May 13, 1958 H. J. WOLLNER 2,834,212

CORE SAMPLING

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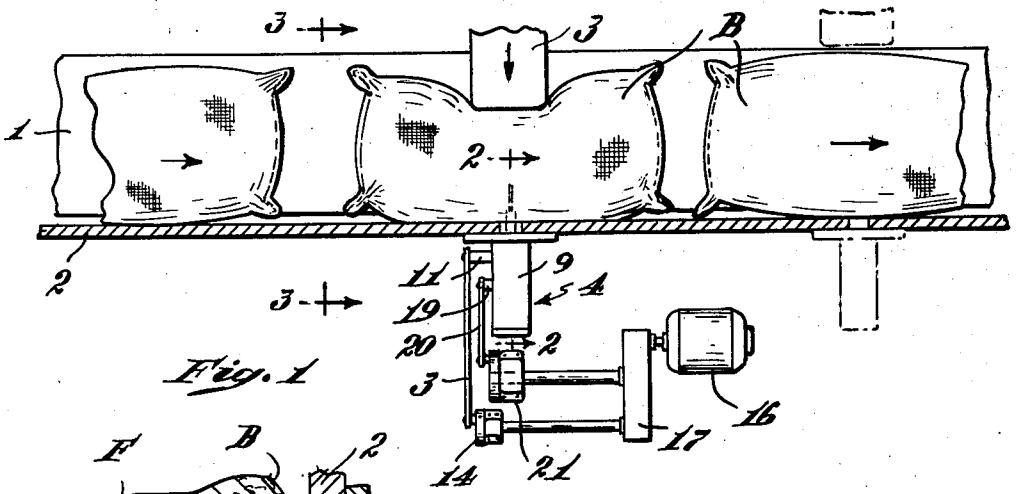


