Jan. 4, 1955 C. E. PITTMAN 2,698,465

COMB BOX FOR CARDING MACHINES

Filed Oct. 25, 1948 4 Sheets-Sheet 1

Fig. 1.

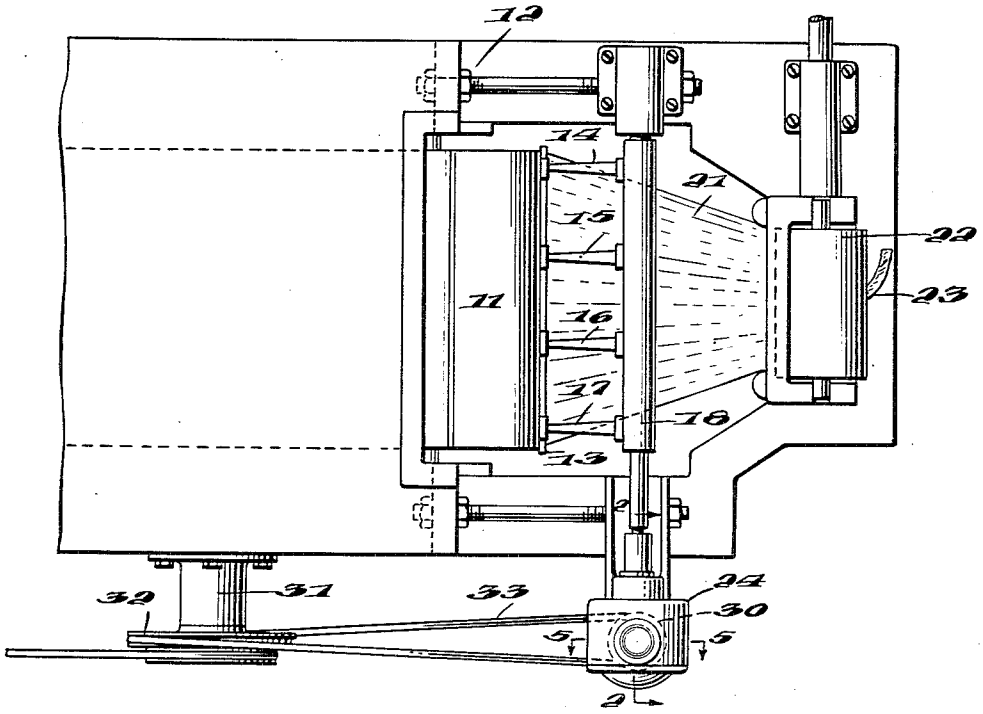


Fig. 7.

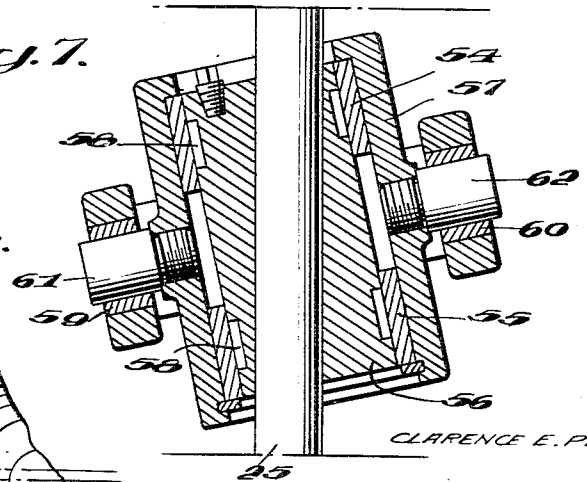
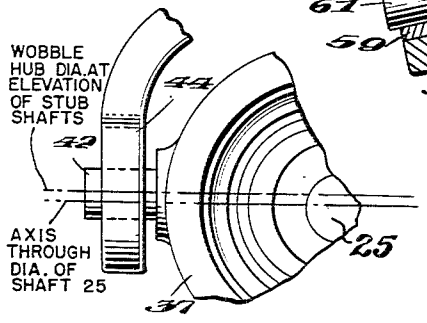


Fig. 8.



