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L. H. MORIN

2,495,592

METHOD OF FORMING SEPARABLE FASTENER STRINGERS

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Fig. 1.

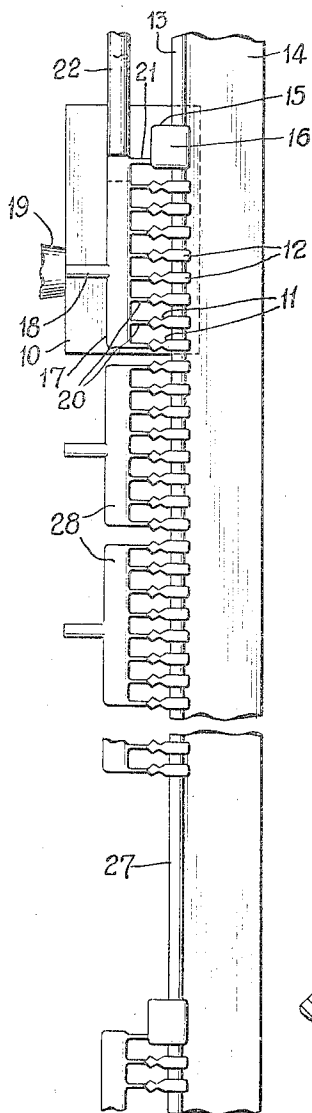


Fig. 2.

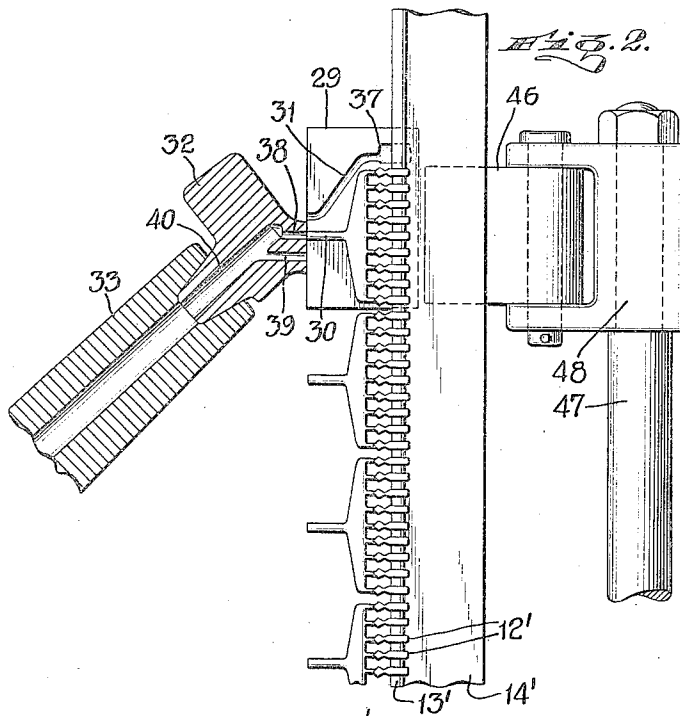


Fig. 3.

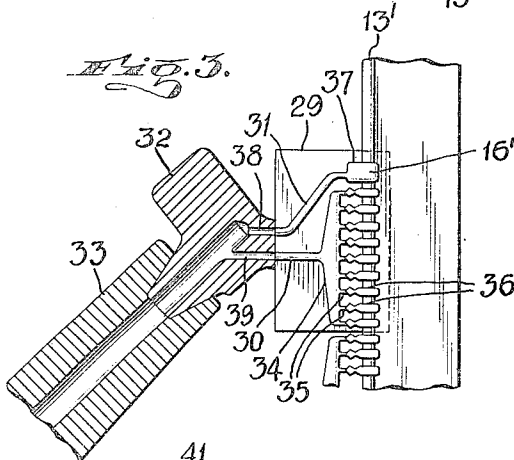


Fig. 4.

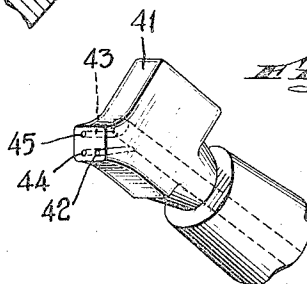
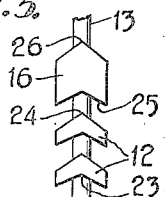


Fig. 5.