Fig. 1

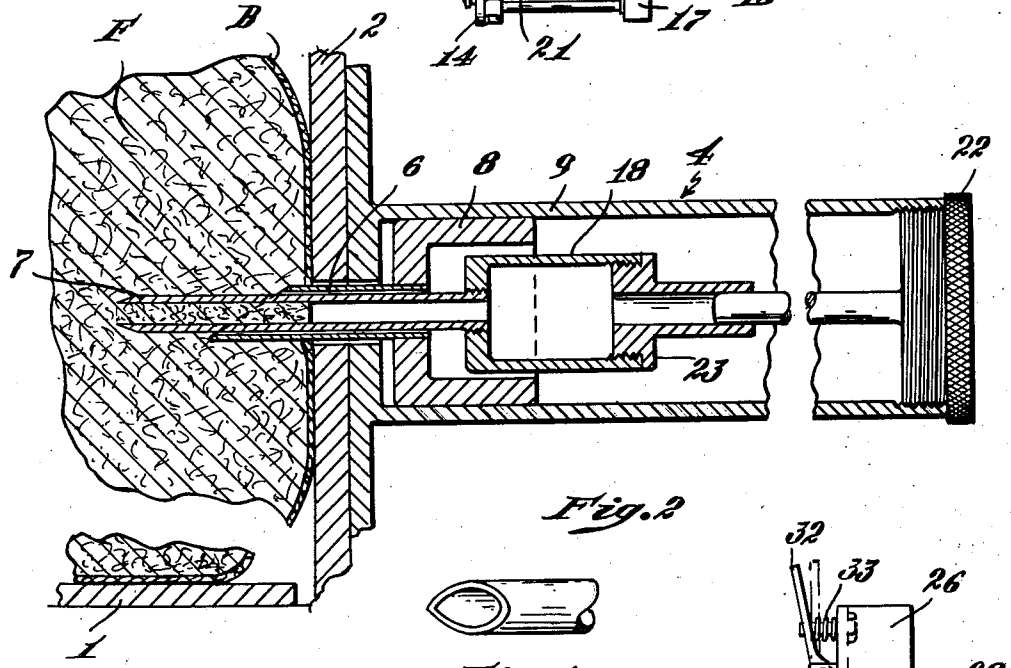


Fig. 2

Fig. 4

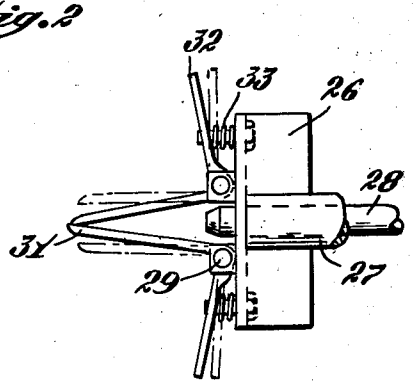


Fig. 6

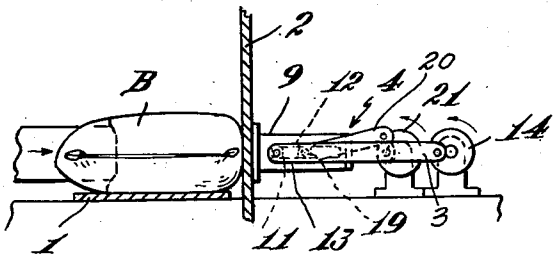


Fig. 3

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CORE SAMPLING

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3 Claims. (Cl. 73—423)

In testing batches of material it is customary to extract cores from the containers of material, a sufficient number of cores being taken to give an average representation of the batch or batches of material, and then the cores are tested. For example, in the wool industry these cores have heretofore been taken with a tubular boring tool which is hollow from end to end, the tool being rotated by a motor while taking the core. In order to extract cores in this way it is necessary to compress the fibres into a compact mass, and when the fibres are in a bag or bale or other container it has not been possible to extract a core free from container covering material unless a separate manual step of making an aperture has first been completed.

Objects of the present invention are to provide apparatus for extracting the cores which is rapid and efficient in use, which eliminates the necessity of removing the material from the containers, and which will operate automatically as the containers move past a fixed point on a conveyor system. A further object is to provide automatically an aperture in the container to permit access for the coring tool without removing any part of the container.

In one aspect the present invention involves means for puncturing and spreading apart the wall of a bag or bale or other container to permit the entry of the coring tool without cutting out a section of the container wall, together with means for concomitantly operating the spreading means and coring tool so that the coring tool enters the container after the spreading means forms an opening.

In another aspect the invention involves means for compressing the container of material while on a conveyor, in combination with coring means, so that cores may be taken from the bags or bales while being conveyed from one location to another.

For the purpose of illustration typical embodiments of the invention are shown in the accompanying drawings in which

Fig. 1 is a top plan view of one embodiment;

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is a section on line 3—3 of Fig. 1;

Fig. 4 is a plan view of the end of the tube forming the opening in the bag; and

Fig. 5 is a top plan of another embodiment.

The embodiment shown in Figs. 1 to 3 comprises a conveyor 1 for bags B, a vertical wall 2 along one side of the conveyor, a ram 3 on the other side of the conveyor for compressing a portion of a bag against the wall, and a sampling device 4 operating through an opening in the wall opposite the ram to extract cores from the bags as they pass by. The conveyor may be fed intermittently so that each bag pauses momentarily at the sampling station, or the compressor and sampler may operate so fast in relation to the speed of the conveyor that the conveyor may be driven continuously. In either case the bags should be positioned on the conveyor so that a bag is at the sampling station each time the ram and sampler operate. This may be accomplished in many

ways, as for example by placing the bags in abutting relation or by providing a cleat on the conveyor at the rear end of each bag position, the cleats being spaced according to the timing of the sampler.

