L. G. BROEL.

HANDLING KAPOK.

APPLICATION FILED FEB. 23, 1921.

1,421,663.

Patented July 4, 1922.

6 SHEETS—SHEET 1.

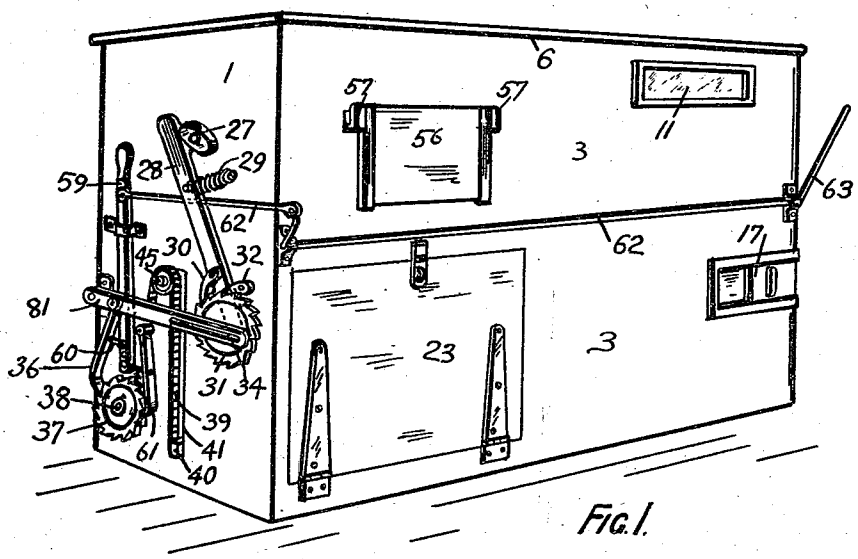



FIG. 1.

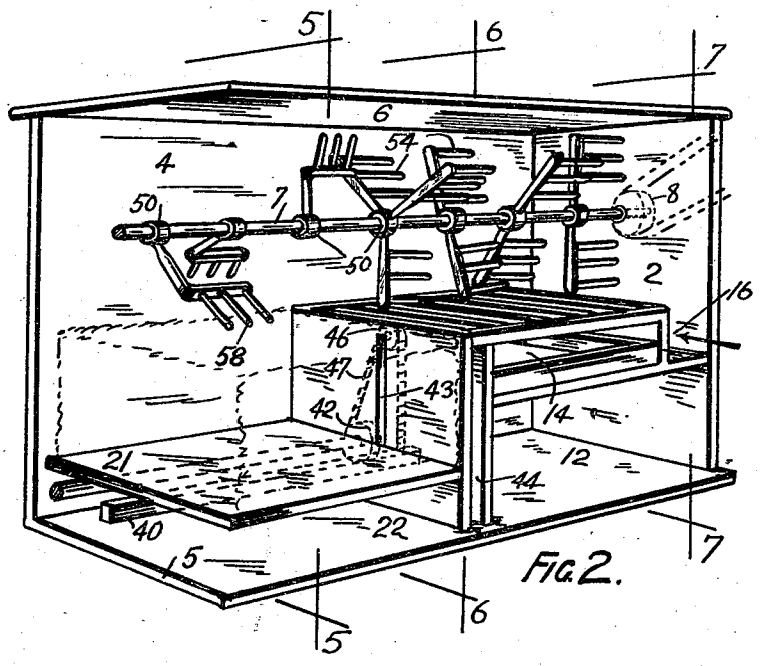



FIG. 2.

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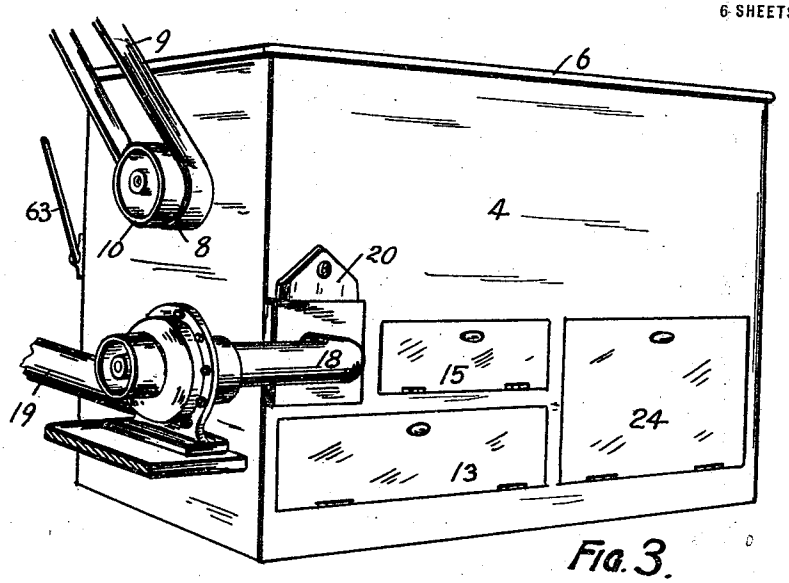



Fig. 3.