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METHOD OF FORMING SEPARABLE
FASTENER STRINGERS

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16 Claims. (Cl. 18—59)

1

This invention relates to separable fastener stringers wherein the scoops and end stops of the stringers are die cast directly on the stringer tape. More particularly, the invention deals with the method of producing stringers of the kind defined wherein a stringer length is formed from a predetermined number of groups of cast scoops in defining the stringer length, and wherein in forming one end group of castings in a stringer length, an end stop is simultaneously formed in the operation of casting said end group of scoops, thereby producing a finished stop end on at least one end of each stringer. The novel features of the invention will be best understood from the following description when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed, and in which the separate parts are designated by suitable reference characters in each of the views; and in which:

Fig. 1 is a face view of a stringer tape and one part of a die illustrating the method of forming stringer lengths on the tape and diagrammatically illustrating the scoops.

Fig. 2 is a view similar to Fig. 1, showing another method of procedure and indicating a part of a gooseneck in section and also indicating a part of the tape gripper and feed mechanism.

Fig. 3 is a view similar to Fig. 2, showing only part of the construction and with parts in a different position.

Fig. 4 is a perspective view of the discharge nozzle of a slightly modified form of gooseneck; and

Fig. 5 is an enlarged detailed view of the edge portion of one end of a stringer showing the type of scoops and end stop formed in accordance with the illustrations in Figs. 1 to 3 inclusive.

In the manufacture of stringers of separable fasteners of the kind under consideration, it has been the common practice to form scoops on the beaded edge of the stringer tape or to attach scoops thereon in defining what is termed stringer lengths. The long tape constituting many stringer lengths is then cut to form the individual stringers, after which end stops are attached thereto. This procedure requires additional operations and additional handling in the production of the finished stringer or separable fastener.

To simplify the production of separable fasteners, and to eliminate the additional handling and operations above referred to, I provide a method of casting stringer scoop lengths on a tape and then, in the final casting operation, in forming a

2

stringer scoop length to add an additional casting portion simultaneously in forming the last casting to produce an end stop at one end of each stringer. This is accomplished in a continuous method and particularly in a method where groups of scoops are formed in each casting operation, each group defining a predetermined increment usually in the measurement of an inch, in view of the fact that fastener stringers are commonly produced in inches.

In Fig. 1 of the drawing I have shown one adaptation of the invention, and in this figure, 10 represents one part of a die, the face or impression surface of the die being shown. This die has a plurality of cavities 11 for forming a plurality of scoops 12 on the beaded edge 13 of a stringer tape 14, as well as a cavity 15 for forming an end stop 16 commonly referred to as a top stop at one end of each stringer length on the tape 14. At 17 is shown a large gate cavity having a single admission opening 18 through which casting material is injected into the cavity 17 from the nozzle 19 of the gooseneck of a die casting machine. Extending from the gate cavity 17 are a plurality of small gate passages 20 which lead to the cavities 11 for forming the cast scoops 12. Another small gate passage 21 is arranged at one end of the die and opens into the cavity 15 to form the cast stop 16. The cavity 17 is cylindrical in form in the construction shown, and opens through the upper end of the die. In this cavity is arranged a shut-off rod or control pin 22 movable with respect to the die from the full line position indicated in Fig. 1 to the dotted line position, in which latter position it closes off the gate passage 21.

The scoops 12, as well as the stop 16 are diagrammatically illustrated in Fig. 1, and these scoops and the stop 16 are preferably of the cross sectional contour shown in detail in Fig. 5 of the drawing, in which the stop 16 and two of the scoops 12 are illustrated. The scoops 12 are of V-shaped cross sectional form, or what I term coreless type of scoops, the V-shaped contour providing a longitudinal channel or female coupling portion 23 longitudinally of the lower surface of the scoops and a raised ridge 24 at the upper edge thereof forming the male coupling portion of the scoops.

