April 2, 1935. E. A. JOHNSTON 1,996,247

COTTON PICKING SPINDLE

Filed Sept. 23, 1933 3 Sheets-Sheet 1

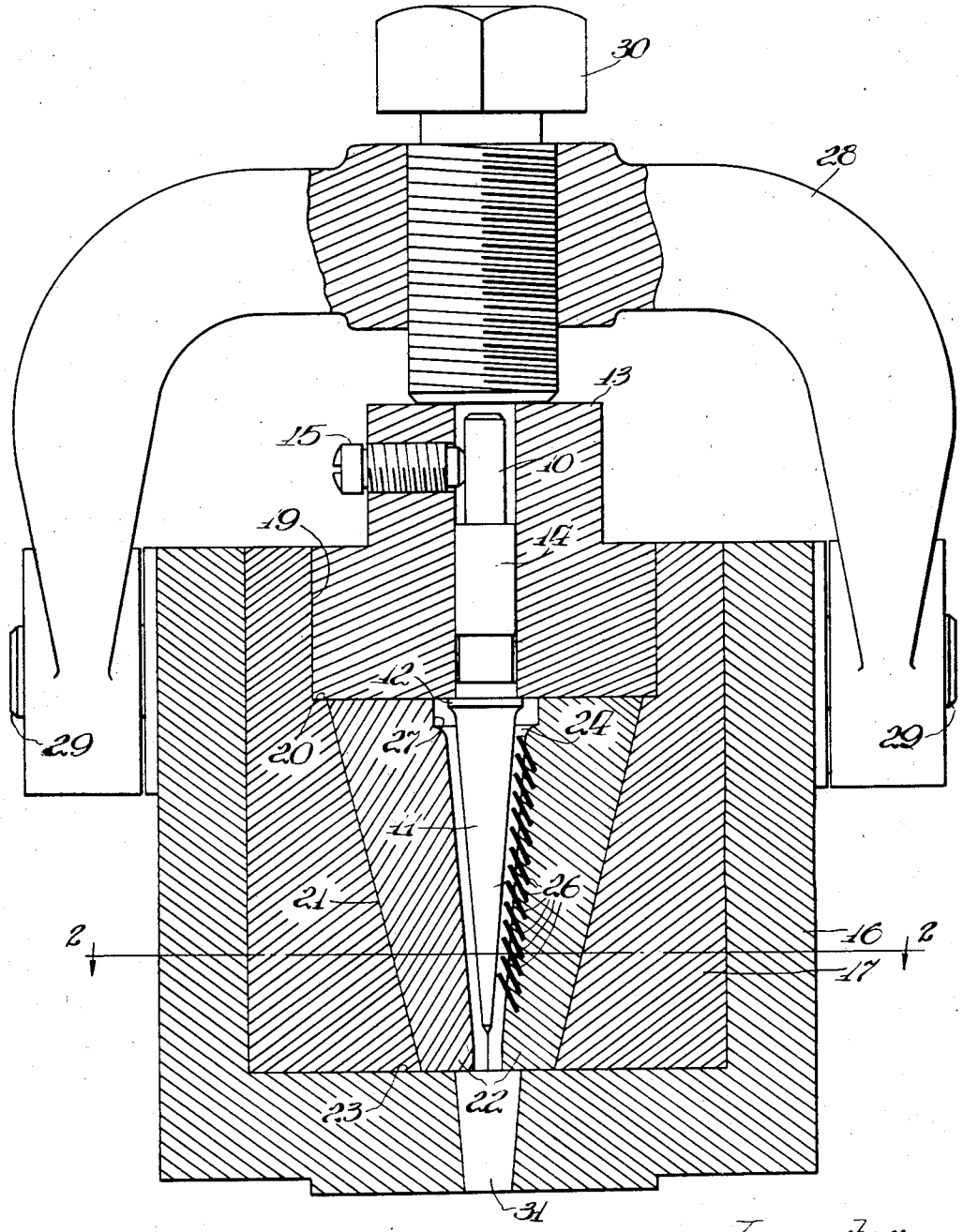


Fig. 1

Inventor
Edward A. Johnston
By V. J. Fitzgerald
Atty.