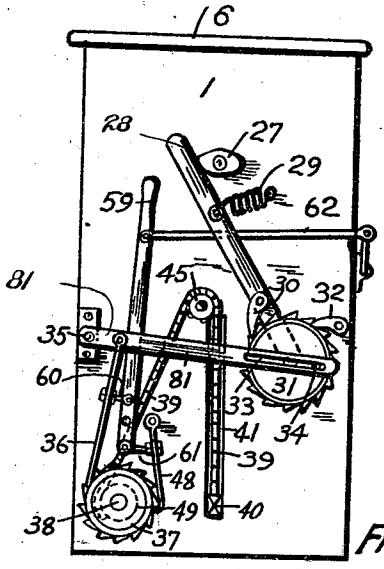



Fig. 4.

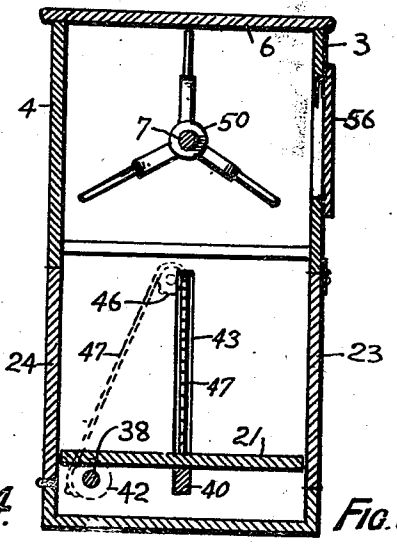



Fig. 5.

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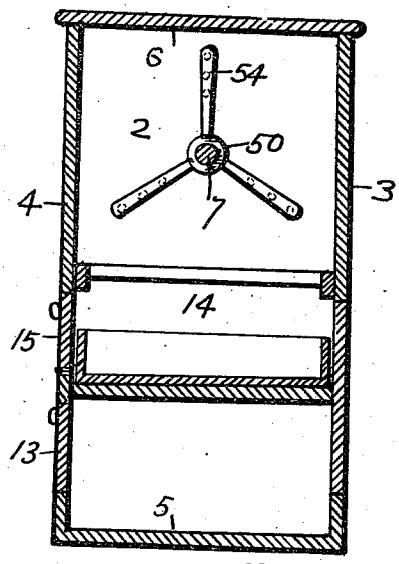



FIG. 6.

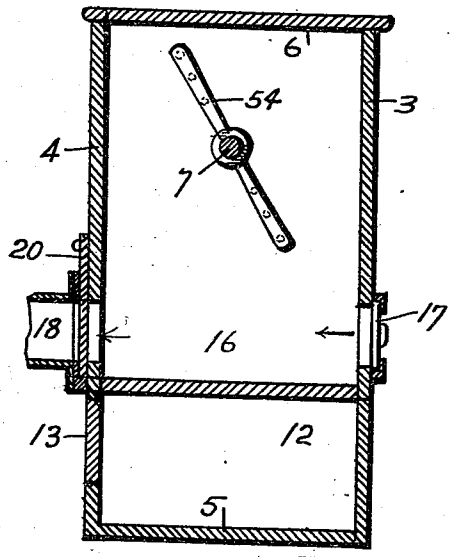



FIG. 7

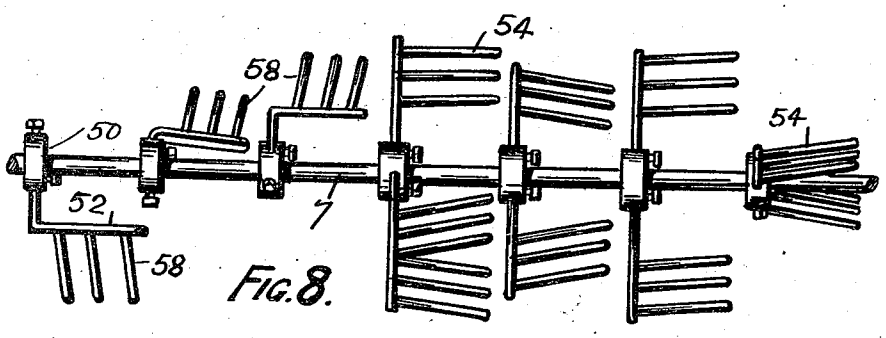



FIG. 8.