When a plurality of scoops, or what might be termed a group of scoops are formed simultaneously in each casting operation of the machine, as illustrated in the accompanying drawing, it is essential that these scoops be of the coreless type, such as the V-shaped cross sectional form

3

illustrated in Fig. 5 in order to remove the scoops from the die cavities 11 when the dies are separated. It will also appear that the stop 13 is of the same general V-shaped cross sectional contour as the scoops 12. In other words, a stop is provided with a V-shaped recess 25 with the lower surface thereof and the corresponding ridge 26 at the upper surface thereof.

The method of producing stringers or stringer lengths on a long tape according to the teachings in Fig. 1 will be substantially as follows:

A predetermined number of groups of scoop castings will be formed at spaced intervals along the beaded edge 13 of the tape 14 until the desired stringer length has been obtained. After the formation of a group of castings with the blocking pin 22 in a lowered position in the passage 17, blocking off the passage 21, the dies are separated and the tape with the group of castings thereon is moved downwardly arranging the uppermost casting of the group in predetermined position with respect to the lower surface of the die so as to space the uppermost cast scoop of one group in proper spaced relationship to the lowermost cavity 11 of the die to provide equal spacing of all scoops in a stringer length. The dies again close, and another group of cast scoops are formed and this operation is continued until it is desired to form the last group of the stringer lengths. In this last operation, the pin 22 is moved into the full line position shown in Fig. 1, exposing the passage 21 to the passage 17 and in forming the last group of scoops, the end stops 16 will be simultaneously formed therewith, as illustrated in the drawing. Upon the completion of this last cast group of castings including the stop 16, the dies are separated and the tape is then moved a greater distance to provide a wide spacing, as at 27 on the tape to space one stringer length from the next adjacent stringer length. In Fig. 1 of the drawing, the upper end portion of a preformed stringer length is shown below the wide tape spacing 27, and the lower portion of the next adjacent stringer is shown above said spacing. After the castings have been formed, the gate portions 28 are trimmed off, thus leaving the scoops 12 and end stop 16 only upon the tape.

In Figs. 2 to 4 inclusive is shown another method of procedure. In view of the fact that the resulting product or stringers in Figs. 2 and 3 of the drawing will be the same as that shown in Fig. 1, the scoops are identified as 12', the beaded edge as 13', and the tape as 14'. The only difference in the latter figures being in the manner of obtaining the desired result and not in the structure of the finished product. In Figs. 2 and 3, the scoops 12' are only diagrammatically illustrated in order to simplify the illustration in the accompanying drawing, but here again, these scoops may be of the structure shown in Fig. 5, and this is also true of the end stop 16' as shown in Fig. 3 of the drawing.

In Fig. 1, each casting comprises a group of eight castings. However, in Figs. 2 and 3, each casting comprises a group of nine scoops. In this connection, it will be understood that the number of scoops formed in each casting operation will vary, particularly in forming large and small scoops. It may also vary in the length of the increments employed, but in this connection, it will also be apparent that the particular structure of the added casting as at 16 and 16' may be varied to suit the results which are required or the particular type and kind of end

4

stop formed. As a matter of fact, from a more general standpoint, it must be understood that my method deals with the formation of successive castings or groups of castings in a completely automatic die casting machine and then at intervals to proceed to add to one of the castings or groups of castings a supplemental cast member or body, particularly of a contour different from that of the other casting or castings formed.

In Figs. 2 and 3, I employ a die structure 29 differing from the die 10 in employing two gate passages 30 and 31 adapted for registration with a nozzle 32, Fig. 3, of a gooseneck, part of which is shown at 33. In both Figs. 2 and 3, the passage 30 opens into a large passage 34 having branches 35 registering with scoop cavities 36. The passage 31 leads directly to a cavity 37 for forming the end stop 16'. In other words, with the die structure shown in Figs. 2 and 3, a blocking pin such as the pin 22 is not employed and the desired result is accomplished by controlling movement of the gooseneck 33 and the nozzle 32 thereof over the surface of the die 29.

