March 14, 1939. E. S. BARTLETT 2,150,352

SHEARING MACHINE

Filed Jan. 6, 1937

Fig. 1

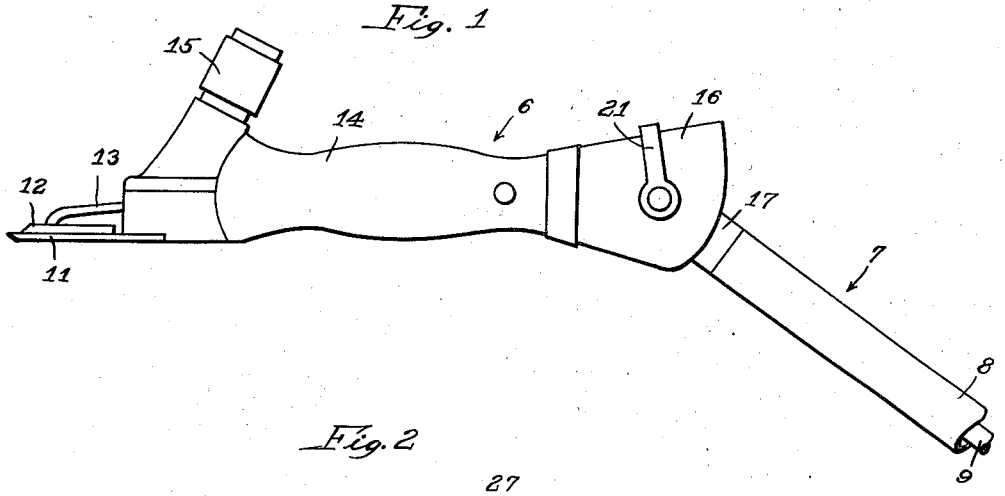


Fig. 2

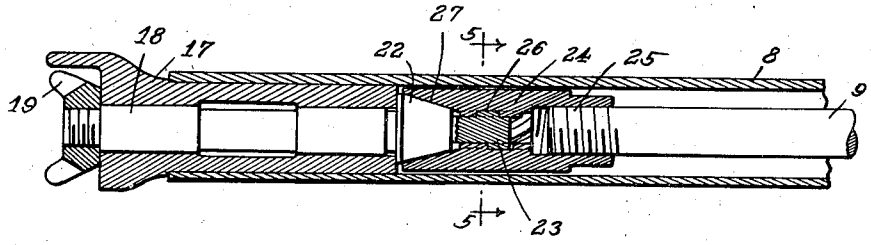


Fig. 3

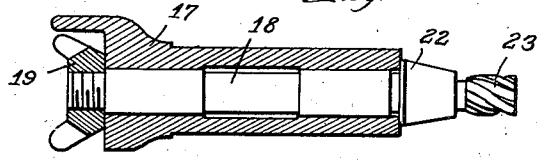


Fig. 4

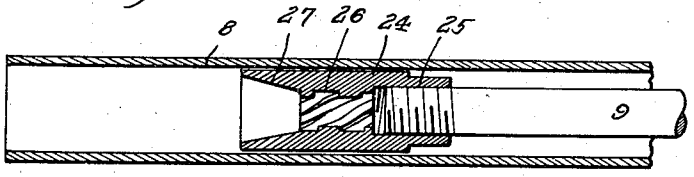
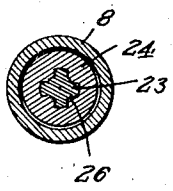


Fig. 5



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SHEARING MACHINE

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5 Claims. (Cl. 64—4)

This invention relates to shearing machines, and has special reference to improved means for connecting the hand piece to the driving portion of the machine.

An important object of the invention is the provision of a shearing machine having improved means for connecting the hand piece to the driving shaft.

A further object of the invention is the provision in a shearing machine of a quick detachable connection of improved form between the hand piece and the driving shaft.

I have also aimed to provide a connection wherein the parts are self-centering, are held rigidly in line, revolve as one piece without relative vibration or movement, and may be quickly broken for removal of the hand piece and quickly replaced.