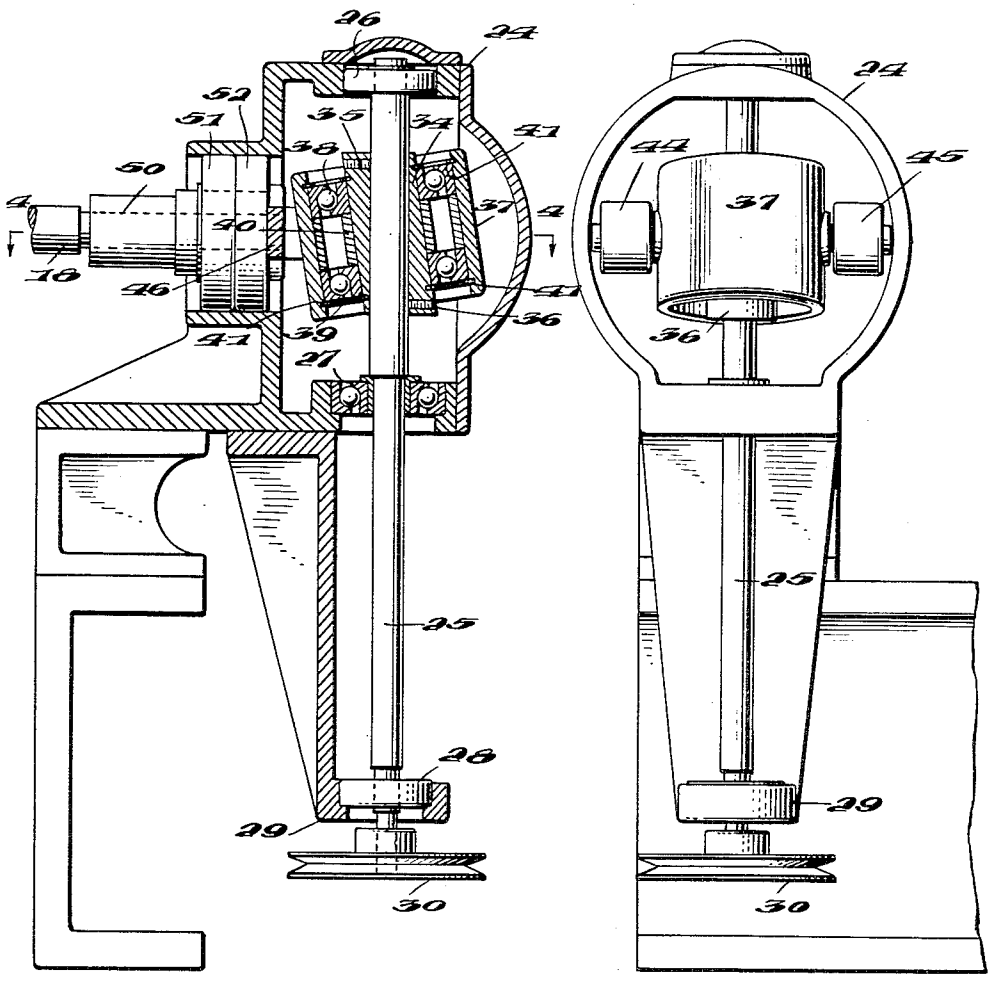
Inventor
CLARENCE E. PITTMAN,
By Hall & Houghton
Attorneys

Jan. 4, 1955 C. E. PITTMAN 2,698,465

COMB BOX FOR CARDING MACHINES

Filed Oct. 25, 1948 4 Sheets-Sheet 2

Fig. 2. Fig. 3.



Inventor
CLARENCE E. PITTMAN,

By Hall & Houghton,
Attorneys

Jan. 4, 1955 C. E. PITTMAN 2,698,465

COMB BOX FOR CARDING MACHINES

Filed Oct. 25, 1948 4 Sheets-Sheet 3

Fig. 4.