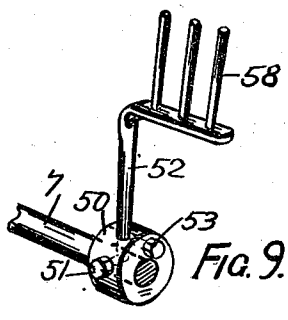



FIG. 9.

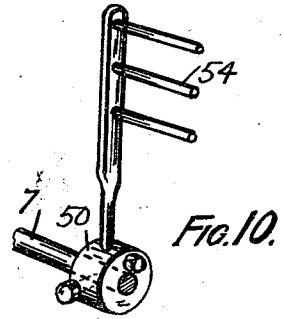



FIG. 10.

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6 SHEETS—SHEET 4.

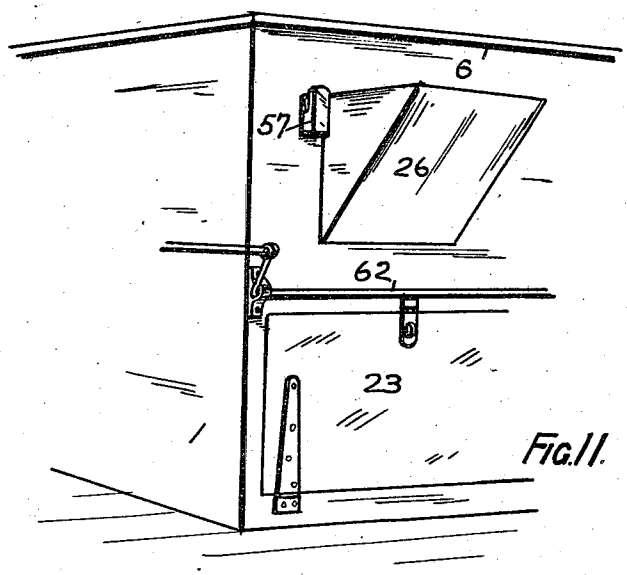



Fig. 11.

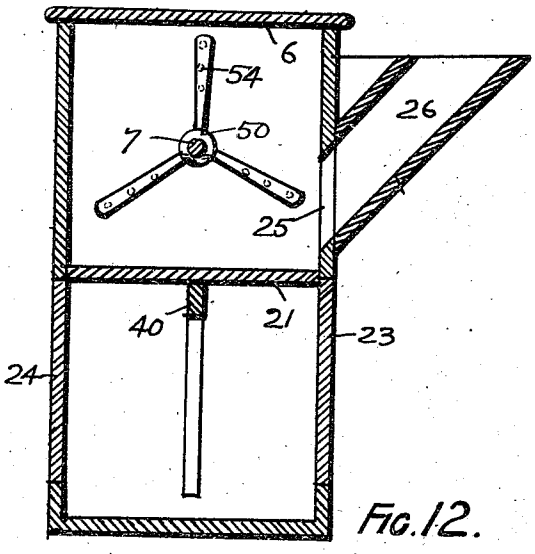



Fig. 12.

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6 SHEETS—SHEET 5.

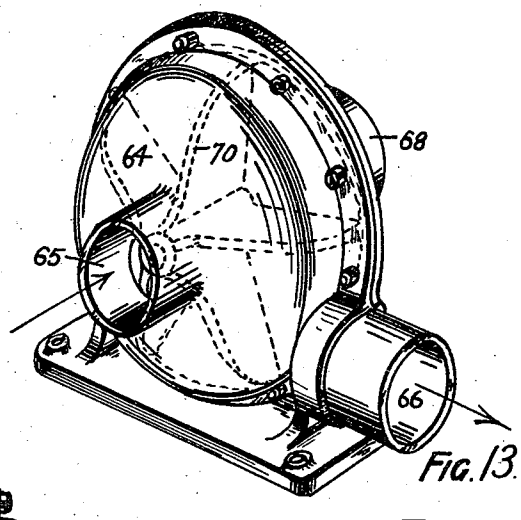



FIG. 13.

