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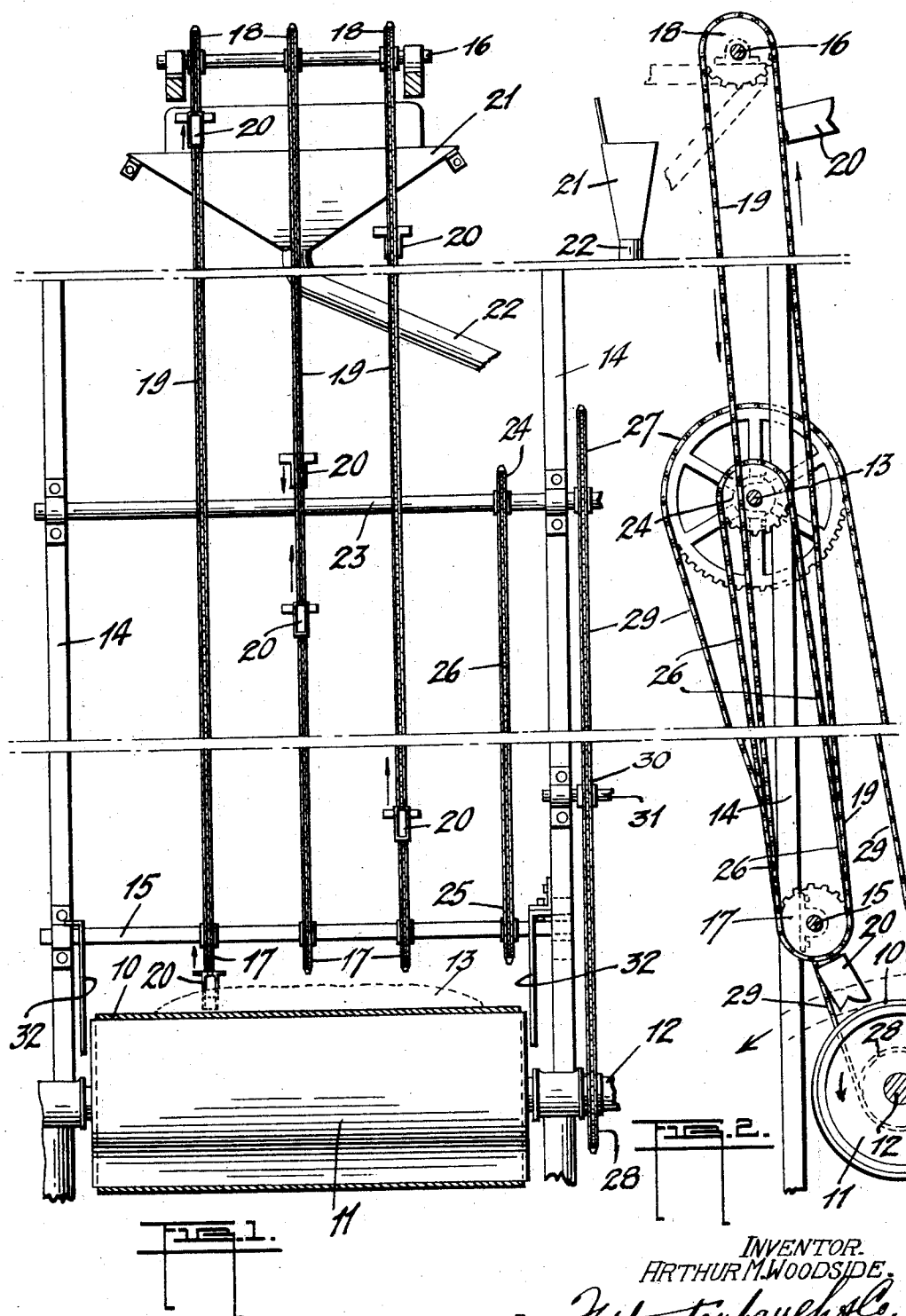
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AUTOMATIC GRAIN SAMPLER