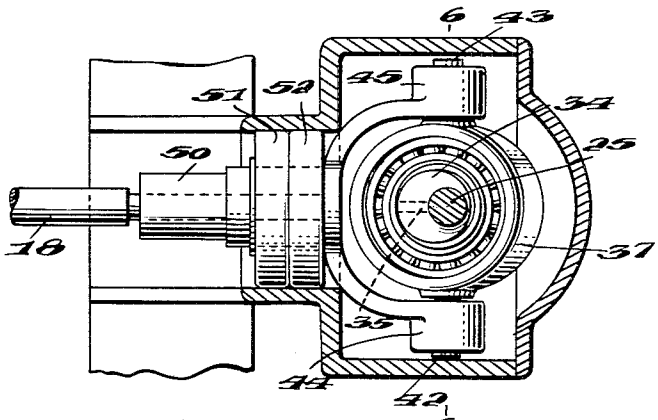


Fig. 9.

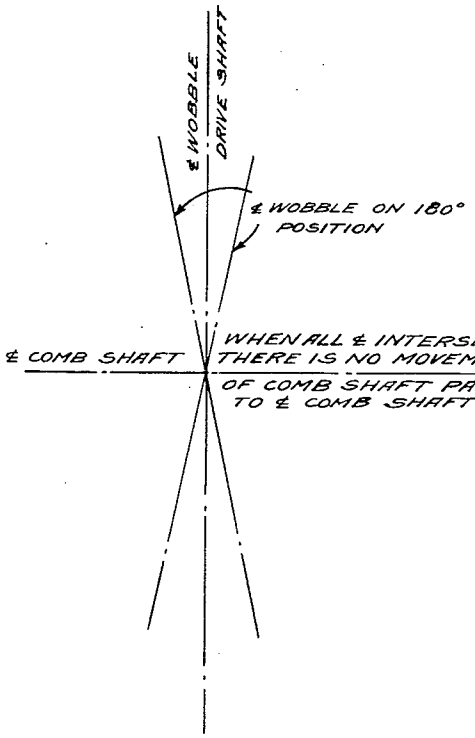
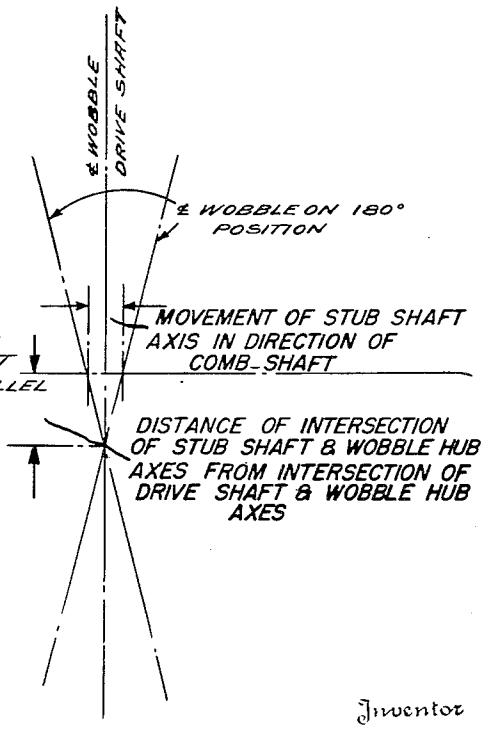


Fig. 10.



Inventor

CLARENCE E. PITTMAN,

By Hall & Houghton,

Attorneys

Jan. 4, 1955 C. E. PITTMAN 2,698,465

COMB BOX FOR CARDING MACHINES

Filed Oct. 25, 1948 4 Sheets-Sheet 4

Fig. 5.