Other objects and advantages will become apparent from the following description and the accompanying drawing, in which—

Figure 1 is a view of a shearing machine showing a hand piece and the adjacent portion of a jointed shaft;

Figure 2 is a longitudinal section through the yoke of a shearing hand piece universal joint and the end of a jointed shaft to which the same is attached;

Fig. 3 is a view of the connecting joint spindle with the hand piece yoke shown in section;

Fig. 4 is a longitudinal section through the end of the jointed driving shaft showing the connecting joint sleeve, and

Fig. 5 is a section on the line 5—5 of Fig. 2.

In Figure 1 I have shown that portion of a conventional shearing machine to which my invention pertains. This machine is of the type commonly employed for the purpose of shearing sheep, and the portion shown is a hand piece designated generally by the numeral 6, and a jointed driving shaft designated generally by the numeral 7 and comprising a sheath 8 and driving shaft proper 9. The hand piece is of a well known type having a comb 11, cutter 12, and fork 13, the fork and cutter being given reciprocating motion by means enclosed within a handle 14. The forward end of the hand piece has a portion 15 containing means for applying pressure between the cutter and the comb in well known fashion. The rear portion of the hand piece carries a guard 16 of leather or other resilient material covering the back joint of the hand piece. This back joint is of well known construction, and includes a universal joint yoke 17 which carries a joint spindle or shaft 18 having a bevel gear 19 engaging a bevel gear on the hand piece for pivotal movement with respect thereto in a well known manner, the yoke 17 being held to the hand piece by means of the conventional pins and spring clip 21.

Referring now more particularly to Figs. 2 to 5, the invention in a more limited sense contemplates the provision of an improved clutch or connection between the hand piece and the driving portion of the machine, in this instance embodied in the jointed shaft 7, though it will be understood that the invention may be utilized with equal facility with other types of flexible shafting. The yoke 17 is shaped and sized to be snugly received in the end of the sheath 8 and extends therein a sufficient distance to give a firm and rigid contact therebetween, but to permit of easy withdrawal of the yoke, this portion of the yoke serving as a bearing member for the driven shaft 18. The inner end of the shaft 18 has a cone-like member designated generally by the numeral 22, in this instance the member having the general shape of a truncated cone with the base of the cone abutting against the end of the bearing portion of the yoke 17. The extreme end of the driven shaft 18 has a helically splined portion 23 which extends beyond the smaller end of the cone-like portion 22, as best shown in Fig. 3. The splined portion 23 and the cone-like portion 22 are coaxial with the axis of rotation of the driven shaft 18 so that they rotate concentrically.

The shaft 9 has a connecting joint sleeve 24 threaded onto the end thereof, as shown at 25, the sleeve being slightly smaller than the internal diameter of the sheath 8, so as to allow the sleeve to float to a limited extent and be brought into alignment with the driven shaft 18. The sleeve 24 has a centrally disposed helically splined bore 26 complemental to the splined portion 23 on the driven shaft, the bore 26 being coaxial with the sleeve 24 and with the driving shaft 9. Tapering outwardly from the bore 26 is a socket 27 complemental to the cone-like portion 22 of the driven shaft and likewise coaxial with the driving shaft and the sleeve.

The driving shaft 9 is adapted to be driven by power means in the usual manner, and constitutes a part of the jointed shaft. The sleeve 24 carried on the shaft 9 will be driven therewith within the sheath 8. When the operator desires to connect the hand piece to the shaft, the yoke 17 and the spindle 18 carried therein are inserted into the end of the sheath. When the inner end of the splined portion 23 reaches the open end of the bore 26, the splines of these two elements will

come into engagement and, assuming that the shaft 9 is rotating, the portion 23 will be rapidly drawn into the bore, bringing the cone-like portion 22 into surface engagement with the socket 27. This establishes a firm driving connection between the sleeve 24 and the driven shaft 18 through which the shearing mechanism is operated. The complemental splines of the bore 26 and the portion 23 are pitched in such direction that while power is being transmitted from the driving to the driven shaft the cone is held in firm surface contact with the socket 27, thus maintaining the clutch connection tight and maintaining the two shafts in alignment. Thus the helical splines of portion 23 extend at an angle of about 36° or slightly thereunder. If the angle becomes too great there is difficulty with the shafts locking up under the driving force so that they will not readily separate for detaching the hand piece. On the other hand, if the angle becomes too small there is a tendency for the joint to become uncoupled. In this way it will be seen that vibration or other movement between the parts of the connection and between the two shafts is entirely eliminated, the two shafts are held rigidly in line and revolve as one piece. When it is desired to disconnect the hand piece, the shaft 9 is stopped and manual rotation of the hand piece in the opposite direction almost instantly breaks the connection and the splines urge the cone 22 out of the socket 27, thus providing for quick and easy removal of the hand piece from the shaft.