April 2, 1935. E. A. JOHNSTON 1,996,247

COTTON PICKING SPINDLE

Filed Sept. 23, 1933 3 Sheets-Sheet 2

Fig. 2

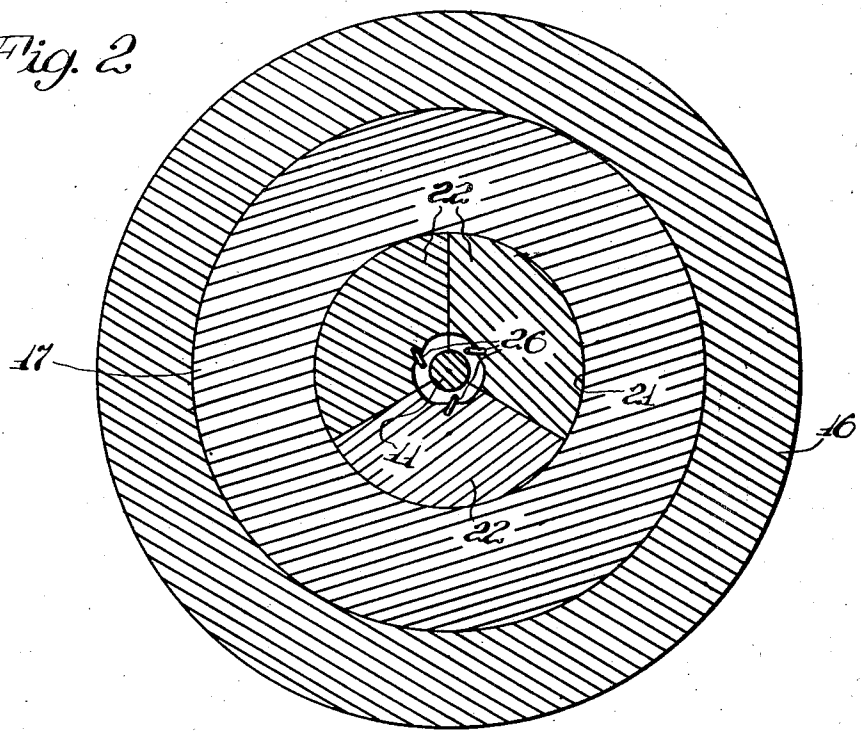
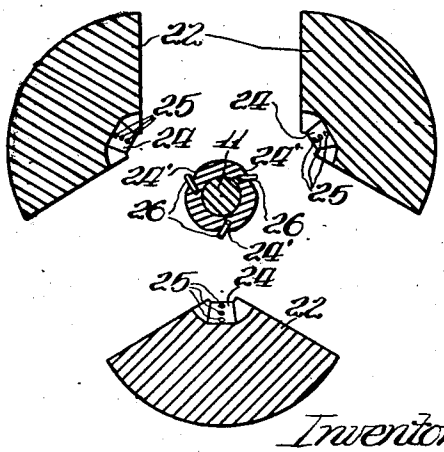


Fig. 3



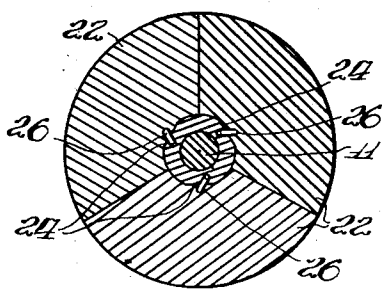


Fig. 4

Inventor

Edward A. Johnston

By V. J. Lanagan

Att'y.