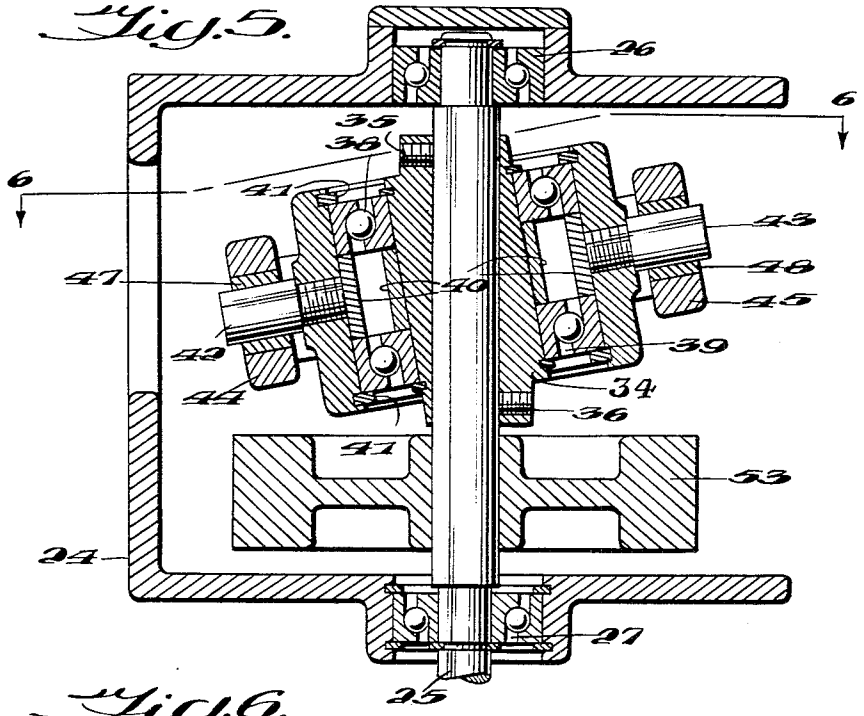
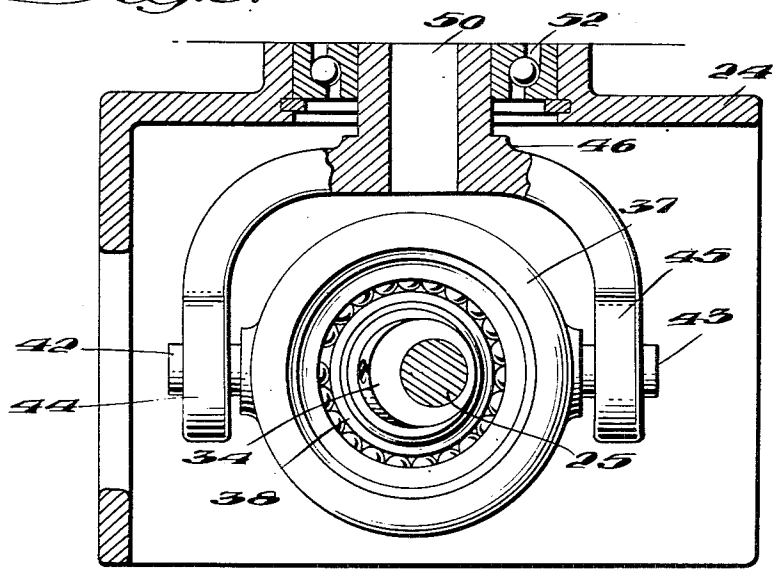


Fig. 6.



Inventor

CLARENCE E. PITTMAN,

By Hall & Houghton

Attorneys

United States Patent Office

2,698,465

Patented Jan. 4, 1955

2,698,465

COMB BOX FOR CARDING MACHINES

Clarence E. Pittman, Griffin, Ga.

Application October 25, 1948, Serial No. 56,299

5 Claims. (Cl. 19—106)

This invention relates to textile machines and is more particularly concerned with carding machines having a doffer cylinder from which a web of cotton is withdrawn by means of the vibrating action of a combing element operating along a portion of the periphery of the doffer roller. The web is subsequently formed into sliver by a trumpet for further processing.

Previous machines of this type employ mechanisms for vibrating the comb which are deficient in many respects. The usual mechanism comprises an eccentric connected to the rocker arm of the comb shaft by a rigid link. Mechanisms of this type wear out frequently and require continual repairs and replacement of parts.