In Figs. 2 and 3, the nozzle has vertically arranged discharge ports 38 and 39 registering with the discharge passage 40 of the nozzle. In forming the groups of castings only, the casting material is discharged from the passage 38 into the passage 30, the passage 39 being sealed upon the face of the die and this position is shown in Fig. 2 of the drawing. In these casting operations, no casting material enters the passage 31 and cavity 37, therefore, end stops cannot be formed. However, in forming the last group of cast scoops, forming the stringer length, the nozzle 32 is simply moved upwardly so as to bring the passage 39 in registering position with the passage 30 and the passage 38 in registering position with the passage 31. Thus in forming the last group of cast scoops, casting material will extend into the cavity 38 in forming the top stop 16' shown in Fig. 3 of the drawing.

The only difference between the structure of Figs. 2 and 3, and the structure of Fig. 4, is in the type of nozzle employed. In Fig. 4, a nozzle 41 is employed which has at one side thereof a single discharge 42 adapted to register with the passage 30, whereas the upper blank surface 43 of the nozzle will be arranged over the passage 31. At the other side of the nozzle 41 are two vertically aligned passages 44 and 45. It will thus be seen that by shifting the nozzle across the surface of the die, the passage 44 may be brought into registering alignment with the passage 30, and at the same time, the passage 45 will register with the passage 31. In this last position, casting material will be simultaneously injected into the scoop cavities 36 and also into the cavity 37 in forming the cast end stop 16' as illustrated in Fig. 3. In other words, in Figs. 2 and 3 of the drawing, the nozzle moves vertically over the surface of the die in controlling the different casting operations, and in Fig. 4, the nozzle moves laterally over the surface of the die for the same purpose.

The die structure illustrated in Figs. 2 and 3 constitute one of the distinctive features of my invention, particularly in providing independent gate passages extending to the cavities of two different contours. That is to say, the passage 30 which extends to the scoop cavity 36 and the passage 31 leading to the cavity 37. With this type of die construction I also employ novel discharge nozzles, one with two discharge passages,

such as 38 and 39 shown in Figs. 2 and 3, and the other with the three discharge passages 42, 44 and 45 as in Fig. 4. By simply moving the surface of the discharge end of the nozzle, in abutting relationship over the surface of the dies vertically or laterally, or in fact in any desired manner, the discharge passages of the nozzle may be brought into registering alinement with the gate passages in the manner described.

While in the accompanying drawing I have illustrated several adaptations of my invention, it will be understood that they are only by way of example, as my invention is adapted for the formation of castings of different contours in a single pair of dies and a control is provided for governing the formation of the respective castings of different contours one with respect to the other in successive casting operations of the machine.

In Fig. 2 of the drawing, I have shown part of a tape gripper and feed mechanism including a jaw portion 46 for engaging and gripping the tape, and a supporting and operating rod 47 with which the jaw portion 46 is coupled through a yoke shaped block 48. The particular means for actuating the gripper and feed mechanism is not illustrated as it forms no particular part of the invention. This mechanism provides the increment feed of the tape as well as the wide spacing feed thereof, as for example, the spacing designated by the reference character 27 in Fig. 1 of the drawing.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The method of forming separable fastener stringers by die casting groups of scoops along one edge of a stringer tape which comprises placing said tape edge in die casting position relative to a die, said die having scoop cavities therein and a cavity for forming an end stop, injecting casting material to said scoop cavities by means of a nozzle in contact with said die, thereby forming a group of scoops on said tape edge, thereafter repeating the foregoing operations to form a predetermined number of successive groups of scoops on said tape edge, and then casting a final group of scoops upon said tape edge to produce a predetermined stringer length, said final casting being accomplished by injecting casting material to said scoop cavities and said end stop cavity by realinement of said nozzle in contact with said die.

2. The method of forming separable fastener stringers by die casting groups of scoops along one edge of a stringer tape which comprises placing said tape edge and a die in die casting position relative to a die, said die having scoop cavities therein and a cavity for forming an end stop, injecting in one casting operation casting material only into said scoop cavities, thereby forming a group of scoops on said tape edge, successively forming upon said tape edge a plurality of said group of scoops, and then casting a final group of scoops and an end stop upon said tape edge to produce a predetermined stringer length, said final group of scoops containing the same number of scoops as any of said preceding groups, said final casting being accomplished by injecting casting material simultaneously into said scoop cavities and said end stop cavity.