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3 Sheets-Sheet 1



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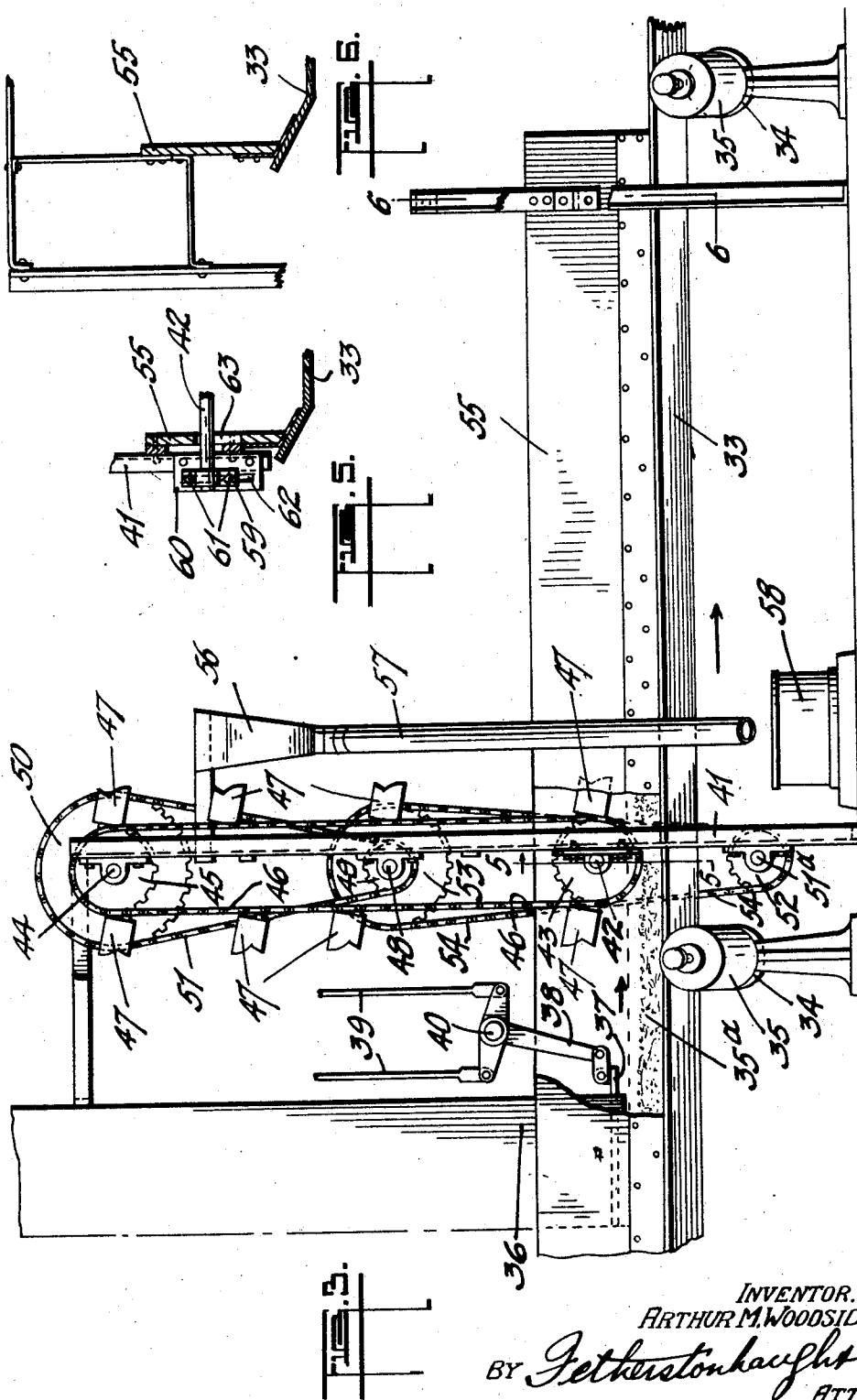
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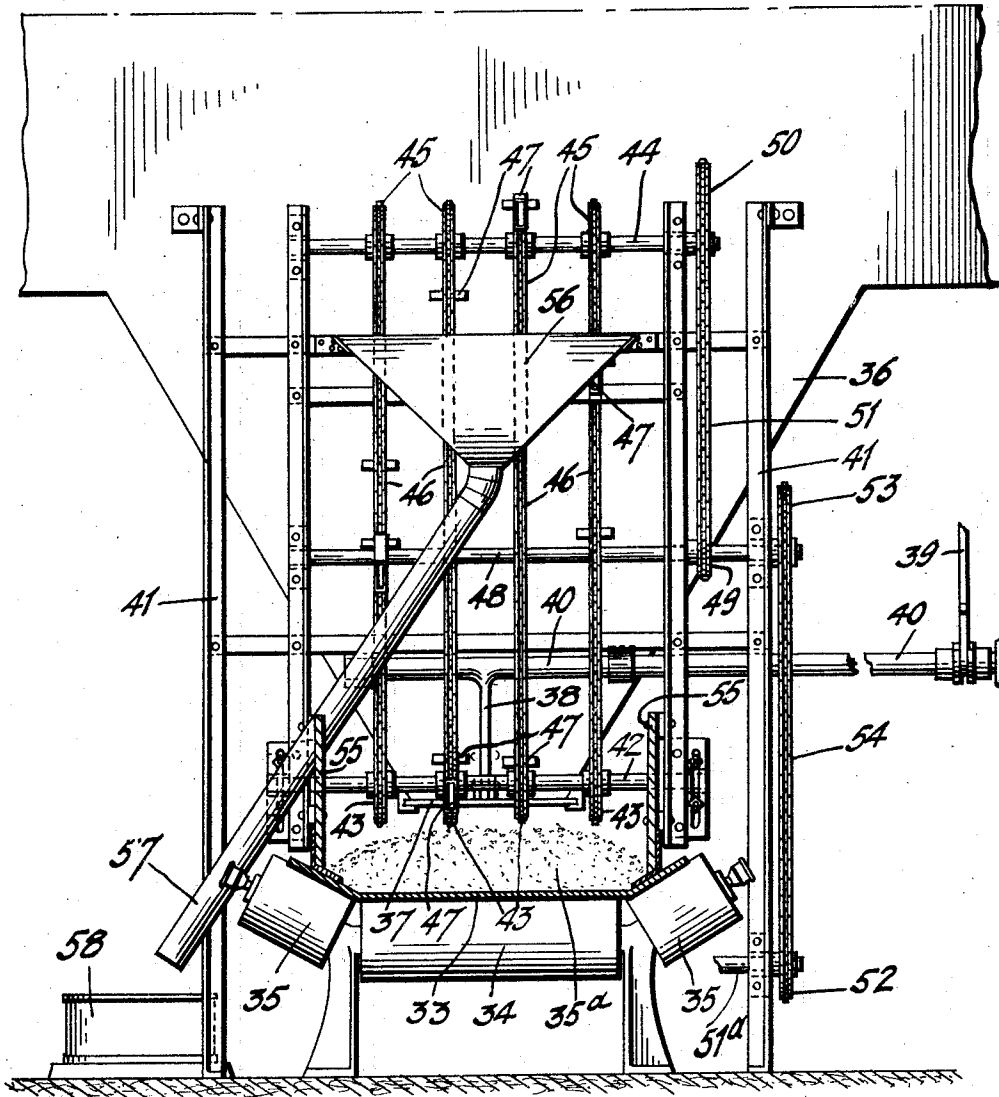