The ordinary comb boxes heretofore employed are not only subject to excessive wear, but are required to be filled with lubricating oil, a large amount of which is consumed. Moreover, the oil placed in these comb boxes tends to leak out and in doing so damages the fibers. Hence it is necessary to clean these boxes frequently.

Another difficulty encountered in comb boxes of previous types is the fact that when parts become worn, incipient vibrations are set up in the comb shaft which results in uneven operation of the comb. This situation not only impairs the efficiency of the comb in stripping the fibers from the doffer cylinder, but results in the formation of non-uniform web and sliver.

It is an object of this invention to provide an oscillating mechanism for a carding machine which is long wearing, requires infrequent repairs and replacement of parts and dispenses with the use of an oil filled comb box.

Another object of this invention is the provision of an oscillating mechanism of the type mentioned which may safely employ the most delicate anti-friction surfaces for its various moving parts without undue wear, hence providing unusually smooth operation.

A further object of my invention is to provide a single mechanism to impart the usual oscillating motion to the comb shaft as well as a vibrating motion in the longitudinal direction.

Further objects and advantages of this invention will appear from the following description considered together with the accompanying drawing, in which drawing:

Fig. 1 is a top plan view of the exit end of a carding machine showing my invention applied thereto.

Fig. 2 is a vertical section of the comb box along the line 2—2 of Fig. 1.

Fig. 3 is an end view of the comb-box with the end plate thereof removed.

Fig. 4 is a plan section along the line 4—4 of Fig. 2.

Fig. 5 is a section along the line 5—5 of Fig. 1.

Fig. 6 is a section along the line 6—6 of Fig. 5.

Fig. 7 is a vertical section through a modified form of wobble mechanism.

Fig. 8 is a fragmentary top plan view illustrating eccentricity of the yoke stub shafts in a modified form of the invention.

Figs. 9 and 10 are diagrams illustrating the difference in the action of the wobble mechanism when modified as shown in Fig. 8.

Referring with more particularity to the drawing in which like numerals designate like parts, the elements of the ordinary carding machine with which the invention is concerned comprise a doffer drum or cylinder 11 rotatably mounted on a suitable base 12 and driven by any suitable means (not shown). The doffer cylinder is provided with a number of closely spaced teeth or pins

throughout its periphery which remove fibers from the main cylinder (not shown) of the machine. These fibers are stripped from the doffer drum by an oscillating doffer comb 13 which is disposed adjacent the periphery of the drum by attachment to the outer ends of a group of bars such as the bars 14, 15, 16 and 17, the inner ends being secured to a rocker or comb shaft 18. The comb 13 is caused to oscillate about the shaft 18 by oscillations imparted to the shaft 18. The comb contacts fibers on the doffer cylinder as they are brought around and strips them from the cylinder, thus forming a web 21 which is fed through a trumpet 22 and the formed sliver 23 is in turn rolled on a calender roll (not shown).

The oscillation imparted to the shaft 18 is usually provided by a mechanism called a "comb box" situated on one side of the machine to receive an extension of the shaft 18 or to be coupled with the shaft in some suitable manner. In the present invention the comb box is designated by the numeral 24 and is secured to the carding machine at the usual location.

In accordance with this invention there is disposed within the comb box a vertical shaft 25, the upper end of which is mounted in a ball bearing assembly 26. The shaft 25 passes through a ball bearing assembly 27 at the lower end of the comb box housing and thence to a third ball bearing assembly 28 mounted on a bracket 29 of the frame of the carding machine. These bearing assemblies, as well as the bearings 38 and 39 hereinafter described, while shown in certain instances herein as ordinary ball bearings for illustrative purposes, are preferably lubricant sealed ball bearings or the like. The lower end of shaft 25 below the bracket 29 is provided with a pulley 30 to receive power from a power take-off 31 of the carding machine having a pulley 32 attached thereto. These pulleys are coupled with a belt 33. However, other suitable means for driving the shaft 25 may be used, the means shown being merely illustrative.