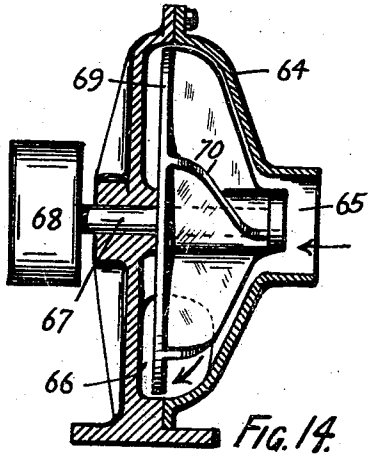



FIG. 14.

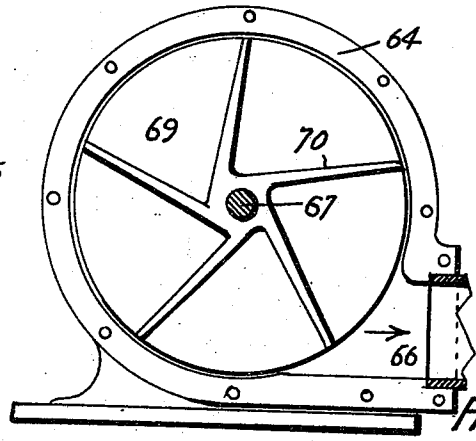



FIG. 15.

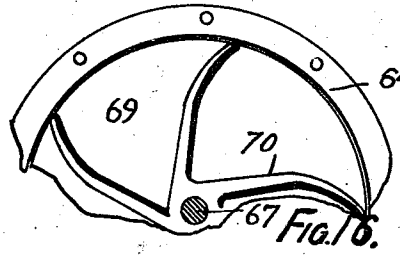



FIG. 16.

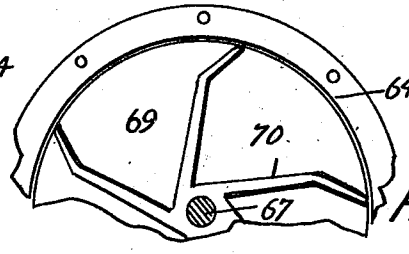



FIG. 17.

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6 SHEETS—SHEET 6.

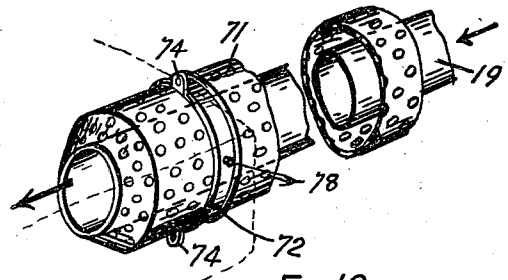



FIG. 18.

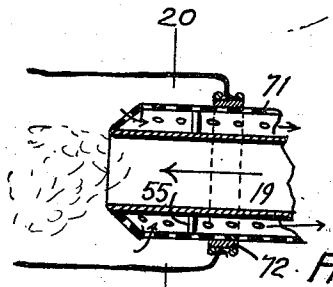



FIG. 19.

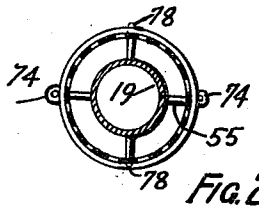



FIG. 20.

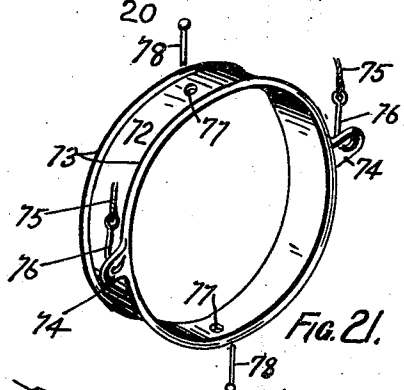



FIG. 21.

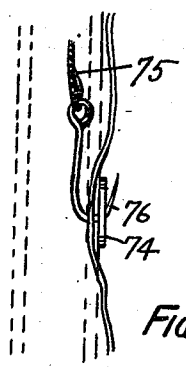



FIG. 22.

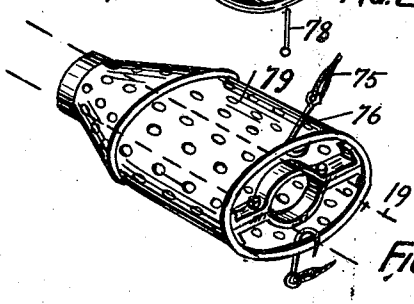



FIG. 23.