April 2, 1935. E. A. JOHNSTON 1,996,247

COTTON PICKING SPINDLE

Filed Sept. 23, 1933 3 Sheets-Sheet 3

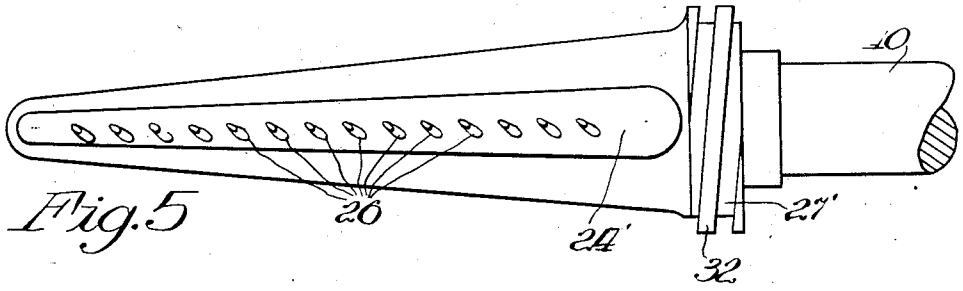


Fig. 5

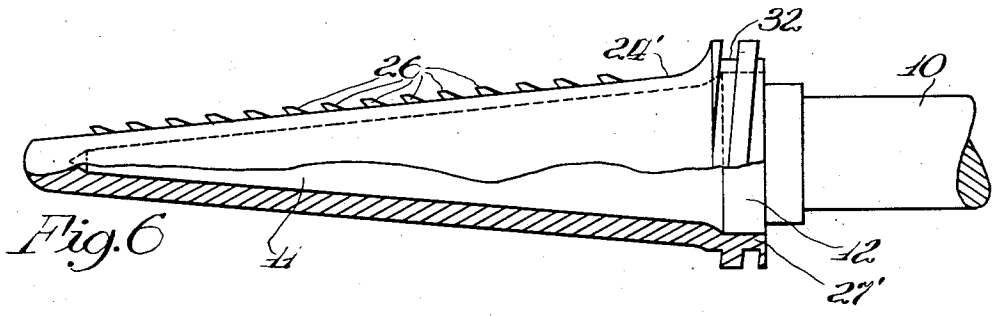


Fig. 6

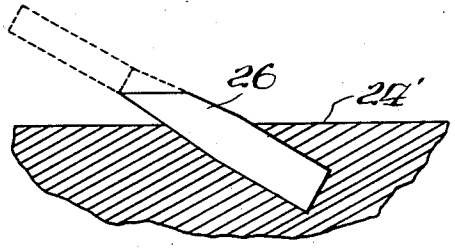


Fig. 7

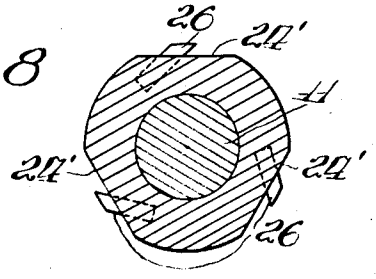


Fig. 8

Inventor
Edward A. Johnston
By V. J. Lasagne
Atty.

Patented Apr. 2, 1935

1,996,247

UNITED STATES PATENT OFFICE

1,996,247

COTTON PICKING SPINDLE

Edward A. Johnston, Chicago, Ill., assignor to International Harvester Company, a corporation of New Jersey

Application September 23, 1933, Serial No. 690,648

3 Claims. (Cl. 56—50)

This invention relates to a method of manufacturing cotton picker spindles. More specifically, it relates to the manufacture of conical picker spindles having a plurality of barbs or teeth projecting therefrom.

In the construction of cotton picker spindles a conical type has been found preferable, due to the better doffing which can be accomplished with a spindle so shaped. Problems have been encountered in the manufacture of spindles, due to the necessity for providing a large number of barbs or teeth and due to the necessity of providing clearance around said barbs or teeth to facilitate doffing. It has also been found necessary to locate the teeth in such positions that they are aggressive with respect to the cotton fiber and yet do not destroy the plant or the unripened bolls of cotton. The spindle must also possess strength sufficient to prevent any distortion, bending or breaking by encounter with heavy stalks.

The solution of this problem with the difficulties above pointed out is the principal object of the present invention. Another object is to adapt a die casting method of manufacture to the construction of a picker spindle having the desired characteristics. These and other objects and the means by which they are accomplished will be apparent from the detailed description to follow.

In the drawings:

Figure 1 is a sectional view of a die casting apparatus specially designed to construct the picker spindles embodying the present invention;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a sectional view, showing the three component parts of the conical spindle die removed from the spindle;

Figure 4 shows the same elements as Figure 3 with the dies in closed position;

Figure 5 is a plan view of a picker spindle made by the process of the present invention;

Figure 6 shows the same spindle as Figure 5 broken away to show the die cast portion and the inserted core;

Figure 7 is an enlarged sectional view, showing one of the inserted pins which form teeth on the picker spindle. The dotted lines show said pin before it is ground off to form a barb or tooth; and,

Figure 8 is a sectional view taken at right angles to the axis of one of the spindles, showing the location of the pins and the center core in the die cast portion of the spindle.

As shown in Figure 1, a steel center core 10, having a conical end portion 11 and a shoulder 12 at the bottom of said conical portion, is fitted into a die block 13. Said block is provided with a bore into which the spindle slidably fits with the shoulder 12 abutting the block around the bore. The spindle is provided with an enlarged portion 14 on which gears are cut for rotation of the spindle. These features have not been shown, as they do not constitute a part of the present invention. A cap screw 15 is provided for securely holding the spindle core 10 in position.