3. The method of producing, in a successive series of casting operations, stringer lengths including an end stop at one end of each stringer,

which comprises employing a die having a predetermined number of scoop cavities therein and a cavity for forming an end stop, placing a stringer tape edge in a die casting position relative to said die, injecting casting material to the cavities of said die by means of a nozzle in contact with the die, said injection being controlled by interrupting the flow of casting material between said nozzle and said end stop cavity, forming in a predetermined series of casting operations only groups of cast scoops on the stringer tape, and then in one casting operation injecting casting material into both the scoop cavities and the end stop cavity to form simultaneously a group of scoops and a die cast end stop on the stringer tape.

4. The method of producing, in a successive series of casting operations, stringer lengths including an end stop at one end of each stringer, which comprises placing a stringer tape edge in a die casting position relative to a die, said die having a predetermined number of scoop cavities therein and a cavity for forming an end stop, said group of scoop cavities and said end stop cavity having gate passages connecting them to a casting material injector, injecting casting material only to the group of scoop cavities by blocking the gate passage to the end stop cavity, casting a series of said groups of scoops on the tape, then opening the gate passage to the end stop cavity and casting on the tape in a single casting step a group of scoops and an end stop to form a stringer.

5. The method of producing, in a successive series of casting operations, stringer lengths including an end stop at one end of each stringer, which comprises placing a stringer tape edge in a die casting position relative to a die, said die having a predetermined number of scoop cavities therein and a cavity for forming an end stop, said group of scoop cavities and said end stop cavity having independent gate passages connecting them to a casting material injector, injecting casting material only to the group of scoop cavities by first moving the injector into alinement with the gate passage to the scoop cavities and out of alinement with the gate passage to the end stop cavity, casting a series of said groups of scoops on the tape, then moving the injector into alinement with both said gate passages and casting on the tape in a single casting step a group of scoops and an end stop to form a stringer.

6. The method of controlling formation of die castings in different cavities of a die, which comprises injecting casting material from an injector through a first passage in said die to one type of cavity to form a casting corresponding to said cavity, moving the injector on and relative to the die face and then injecting casting material through said first passage and also through a second passage in said die leading to a second type of cavity to simultaneously form castings corresponding to both said first and second types of cavities.

7. The method of forming a successive series of similar castings and then to add to the series, at predetermined intervals, a different casting, which comprises injecting casting material through a first passage in a pair of dies having cavities of different contour, said passage leading to cavities of one contour, thus forming a series of castings of said contour, forming a successive series of said castings, then injecting casting material simultaneously through said first passage

7

and also through a second passage in said dies, said second passage leading to a cavity of another contour, thus forming a series of said first-mentioned castings and also a casting of a different contour.

8. The method of forming castings of different contour on an elongated mounting member by means of a die having cavities defining castings of different contour, which comprises injecting casting material to die cavities of a first contour in successive die casting operations to form castings of said first contour, and then injecting casting material to die cavities of said first and of a second contour in one operation to form castings of said first contour and of said second contour with the latter disposed at one end of said castings of the first contour, and then repeating said casting operations.

9. The method of forming a predetermined number of cast devices on a mounting member by the use of a single mold having a plurality of cavities therein each connected by a passageway to a surface of the mold, each cavity defining one of said devices, and said cavities being of more than one contour, which comprises placing said mold and mounting member in casting position relative to each other, injecting casting material into the cavities of said mold through said surface while maintaining passageways open only to the cavities of a first contour, thereby casting upon said mounting member a group of said devices characterized by the cavities of said first contour, successively forming upon said mounting member a plurality of said group of devices, thereafter in a final casting operation injecting casting material into the cavities of said mold while maintaining passageways open to cavities of said first and of a second contour so as to cast upon said mounting member a group of devices characterized by the cavities of said first and second contours.

10. The method of forming a predetermined number of cast devices on a mounting member by the use of a single mold having a plurality of cavities therein each connected by a passageway to a surface of the mold, each cavity defining one of said devices, and said cavities being of more than one contour, which comprises placing said mold and mounting member in casting position relative to each other, injecting casting material into the cavities of said mold through said surface while maintaining passageways open only to the cavities of a first contour, thereby casting upon said mounting member a group of said devices characterized by the cavities of said first contour, successively forming upon said mounting member a plurality of said group of devices, thereafter in a final casting operation injecting casting material into the cavities of said mold while maintaining passageways open to cavities of said first and of a second contour so as to cast upon said mounting member a group of devices characterized by the cavities of said first and second contours, the number of cast devices in said last group being greater than in any of said prior groups.