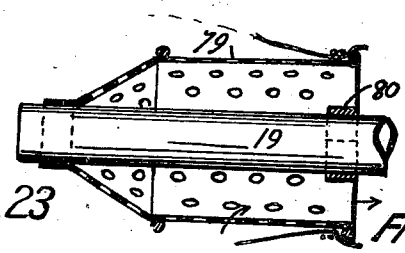



FIG. 24.

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his ATTORNEY.

# UNITED STATES PATENT OFFICE.

LOUIS GRAND BROEL, OF LEICHHARDT, NEAR SYDNEY, NEW SOUTH WALES, AUSTRALIA.

## HANDLING KAPOK.

1,421,663. Specification of Letters Patent. Patented July 4, 1922.

Application filed February 23, 1921. Serial No. 447,359.

*To all whom it may concern:*

Be it known that I, LOUIS GRAND BROEL, a subject of the King of Great Britain and Ireland, residing at "Harrowgate," Fraser Street, Leichhardt, near Sydney, New South Wales, Australia, have invented certain new and useful Improvements in Handling Kapok, of which the following is a specification.

This invention relates to apparatus for teasing and cleaning materials which are used for stuffing mattresses, cushions, pillows, quilts, and other similar articles, and for feeding the treated materials to the covers of said articles or to rooms or other enclosed spaces. The apparatus has been designed primarily for the purpose of teasing and cleaning and the feeding of kapok in the stuffing of mattresses and the like articles though it may be used for such purposes in connection with other stuffing materials for said articles.

The apparatus comprises a chamber which carries a rotatable shaft upon which is mounted a series of beater arms; means for permitting stuffing material to be fed to said chamber and to said beater arms; exhaust means for drawing air through said chamber and also for withdrawing it and the treated stuffing material therefrom and blowing it into the covers of mattresses or other enclosed spaces; means for permitting egress of air from said covers (when they consist of air impermeable materials) whilst they are being filled with the stuffing material; and means for collecting seeds, or other extraneous matter which is separated from the stuffing material. The rotatable shaft may also be fitted with picker arms.

Referring to the accompanying drawings, Fig. 1 is a perspective view of the apparatus; Fig. 2 a broken perspective view showing the interior thereof; Fig. 3 a perspective view showing the rear and one of the ends of the apparatus; Fig. 4 an end elevation; Figs. 5, 6, and 7 cross-sectional views respectively on lines 5—5, 6—6, and 7—7, Fig. 2; Figs. 8, 9, and 10 detail views of picker and beater arms; Fig. 11 a broken perspective view of the apparatus with feed chute secured to the front wall of the teasing and cleaning chamber; Fig. 12 a cross sectional view of the apparatus shown in Fig. 11; Fig. 13 a perspective view of the rotary fan and blower; Fig. 14 a cross-sectional view thereof; Figs. 15, 16 and 17 detail views of fan wheels; and Figs. 18 to 24 detail views of the air egress appliances.

The teasing and cleaning chamber consists of a rectangular box or case constructed of either wood or metal and having closed ends 1 and 2, sides 3 and 4, bottom 5, and a hinged cover 6. Said chamber has bearings in its end walls in which is journalled a rotatable shaft 7 which carries a series of adjustable beater arms disposed thereon at suitable distance apart. On one end of said shaft, but on the exterior of the chamber, a fixed pulley 8 or the like is mounted which may be driven by a belt 9 or other suitable means for the purpose of rotating the said shaft and the beater arms mounted thereon. A loose pulley 10 is also mounted on said shaft at the side of said pulley 8. One or more sight windows 11 are provided in the front wall 3 of the teasing chamber.

At one end of said chamber toward the bottom thereof a storage compartment 12 (provided with a door 13 in the rear wall 4 of said chamber) is arranged, and extending partly over said compartment is a grid chamber 14 within which a drawer (removable through a door 15 in the rear wall 4 of the teasing chamber) may be positioned, into which seeds or other extraneous matter separated from the stuffing material is discharged through the grid. At the side of the grid chamber 14 is a passage 16, which extends transversely of the teasing chamber and is closed at one end by an adjustable door 17 located on the front wall 3 of said chamber, through which air may be admitted to said passage when said door is open; the other end of the passage 16 is in communication with a pipe 18, which leads to the intake of an exhaust fan located on the exterior of the teasing chamber, and adapted (when rotated) to suck air through the opening over which the said adjustable door 17 is fitted into said chamber, from whence it and the treated stuffing material are sucked by said fan and blown into the cover of a mattress or other enclosed space through a pipe 19 which is connected to the outlet of the said fan. An adjustable shutter 20 is preferably provided for the opening in the rear wall 4 of the teasing chamber to which the fan intake pipe 18 is in communication.

