 through its plunger 32 and cause the machine to stop. The operator then removes the defective wire.

FIGS. 5 and 6 and 7 show an enlarged view of the blocks 27. The blocks 27 are divided into two parts 70 and 71 which are held together by studs 72. The parts 70 have slots 20 cut in them and a recess 60 cut across the intermediate part. The parts 71 have a flat face 73 which in working position lies against the face 74 of the block 70. Holes 74 are formed in the parts 70 and the holes 74 are counterbored at 60 and balls 62 are placed in the counterbores. The balls are urged by the helical compression spring 61 into engagement with the wire pieces as they are fed down through the slots 20. The balls 62 thus hold the wires in position and keep them from being withdrawn. The relieved portion 64 allows the balls 62 to more firmly engage the wire pieces.

The sequence of the operation of the machine is as follows:

The table 15 and table 14 are indexing in synchronism with each other to bring a block 27 over a nest 16 on each cycle of the machine. The wire nest 50 grabs the ends of the wires and holds them as the wires are moved down from spools 34, 35 and 36. The three lengths of wire are then cut off to length by knife 51. The turret 14 moves upward where it receives the wire from the wire cutoff mechanism.

The wire from the spools 34, 35 and 36 are received in the blocks 27 and measured and cut off to length. The turret then moves down and over and brings a pocket 27 over a nest 16. The link 30 then actuates the lever 29 to cause the punches to move down and force the wires into the disk. The disk is then discharged into the discharge tray 45.

The foregoing specification sets forth the invention in its preferred practical forms but the structure shown is capable of modification within a range of equivalents without departing from the invention which is to be understood is broadly novel as is commensurate with the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A machine for assembling wires in disks comprising,
  - a disk turret support on said machine to index about a vertical axis,
  - spaced nests on said disk support,
  - each said nest having a pocket in it for receiving a disk,
  - a feeder for feeding said disks to said nests,
  - wire support means on said machine to support wire,
  - a wire turret,
  - said wire turret having spaced wire holders supported on its outer periphery,
  - index means to index said wire turret about a vertical axis whereby a wire is measured, is inserted in said wire holder and cut to lengths,
  - said index means being adapted to index said wire turret to position over a said nest in said disk turret,
  - means to force said lengths of wire into said disks in said nests,
  - and means to discharge said disks with said wire from said nests.

2. The machine recited in claim 1 wherein means is provided to hold said wire in said wire holders.

3. The machine recited in claim 1 wherein said wire holder blocks are divided into two parts, one part of said block having grooves formed therein, the other part of said block having counterbored openings therein,

and a spring rolled ball in said counterbored openings for engaging said springs when said wires extend through said grooves whereby said wires are restrained against movement through said grooves.

4. The machine recited in claim 1 wherein said support means comprises said index means being adapted to index said wire turret and said disk turret whereby said nests are brought in sequence under said wire support means,

and said wire turret is indexed to bring said wires over said nest with said wire therein and said means to force said wires into disks is actuated whereby said wires are forced into said disks.

5. The machine recited in claim 1 wherein an escapement means, synchronized with said turret, places a said disk into each said nest, oriented to receive said wires, and a holding means engages the top of each said disk as said turret moves said disk from said escapement means whereby said disk slides under said holding means as said disk turret indexes.

6. A machine for assembling wires into disks comprising a disk turret having a plurality of spaced disk nests on its periphery, means for feeding disks to said nests, a wire turret, spaced block means on the periphery of said wire turret for receiving lengths of wire, a wire cutting and measuring means on said machine, index means to index said wire turret bringing said blocks in sequence to receive wires from said wire measuring means, said index means being adapted to move said wire turret up whereby said wires are deposited in said wire receiving means, said index means being adapted to index said wire turret to bring each said block with wires therein over a said nest, punch means driven by said index means for forcing said wires into said disks, and means to index said nest turret to bring each said disk to a discharge position.

7. The machine recited in claim 6 wherein a wire checking means is provided on said machine adjacent said punch means whereby said wires are checked to insure that no said wire is bent.

8. A machine for assembling wire into disks of plastic comprising, support means for supporting said disks, means for cutting a plurality of wires to length, means for supporting said plurality of lengths of wire, and a punch assembly for punching said lengths of wire into said disks, said punch assembly comprising a plurality of punch rods, each punch being approximately the same diameter as said wire, fixed means for fixing one end of said punches to said machine, at least one bolster slidably supported on said punch rods, said bolster having holes therein receiving said punch rods, restraining said punches from lateral deflection, means urging said punches whereby said punches enter said support means for said wires forcing said wire into said plastic, said bolster engaging said support means and sliding on said punches toward said fixed means whereby said punches are held against bending.

9. The machine recited in claim 8 wherein at least three said punches are provided, and at least two said bolsters are provided, links are provided, one link being disposed at each side of said bolsters limiting the distance said bolsters may move from each other, and link means for limiting the movement of said punches from said support means, said bolsters being adapted to slide on said punches and to be forced into engagement with each other as said punches force said wires into said plastic.

10. The machine recited in claim 9 wherein said means for

supporting said lengths of wire comprises a wire pocket in the form of a block,

said block having a plurality of elongated bores extending therethrough, each said bore being adapted to receive and support a said wire, said punches being adapted to enter said bores forcing said wires from said bores into said disks.

11. The machine recited in claim 10 wherein means is provided to hold the said wires in said bores.

12. The machine recited in claim 10 wherein said bolsters each comprise an elongated rod slidably supported on said guide rods,

and said punches and said guide rods are fixed to said support means for said punches.

13. The machine recited in claim 12 wherein means is provided to move said wire turret up to receive said wire lengths, and means to move said wire turret down to a predetermined space from said disk turret, and means to move said punch support down to force said wires from said wire supports into said plastic disks.

14. A machine for inserting wires into disks comprising, a means for supporting said disks, means for supporting wires over said disk, punch means,

said punch means comprising a punch member for each said wire,

each said punch member having one end fixed to said punch means and the other end of each punch adapted to engage a said wire,

spaced bolsters slidably supported on said punches, links, each said link having a slot therein receiving a pin fixed to one end of a said bolster, each said link having a second end attached to a bolster adjacent the first-mentioned bolster,

said bolsters being adapted to slide on said punches toward said punch means whereby said punches are restrained against bending by said bolsters.

15. The machine recited in claim 14 wherein there are three said bolsters,

the total movement of said bolsters on said punch members is substantially equal to the distance said wires are forced into said disks.

16. The machine recited in claim 14 wherein each said bolster has a said pin in its end and each said pin is received in a said link.

17. An assembly machine comprising,

a disk turret,

a wire turret,

a disk feeding means,

a wire feeding means,

a wire cutoff means,

and a wire checking means,

said wire turret having at least one wire nest attached to its outer periphery,

said disk turret having at least one disk receiving nest on its upper surface,

index means for moving said wire turret up to receive ends of said wires, for moving and rotating said turrets to bring said disk receiving nests under said wire receiving nest, all in synchronism with each other,

said cutoff means for cutting off the ends of said wires while in said wire nest,

and punch means for forcing said wires from said wire nest into said disks.

18. The machine recited in claim 17 wherein means is provided to check said wires before said wires are indexed under said punch to insure that said wires are straight.

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