In an outside casing 16, a member 17 is fitted for holding die blocks which support and surround the spindle core. Said member is provided at the top with a cylindrical bore 19 into which the die 13 slidably fits. At the bottom end of the cylindrical portion, a shoulder 20 is provided to limit axial movement of the die 13. A conical chamber 21 extends downwardly from the shoulder 20 to the bottom of the member 17, terminating adjacent the bottom of the casing 16. As shown in Figures 2, 3 and 4, three dies 22, each of 120 degrees in angular dimension, are fitted into the conical chamber 21. At the top ends, said dies abut the bottom of the die 13. At their bottom ends, said dies abut the bottom 23 of the casing 16. It is to be understood that all of the dies are fitted so as to be fluid tight with respect to the hot die casting metal.

Each of the segmental dies 22 is provided along the center of its inside conical surface with a flattened portion 24. This flattened portion can best be seen in Figures 3 and 4. A plurality of small bores 25 are formed in the dies spaced along the flattened portions 24. Prior to assembly of the dies 22 into the holder member 17, a plurality of pins 26 are inserted into the bores. Said pins project from the walls of the dies, as shown in Figure 1. The dies are then placed in position with the die 13, which carries the steel core 10, slidably fitted into the cylindrical portion 19 at the top of the member 17. The conical portion 11 of the steel core is so proportioned that, when in clamped position ready for casting, it is spaced from the walls a substantially uniform distance, as shown in Figure 1. The pins 26 extend adjacent the core, but do not contact the surface thereof. At the tops of the segmental dies 22, recesses 27 are cut out to form a shoulder on the picking spindle for a particular purpose to be hereinafter described.

A yoke 28 is provided on trunnions 29 mounted on the casing 16. A stud 30, threaded through the yoke 28 in alignment with the die 13, provides

means for rigidly securing the dies in position for the casting operation.

With the dies set up and clamped in position as above described, hot fluid die casting metal is forced under pressure through an opening 31 in the bottom of the casing 16 and into the space provided around the pins 26 and the core 11. The core is knurled or roughened to insure a better bond between the die cast metal and the core.

After the casting operation, which is performed in a conventional die casting machine, the spindle is removed from the dies. To complete the formation of the spindle, the ends of the pins 26 are ground off with their ends terminating substantially in the conical surface of the outside of the spindle. The flattened portions 24 in the die blocks form corresponding flattened portions 24' on the completed spindle. The length of the pins as ground off with their ends terminating in the surface of the cone bounding the spindle is determined by the extent of the flattened portion 24'. In positioning the pins 26 in the mold, the final position of the pins is determined.

As illustrated in Figures 5, 6 and 8, the pins 26 slant in an angular direction towards the apex of the conical spindle and also slant towards tangential positions with respect to the radii of the cone. It has been found that this particular angular positioning possesses marked advantages, both for gathering the cotton fibers and for doffing the fibers from the spindles. It is due to the necessity for such an angular position and to the necessity for having clearance all around the pins that a special method of manufacture was necessary. Previous attempts to cut teeth directly on the spindles have led to very expensive construction and have resulted in the formation of shoulders which prevent satisfactory doffing.

The circular recess 27 in the dies 22 forms a shoulder 27' on the spindle. After casting, this shoulder is machined to form a thread 32 extending in a direction left-hand with respect to the direction of rotation, whereby, during rotation, there is a tendency for the thread to unwind material and to throw particles collecting thereabout, and to push the material and particles axially towards the apex of the conical spindle.

It is to be understood that in devising an apparatus for practicing the method of the invention and for constructing an improved picker spindle as contemplated by the invention, applicant has illustrated and described only one machine capable of performing the method and only one type of spindle embodying the features of the invention. However, all modifications coming within the scope of the appended claims are contemplated and form a part of the present invention.

What is claimed is:

1. A cotton picker spindle consisting of a steel core, a die cast conical body around said core having longitudinally extending flattened portions thereon, and pins embedded in the body along the flattened portions and terminating within the surface of the cone formed by continuation of the conical wall of the body over the flattened portions.

2. A cotton picker spindle consisting of a steel core, a die cast conical body around said core having longitudinally extending flattened portions thereon, and pins embedded in the body along the flattened portions thereof and extending at an angle with respect to the surface of the flattened portions, said pins terminating substantially within the surface of the cone formed by continuation of the conical wall of the body over the flattened portions.

3. A cotton picker spindle consisting of a conical body having circumferentially spaced longitudinally extending flattened portions thereon, and a series of pins extending from each flattened surface and inclined towards the apex of the spindle, the ends of said pins being beveled on a plane parallel with the flat surface from which they extend and lying within the surface of the cone formed by continuation of the conical wall of the spindle over said flattened surfaces.

EDWARD A. JOHNSTON.