On the end wall 1 of the teasing chamber

are mounted means adapted to raise or lower a monkey plate 21 which is disposed in a feed compartment 22 for the stuffing material arranged at the side of the said storage compartment 12. Such monkey plate is capable of receiving thereon a packed bale or a loose bundle of kapok or other stuffing material, doors 23 and 24 being provided in the front (3) and rear (4) walls of the teasing chamber through which a packed bale of the stuffing material may be inserted and placed on the monkey plate 21 when it is in its lower position, and an opening 25 (Fig. 12) being provided in the front wall 3 of the teasing chamber over which a chute 26 may be detachably affixed through which loose stuffing material may be fed onto the monkey plate 21 when it is in raised position. Such raising or lowering means for the said monkey plate may consist of a fixed cam 27 on the shaft 7 which carries the beater arms; this cam is adapted (when rotated) to make contact with a pivoted lever 28 (held in restraint by a spring 29) on the lower end of which is a pawl 30 capable of engaging a ratchet wheel 31, reverse rotation of which may be prevented by a second pawl 32 pivoted to the wall 1 of the teasing chamber.

Associated with the ratchet wheel 31 is a lever 81 (pivoted at 35) with elongated slot 33 therein which engages a pin 34 on the ratchet wheel 31; when the ratchet wheel 31 is rotated the lever 81 is reciprocated. Said lever also carries a pawl 36 which engages the teeth of a ratchet wheel 37 carried on the spindle 38; this ratchet wheel 37 has a boss 49 to which one end of a chain 39 is connected; the other end of the chain being attached to the forward end of a rod 40 affixed to the monkey plate 21; this rod projects through a slot 41 in the end wall 1 of the teasing chamber and is adapted to slide therein. On the opposite end of the spindle 38 is a roller 42 to which one end of a second chain 47 is fastened, the other end of said chain 47 being affixed to the rear end of the rod 40 attached to the monkey plate 21; such end of said rod fits and is slidable in a slot 43 in the front wall of a chamber 44 which divides the feed compartment 22 from the storage compartment 12 arranged interiorly of the teasing chamber. Guide rollers 45 and 46 are also provided for said chains 39 and 47, and a pivoted stop pawl 48 to prevent unwinding of the ratchet wheel 37 on the spindle 38 is also provided.

To enable the monkey plate 21 to be lowered in the compartment 22 it is necessary to release the pawls 36 and 48 from engagement with the ratchet wheel 37 and the lever 59 is provided for this purpose; this lever is pivoted to the wall 1 of the teasing chamber and it carries the links 60 and 61 which are connected respectively with the pawls 36 and 48. When the lever 59 is moved to the left the pawls 36 and 48 are released from engagement with the ratchet wheel 37 and the monkey plate 21 may then be lowered in the compartment 22. The lever 59 may be operated at either the end 1 or the end 2 of the teasing chamber by providing the pivoted rods 62 (Fig. 1) which extend from the lever 59 to the end 2 of the teasing chamber. At such end the rods 62 are furnished with an operating handle 63.

As the beater arms must be capable of teasing and cleaning as well as feeding the stuffing material toward the discharge end of the teasing chamber they are constructed and arranged on the rotatable shaft 7 to adapt them for these purposes. Such arms comprise a collar 50 which is slidable on the rotatable shaft 7 and adjustable thereon by a pinching screw 51 or other suitable means. One or more detachable rods 52 are attached to the collars 50 by a pinching screw 53 or other preferred means, certain of which rods are straight and others are angular; they carry the arms 54 consisting preferably of pins or rods some of which are arranged parallel to each other, whilst others are arranged in angular relation to each other. They are spaced on the rotatable shaft 7 at suitable distance apart. In Figs. 8 to 10 of the drawings the construction and arrangement of the beater arms on the rotatable shaft 7 are shown.

Instead of providing the teasing chamber with the monkey plate 21 and the lifting and lowering means therefor hereinbefore described, the said chamber may only be fitted with a chute 26 (Fig. 12) through which loose stuffing material may be fed. This chute may also be used for feeding loose stuffing material to the teasing chamber when the monkey plate 21 and the said lifting and lowering means are provided in connection therewith; it is removable from the front wall 3 of the teasing chamber, and when so removed the opening 25 in said wall is closed by a sliding or other suitable door 56 (see Fig. 1). If loose stuffing material is to be fed to the teasing chamber by means of the chute 26 and the monkey plate 21 is fitted to said chamber, the said plate is first raised to its upper position as shown in Fig. 12 and the loose stuffing material is then fed thereon through the chute 26. Cleats 57 or other suitable means may be fitted to the front wall 3 of the teasing chamber to enable the door 56 or the chute 26 to be attached to said wall.