11. The method of forming a predetermined number of cast devices on a mounting member by the use of a single mold having a plurality of cavities therein each connected by a passageway to a surface of the mold, each cavity defining one of said devices, and said cavities being of more than one contour, which comprises placing said mold and mounting member in casting position relative to each other, injecting casting ma-

8

terial into the cavities of said mold through said surface while maintaining passageways open only to the cavities of a first contour, thereby casting upon said mounting member a group of said devices characterized by the cavities of said first contour, successively forming upon said mounting member a plurality of said group of devices, thereafter in a final casting operation injecting casting material into the cavities of said mold while maintaining passageways open to cavities of said first and of a second contour so as to cast upon said mounting member a group of devices characterized by the cavities of said first and second contours, and then feeding the mounting member to widely space the same preparatory to forming another predetermined number of cast devices thereon.

12. In die casting machines employing a pair of dies having cavities of different contour, said dies having independent gate passages, one leading to a cavity of one contour, and the other to a cavity of a different contour, an injector nozzle having independent discharge passages, said nozzle being in contact with the dies and movable relatively thereto, during said contact to bring the discharge passages of the nozzle in registering alignment with the independent gate passages of said dies whereby in one position of the nozzle relative to the dies, casting material is injected into only one of said gate passages to form a casting of one contour, and in another position of said nozzle, both discharge passages are in registering alignment with both gate passages to simultaneously form castings of both contour in said dies.

13. In die casting machines employing a pair of dies having cavities of different contour, said dies having independent gate passages, one leading to a cavity of one contour, and the other to a cavity of a different contour, an injector nozzle having independent discharge passages, said nozzle, casting material is injected into both and movable relatively thereto to bring the discharge passages of the nozzle in registering alignment with the independent gate passages of said dies, whereby in one position of the nozzle relative to the dies, casting material is injected into only one of said gate passages to form a casting of one contour, and in another position of said nozzle, casting material is injected into both gate passages to simultaneously form castings of different contour in said dies, the discharge passages of the nozzle being sealable by the surface of the dies when said passages are in non-registering position with the respective gate passages.

14. In die casting machines employing a pair of dies having a group of cavities all of one contour and an independent cavity of different contour, said dies having independent gate passages, one leading to all of the cavities in said group and the other to the second named cavity, an injector nozzle having independent discharge passages, said nozzle being in contact with a surface of the dies and movable relatively thereto, while in contact therewith, to bring the discharge passages of the nozzle in registering alignment with the independent gate passages of said dies, whereby in one position of the nozzle on the dies, casting material is injected into only one of said gate passages, and whereby in the other position of said nozzle, casting material is injected into both of said gate passages.

15. The combination with a pair of dies having gate passages for directing casting material to independent cavities in the dies, of a nozzle for

injecting casting material into the dies, said nozzle having independent discharge passages, said nozzle being movable relatively to the dies while in contact with a surface thereof, whereby in one position of the nozzle casting material is injected into one only of said gate passages, and in another position of the nozzle, casting material is injected simultaneously into both of the gate passages.

16. In die casting machines employing dies having independent gate passages into which casting material is adapted to be injected, a discharge nozzle for injecting casting material into gate passages of said dies, said nozzle having independent discharges, and said nozzle being movable relatively to a surface of the dies while in contact therewith for controlling discharge of

casting material from the nozzle passages into one and both of the gate passages of said dies.

LOUIS H. MORIN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,234,185	Marinsky et al.	Mar. 11, 1941
2,368,260	Morin	Jan. 30, 1945

FOREIGN PATENTS

Number	Country	Date
697,034	Germany	Oct. 4, 1940

Certificate of Correction

Patent No. 2,495,592

January 24, 1950

LOUIS H. MORIN

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 8, line 42, strike out the comma and words ", casting material is injected into both" and insert instead *being in contact with a surface of the dies*;

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of May, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.