Within the comb box, the shaft 25 is provided with a hub 34 or, as it is commonly termed, a wobbler, disposed at an angle to the longitudinal axis of the shaft 25. The hub or wobbler 34 is fixed to the shaft by means of set screws 35 and 36 or other suitable means. Upon rotation of the shaft the axis of the wobbler generates two cones about the axis of the shaft 25, the apices thereof touching each other at the line of intersection of the two axes. The set screws permit adjustment of the position of the hub on the shaft.

The hub 34 is provided with a cylindrical collar 37 about its periphery the inside diameter of which is larger than the outside diameter of the hub by an amount sufficient to permit the disposing of ball bearing assemblies 38 and 39 therebetween. The assemblies 38 and 39 are held in spaced relation on the hub between a central ring 40 and holding rings 41.

The collar 37 is provided on opposite sides with stub shafts 42 and 43. Said shafts are aligned on an axis perpendicular to the axis of the hub 34. In one embodiment of the invention the axis of the stub shafts is disposed across a diameter of the shaft 25 as shown in Fig. 6. In the embodiment shown in Fig. 8 the axis while still diametrical with respect to the collar 37 and hub 34 is slightly displaced along the axis of hub 34 from the diameter of the shaft 25, the purpose for which will be more fully explained hereinafter.

The collar 37 is straddled by the fork or arms 44 and 45 of a yoke member 46, said arms being pivotally attached to the stub shafts 42 and 43 respectively. Suitable bearings 47 and 48 are provided between the arms 44 and 45 and their corresponding shafts 42 and 43.

The other end of the yoke 46 terminates in the form of a shaft 50 which projects through the housing of the comb box in bearings 51 and 52 and is connected to the comb shaft 18 of the carding machine.

It may be seen therefore that rotation of the shaft 25 will result in an oscillatory motion being delivered to the yoke member 46 which is transmitted through its shaft end 50 to the comb shaft 18 of the carding machine.

To dampen vibrations, a fly wheel 53 may be secured

to the shaft **25** at any suitable point preferably near the wobbler hub.

The embodiment illustrated in Fig. 7 shows the use of sealed oil bearings instead of ball bearings as the anti-friction means. Bearing rings **54** and **55** are disposed between the wobbler hub **56** and collar **57**. Beneath the rings **54** and **55** oil reservoirs **58** are cut out in the hub to be filled with oil so as to furnish a constant source of oil under seal for the sliding surfaces. Similar anti-friction means may be employed at other points of the mechanism such as the means **59** and **60** at the stub shafts **61** and **62**.

The embodiment of Fig. 8 is for the purpose of imparting a slight longitudinal reciprocating motion in the nature of a vibration to the yoke and hence to the comb shaft **18** in addition to the oscillatory motion. The vibratory reciprocating motion of the comb improves its action in stripping the fiber from the doffer roller. Figs. 9 and 10 illustrate diagrammatically the difference in the action. Thus, in the form of Figs. 1–6 and 9, in which the axis of the stub shafts **42—43** passes through the point of intersection of the axes of the drive shaft **25** and wobbler **36**, the stub-shaft axis merely tilts about that point of intersection. Hence in this form a purely rotary oscillation is imparted to the comb shaft. In the form of Figs. 8 and 10, in which the stub shaft axis, while still diametrical of the collar **37** and wobbler **36**, is displaced along the wobbler axis from the point of intersection thereof with the drive shaft axis, the mid-point of the tilting stub shaft axis is translated about the drive shaft axis, and the component of this translation in the direction of the comb shaft axis is available for producing reciprocation thereof. When the comb shaft axis, as before, passes through the point of intersection of the drive and wobble hub axes, with only the fork connections to the stub shaft displaced therewith, the rotary oscillation and the longitudinal reciprocation are imparted thereto as described without requiring any universal connection between the fork and the comb shaft. The reciprocating comb shaft may slide through the inner race of the comb shaft bearings **51** and **52** (cf. Fig. 4 showing both these bearings and Fig. 6 showing the bearing **52** and showing how the fork **45—46** and shaft **50** may slide through the bearing from the position thereof in Fig. 4), such being one mode of accommodating the reciprocation, and the housing clearances will of course accommodate the movement.