When, however, a packed bale of the stuffing material is placed on the monkey plate 21 and is to be fed to the beater arms, the said plate is first lowered in the compartment 22 and the bale is then fed to the plate 21 (see Fig. 2) through either the doors 23 or 24 on the front and rear walls respectively of the teasing chamber. To

feed the stuffing material to the beater arms from the packed bale a series of picker and pusher arms 58 are attached to the rotatable shaft 7 over the feeding compartment 22; these latter arms are carried by collars 50 and angular rods 52 and are set in angular relation to such rods to adapt them not only to pick the material from the bale but to push it toward the beater arms which tease and clean it and transfer it to the delivery end of the teasing chamber. If the stuffing material is fed loosely to the teasing chamber through the chute 26 it is unnecessary to provide the picker arms 58 on the shaft 7 as said shaft in such case need only be fitted with the beater arms.

The exhaust fan which sucks air into the teasing chamber and also sucks it and the treated stuffing material from such chamber and blows them into the cover of a mattress or other enclosed space is mounted in a casing 64 provided with an intake opening 65 and an outake opening 66; to the former opening is connected one end of the pipe 18 which is attached at its other end to the discharge passage 16 of the teasing chamber. The shaft 67 of the fan is journalled in bearings in said casing and preferably carries a fixed driving pulley 68 on its rear end which pulley is driven by means of a belt. Attached to the outlet 66 or the fan is one end of the pipe 19, the other end of which is in communication with the cover of the mattress or the like to be stuffed or to some other enclosed space. The fan consists of a wheel with back plate 69 having a series of ribs 70 thereon each pair of which forms a pocket therebetween adapted to receive a supply of the stuffing material through the intake 65 of the fan casing and to carry it to the fan outlet 66 and to blow it through the pipe 19 leading from such outlet into the cover of the mattress or the like which is to be stuffed with such material or into some other enclosed space. Said ribs 70 are disposed tangentially to the axis 67 of the fan. Depending on the diameter of the fan and its rate of revolution the ribs 70 thereof may be made straight as shown in Fig. 15 or their ends may be curved as shown in Fig. 16 or bent as shown in Fig. 17.

In case the covers of the mattresses or other articles to be stuffed consist of air permeable material it is unnecessary to provide means associated with such covers and the pipe 19 connected with the fan outlet 66 through which air led from the teasing chamber to such covers may be discharged therefrom, as such air will be free to pass through the pores of such covers. Should such covers, however, consist of material which is non-permeable to air it is necessary to fit to the free end of the pipe 19 means (see Figs. 18 to 24) which will permit egress of air blown by the fan with stuffing material into the mattress or like cover. Such means may consist of a perforated metal cylindrical sleeve 71 (Fig. 18) of larger diameter than the pipe 19 and secured thereto by radial plates 55 or other preferred means. On said sleeve is mounted a sliding collar 72 furnished with ribbed edges 73 and with oppositely disposed eyed lugs 74; the forward end of the perforated sleeve is preferably tapered. A pair of cords 75 carrying hooks 76 respectively at one of their ends are adapted to secure the ends of the open mouth of the mattress or like cover to be stuffed (after the hooks 76 have been fastened to the ends of such mouth and to the lugs 74 on said sleeve) by tying the cords around the said collar. A pair of holes 77 is also provided in opposite portions of the collar into which a pair of pins 78 may be inserted to be passed into any of the perforations in the sleeve 71; the said pins when so positioned prevent the collar 72 sliding on the sleeve. When a mattress or like cover is to be stuffed its ends are sewn or otherwise connected together but an opening is left in one of its sides or ends to which the fan outlet pipe 19 is attached.

The perforated sleeve instead of being cylindrical may be of oval or other suitable shape (see Figs. 23–24) in which event the mattress is attached to the sleeve 79 without the aid of a sliding collar, and such sleeve is constructed so as to be slidable on the free end of the fan outlet pipe 19, a bridge piece 80 being provided centrally of the sleeve 79 through which the pipe 19 projects. The hooks 76 take into the ends of the open mouth of the mattress and into any of the perforations in the sleeve. In the stuffing of mattresses or the like when the stuffing material is fed to the covers thereof with the aid of the air egress appliance, the latter has one portion of it and the free end of the pipe 19 extending into the mattress or like cover whilst the other portions of the perforated sleeve and the pipe 19 extend beyond such cover. Air fed to the covers is thus free to be discharged therefrom to atmosphere through that portion of the sleeve which lies outside the covers, and stuffing material is thereby free to be blown into the covers in place of the discharged air.