As shown in Figs. 1 to 3 the sampling device comprises a tube 6 slidable back and forth through the aforesaid opening in wall 2, the forward end of the tube being beveled with a rounded edge so that it punctures the bag B and spreads apart the strands thereof without entrapping any of the bag fragments. Slidable back and forth inside the tube 6 is a tubular coring tool 7 having its forward end sharpened to cut a core from the compressed mass of fibers F, the tool being longer than the tube 6 so as to extend farther into the bag. The plunger 3, tube 6 and tool 7 may be reciprocated back and forth by any suitable mechanism, electrical, hydraulic, mechanical or pneumatic. As illustrated the tube 6 is actuated through the medium of a piston 8 sliding in cylinder 9, an arm 11 fast to the tube 6 and extending out through a slot 12 in the cylinder, a link 13, and a crank 14 driven by a motor 16 through a gear box 17. The coring tool is similarly driven through mechanisms 18, 19, 20 and 21, the arm 19 being fast to 18. In the illustration the spreader 6 precedes the corer 7 in both forward and rearward movements, but the only essential of the timing is that the spreader precedes the corer in their forward movements. The bag must be in a compressed state before the corer is retracted and preferably before it is advanced.

The cylinder 18 serves not only as a mounting device for the corer but also as a container for the cores, each core being pushed back into the cylinder by the next succeeding core. After the desired number of cores are collected the caps 22 and 23 are removed to remove the cores.

The modification shown in Fig. 5 comprises a head 26 corresponding to the part 9 in the first embodiment. However instead of being stationary it is mounted on plungers 27 for reciprocating it back and forth. Sliding back and forth through an opening in the head between the plungers 27 is a coring tube 28 like 7 of the first embodiment. Pivotally mounted on the front of the head are two valve cranks journaled at 29, each valve crank comprising a forwardly projecting arm 31 and a laterally projecting arm 32. The forwardly projecting arms 31 are not of equal length, one being slightly shorter and lying in the shadow of the other to assure entry into the bag at the same point. Under the arms 32 are compression springs 33 for holding the tips of the pointed arms 31 together.

The operation of the modification is as follows. With the tips of the arms 31 together the head 26 is advanced to insert the arms 31 into a bag, thereby to puncture the bag and spread the strands thereof apart. When the laterally extending arms 32 come into contact with the bag they are retarded, thereby spreading the arms 31 apart and compressing springs 33. After an opening has been formed in the bag the coring tube 28 is advanced relatively to the head 26 to cut a core from the mass of fibers in the bag. Before the coring tube 28 advances relatively to the head 26 the fibers in the bag must be in a compressed state. This can be accomplished in different ways. For example the head 26 may press the bag against a fixed abutment, or a plunger like 3 in the first embodiment may compress the bag against the head 26 after the head reaches the forward end of the stroke and before the core 28 advances.

While the invention has been illustrated with bags of fibers it should be understood that other materials and containers are included within the scope of this invention. For example containers made from woven fabric

of all types, paper, laminated material, sheet metal, etc. and containing bulk materials such as sand, sugar, cement, etc. as well as fibers of all types are included. The term "puncture" as herein used includes entry between the strands of loosely woven materials. In the case of dense materials or tightly packaged materials already in a compressed state, the separate step of compressing the material can be omitted.

It should be further understood that the present disclosure is for the purpose of illustration only and that the invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. For extracting a sample of material from a container, apparatus which comprises spreading means having a tapered nose for puncturing a container and then spreading the opening, and coring means movable through said opening from a retracted position where its cutting end is behind said nose to an advanced position where its cutting end projects beyond said nose.

2. For extracting a sample of material from a container, apparatus which comprises spreading means having a tapered nose for puncturing a container and then spreading the opening, coring means movable through said opening from a retracted position where its cutting end is behind said nose to an advanced position where its cutting end projects beyond said nose, and means for advancing said coring means from said retracted position to said advanced position.

3. For extracting a sample of material from a container, apparatus which comprises spreading means having a tapered nose for puncturing a container and then spreading the opening, coring means movable through said opening from a retracted position where its cutting end is behind said nose to an advanced position where its cutting end projects beyond said nose, and means for advancing said coring means from said retracted position to said advanced position and then back to retracted position while said nose is inserted in the container so that the opening cannot start to close before the core is removed.

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