As above noted, the bearings employed are preferably lubricant sealed ball bearings, and the comb box housing **24** is a dry housing. The housing thus serves as a guard to prevent accidental contact with the moving parts, and as a casing to prevent accumulation of lint, etc., on the working parts, but is not oil filled. This is an advantage compared to conventional oil-filled comb-boxes in which the leakage of oil causes spoilage of work and slippery floors.

While there have been described herein what are at present considered preferred embodiments of the invention, it will be obvious to those skilled in the art that minor modifications and changes may be made therein without departing from the essence of the invention. It is therefore to be understood that the exemplary embodiments are illustrative and not restrictive of the invention, the scope of which is defined in the appended claims, and that all modifications that come within the meaning and range of equivalency of the claims are intended to be included therein.

I claim:

1. In a carding machine, and in combination, a doffer roll, a comb shaft mounted for rotary and longitudinal movement adjacent said roll, a comb carried by said shaft in juxtaposition to said roll, and means for simultaneously oscillating said shaft and comb both rotationally and longitudinally relative to said roll.

2. In a carding machine, and in combination, a doffer roll, a comb shaft mounted for rotary and longitudinal movement adjacent said roll, a comb carried by said shaft in juxtaposition to said roll, a driving element having a stem end and a forked end, said stem end aligned with and drivingly connected to said comb shaft, a collar pivotally connected to said forked end, a hub rotatably supporting said collar, a drive shaft for said hub arranged at right angles to the axis of said comb shaft, said hub having its axis inclined to the axis of said drive shaft, the axes of said hub, drive shaft and comb shaft all intersecting at a common point, and the axis of the pivotal connection of said forked end intersecting said hub axis in spaced relation to said common point.

3. In a comb box for a carding machine having a doffer roll and a comb mounted for rotary and longitudinal oscillatory movement in juxtaposition to said roll; a housing having top, bottom and side walls, a driving shaft journaled in bearings in said top and bottom walls, a comb-actuating shaft journaled in one of said side walls and arranged substantially at right angles to said driving shaft, a driving hub carried by said driving shaft within said housing, said hub having its axis at an angle to the axis of the driving shaft, a collar rotatable on said hub, a fork carried by said comb-actuating shaft and embracing and pivoted to said collar on a diameter of said hub displaced from the intersection of said hub and drive shaft axes, and means for imparting rotary motion to said driving shaft to simultaneously rotatively and longitudinally oscillate said comb-actuating shaft.

4. In a comb box for a carding machine of the type having a doffer roll and a comb mounted for rotary oscillatory movement in juxtaposition to said roll; the combination of a housing having top, bottom, and side walls, a driving shaft journaled in said top and bottom walls, a comb-actuating shaft journaled in one of said side walls and arranged at substantially right angles to said driving shaft, a driving hub carried by said driving shaft within said housing, said hub having its axis at an angle to the axis of the driving shaft, a collar rotatable on said hub, a fork carried by said comb-actuating shaft and embracing and pivoted to said collar on an axis at right angles to the axes of said comb-actuating and driving shafts, and means for imparting continuous rotary motion to said driving shaft to rotatively oscillate said comb-actuating shaft, said shafts and fork being journalled in lubricant sealed bearings and said collar being rotatably mounted on lubricant sealed bearings, whereby lubricant filling of the housing is avoided.

5. A combination according to claim 4 further comprising a flywheel mounted on said driving shaft within said housing and between the bearings supporting said driving shaft and hub.

References Cited in the file of this patent

UNITED STATES PATENTS

237,702	Rominger	Feb. 15, 1881
1,554,530	Sheehan	Sept. 22, 1925
2,225,512	Stiles	Dec. 17, 1940
2,413,636	Long	Dec. 31, 1946

FOREIGN PATENTS

2,331	Great Britain	of 1862