It will be understood that the teasing and cleaning apparatus may be used independently of the fan feeding apparatus in which event the treated material may be taken by hand from the teasing chamber or discharged therefrom through the opening in its rear wall 4 over which the door 20 is fitted.

What I claim as my invention and desire to secure by Letters Patent is:—

1. An apparatus for teasing and cleaning stuffing material, comprising a chamber,

bearings in the end walls of said chamber, a rotatable shaft journaled therein, said chamber having a delivery outlet at one end, a series of beater arms mounted on said shaft and adapted to tease and clean stuffing material fed to said chamber and to transfer the treated material to said delivery outlet, an opening in one of said walls, a chute attachable over said opening and through which loose stuffing material is fed to the interior of the chamber, and a grid compartment within said chamber for collecting extraneous materials separated from said stuffing material.

2. An apparatus for teasing and cleaning stuffing material, comprising a chamber, bearings in the end walls of said chamber, a rotatable shaft journaled therein, an adjustable monkey plate disposed within said chamber and adapted to carry a packed bale of stuffing material, a series of picker arms mounted on said shaft and adapted to pick material from said bale, beater arms mounted on said shaft adjacent said picker arms and adapted to receive, tease and clean material transferred from the picker arms, said chamber being provided with a delivery outlet at one end thereof to receive the treated material from the beater arms, and a grid compartment within said chamber for collecting extraneous materials separated from said stuffing material.

3. In an apparatus for teasing and cleaning stuffing material, the combination with the elements claimed in claim 2, of a rotary exhaust fan and blower in communication with said delivery outlet and adapted to draw air into said chamber and to exhaust it therefrom with a supply of stuffing material, said fan comprising a rotatable wheel having a back plate provided with a series of ribs tangentially disposed to the center of the wheel, whereby pockets are formed between the adjacent ribs.

4. In an apparatus for teasing and cleaning stuffing material, comprising a chamber, a rotatable shaft mounted therein, beater arms mounted on said shaft, said chamber being provided with a delivery outlet at one end, and means disposed within said chamber for collecting extraneous material separated from the said stuffing material, the combination of a rotary exhaust fan and blower in communication with said delivery outlet and adapted to draw air into said chamber and to exhaust it therefrom with a supply of stuffing material, said fan comprising a shaft, a wheel mounted thereon and having a back plate provided with a series of ribs disposed tangentially to said shaft, said ribs forming pockets between themselves and their adjacent ribs.

5. In an apparatus for teasing and cleaning stuffing material, comprising a chamber, a rotatable shaft mounted therein, beater arms mounted on said shaft, said chamber being provided with a delivery outlet at one end thereof, and means disposed within said chamber for collecting extraneous material separated from said stuffing material, the combination of a rotary exhaust and blower fan in communication with said delivery outlet and adapted to draw air into said chamber and to exhaust it therefrom with a supply of stuffing material, a metal pipe provided to receive the stuffing material exhausted from the chamber, one end of said pipe being attached to the outlet of said fan and the opposite end thereof being adapted to receive an air impermeable cover which is to be stuffed, and discharging means at the free end of the said pipe within the cover and comprising a perforated metal sleeve attached to the pipe and adapted to be connected with the pipe to said cover and to by-pass to atmosphere air which has been blown into said cover with the stuffing material.

6. In an apparatus for teasing and cleaning stuffing material, the combination with the elements claimed in claim 2, of a rotary exhaust fan and blower in communication with said delivery outlet adapted to draw air into said chamber and to exhaust it therefrom, said fan comprising a shaft, a wheel carried by the shaft and being provided with a series of tangentially disposed ribs projecting from a back plate to form pockets between adjacent ribs, a solid metal pipe attached at one end to said fan and the opposite end thereof being adapted to project into an air impermeable cover which is to be stuffed, and a perforated metal sleeve disposed about said pipe and attached thereto at the free end of the latter and adapted to be connected with said pipe to said cover and to by-pass to atmosphere air which has been blown into said cover with the said stuffing material.

In testimony whereof I have affixed my signature.

LOUIS GRAND BROEL.