While I have described and illustrated a specific embodiment of the invention, it will be understood that this is by way of illustration and not limitation, and I do not wish to be limited except as required by the prior art and the scope of the appended claims, in which—

I claim:

1. The combination in a shearing machine of the type including a hand piece of a driven shaft, a driving shaft and a quick acting joint between said shafts comprising a sheath enclosing the driving shaft and the joint, said sheath extending a substantial distance beyond the joint, a bearing sleeve enclosing the driven shaft shaped for snug reception a substantial distance into the sheath to align the sheath and the sleeve, cam means for moving the shafts into and out of engagement upon relative rotation of the shafts in opposite directions, and means for bringing the shafts into alignment when the shafts come into engagement, said cam means serving to draw the shafts into engagement upon rotation of the driving shaft and to instantly separate shafts upon manual rotation of driven shaft in one direction.

2. The combination in a shearing machine of the type including a hand piece of a driven shaft, a driving shaft and a quick acting joint therebetween comprising a sheath enclosing the driving shaft and the joint, extending a substantial distance beyond the end of the joint, a bearing sleeve surrounding the driven shaft and providing bearing support therefor, said bearing sleeve being shaped for snug reception in the end of said sheath through a substantial distance to align said sleeve and said sheath a portion on one of said shafts having conically tapering side walls coaxial therewith, the other of said shafts having a complementary socket for the reception thereof to bring said driving shaft into alignment, and splined means acting between said shafts for drawing said portion into said socket and retaining said bearing sleeve in said sheath upon relative rotation of the shafts in one direction and for urging said portion outward to disconnect the shafts upon relative rotation of the shafts in the opposite direction.

3. The combination in a shearing machine of the type including a hand piece of a driven shaft a driving shaft, and a quick acting connection comprising a portion on one of said shafts provided with conically tapered side walls coaxial therewith, a complementary socket on the other of said shafts for reception of said portion in frictional contact to align said shafts and provide driving contact, a bore on one of said shafts having internal helical splines at an angle of about 36° internally splined bore on one of said shafts and a portion on the other shaft having external helical splines complemental to said internal splines for reception in said bore to draw said shafts together and seat said conical portion under the driving power of said driving shaft and to unseat said conical portion under manual rotation of said driven shaft.

4. A quick acting connection for shearing machines of the type including a hand piece, a driving shaft and a driven shaft on said hand piece comprising a frusto-conical portion on said driven shaft coaxial with said driven shaft and a splined end portion, a sleeve on said driving shaft having a socket complementary to said frusto-conical portion and a splined bore complementary to said splined end portion whereby rotation of said shaft draws the frusto-conical portion tightly into the complementary socket to align and bring the same into dynamic balance when the splined end portion is brought into position to engage the splined bore.

5. A quick acting connection for shearing machines of the type including a jointed shaft having a driving shaft and an enclosing sheath, a hand piece having a yoke and a driven shaft journaled therein, the yoke being shaped for close reception in the end of said sheath to bring the yoke and sheath into alignment comprising a portion on said driven shaft having tapered side walls coaxial with said driven shaft, an end portion on said driven shaft having quick advancing splines, a sleeve on said driving shaft having a socket complementary to said tapered portion and a splined bore complementary to said end portion whereby rotation of said driving shaft draws the tapered portion tightly into the socket to bring the driving shaft into alignment and to rigidly unite the parts when the splined end is brought into position to engage the splined bore and forces the shafts apart upon manual rotation of the hand piece in a reverse direction through a short distance.

EDWIN S. BARTLETT.