FIG. 4.

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AUTOMATIC GRAIN SAMPLER

Application filed December 6, 1929; Serial No. 412,166, and in Canada August 13, 1929.

This invention relates to improvements in automatic grain samplers, and the object of the invention is to provide an apparatus which will automatically take a running sample of grain while it is being unloaded from a car and being transferred to the receiving leg in the elevator and which will provide for the taking of a continuous sample during the entire unloading of the car.

10 A further object is to provide such a device which will automatically and continuously take a sample from the grain being carried upon a conveyor belt and which will take the sample from the entire depth of the layer of grain thereon and intermittently at various points of the width of the belt so that the collected sample will be a very true average sample of the entire quantity of the grain unloaded.

20 A further object is to provide such a device which will be entirely automatic during the unloading operation and which will not involve any manual attention whatever.

25 A further object is to provide such a device which will collect the entire sample from a car so that it may be tested after the car is unloaded.

30 A further object is to provide such a device which may be employed to take a sample from the end of the grain conveyor belt or from an intermediate point thereof as desired.

35 Hitherto it has been common practice for a Government sampler positioned at the door of a car to take samples manually as the car was unloaded but in this way it was impossible to get a fair average sample of the grain in the car; but by the improved apparatus this manual sampling is entirely eliminated and the device works continuously and automatically during the entire unloading process so that a fair average sample of the entire contents of the car is obtained and this sample cannot be taken away until the car is completely unloaded.

40 The invention consists in the construction and arrangement of parts, all as hereinafter more particularly described, and illustrated in the accompanying drawings in which,

50 Figure 1 shows a vertical front elevation,

partly in section and broken intermediately, of an apparatus constructed in accordance with the present invention of a form suitable for taking a sample from the end of a grain conveyor belt.

Figure 2 is a diagrammatic side elevation thereof also broken intermediately.

Figure 3 is a diagrammatic side elevation of a slightly modified form of the apparatus shown as adapted for taking a sample from a point intermediate of the length of the grain conveyor belt.

Figure 4 is a front elevation partly in section of the form of apparatus shown in Figure 3.

Figure 5 is a fragmentary view taken on the line 5—5 of Figure 3.

Figure 6 is a fragmentary section taken on the line 6—6 of Figure 3.

In the drawings like characters of reference indicate corresponding parts in the different views.

In the form of apparatus shown in Figures 1 and 2 the grain conveyor belt is indicated by the numeral 10 and one of the end rollers for this belt is indicated by the numeral 11, the roller 11 being supported in the usual manner upon a shaft 12 and a layer of grain being carried upon the belt being indicated by the numeral 13.

Extending upwardly above the belt 10 is any suitable framework 14 and mounted therein in spaced relationship above the belt 10 is a lower shaft 15 which extends transversely of the belt. Mounted at some distance above the lower shaft 15 and parallel thereto is an upper shaft 16. Mounted upon the lower shaft 15 are a series of spaced apart sprockets 17 which are spaced apart transversely of the belt 10 and carried by the upper shaft 16 are a similar number of spaced apart sprockets 18 which are in alignment with the sprockets 17.

Mounted upon each pair of upper and lower sprockets 18 and 17 respectively is an endless chain 19 and carried by each of these chains are a plurality of spaced apart sample-collecting buckets 20.

Supported adjacent to the upper sprockets

18 is a sample receiving hopper 21 from the bottom of which a pipe 22 extends.

Journalled in the frame 14 is a jack shaft 23 upon which is carried a sprocket 24 and in alignment with this sprocket 24 and upon the shaft 15 is a sprocket 25. Operatively connecting the sprockets 24 and 25 is a chain 26.

Also carried by the shaft 23 is a sprocket 27 and carried by the main roller shaft 12 is a sprocket 28 and operatively connecting the sprockets 27 and 28 is a chain 29.

An idler sprocket 30 is supported upon a shaft 31 journalled in the frame 14 and acts as a tightener for taking up the slack in the chain 29.

Carried by the frame 14 are two vertical guards 32 located one at either side of the belt adjacent to the lower shaft 15.

The operation of the apparatus illustrated in Figures 1 and 2 is as follows:—

The conveyor roller 11 would be driven from any suitable source of power connected to the main shaft 12 so that the belt 10 would be driven thereby. Belt 10 carries the layer of grain 13 which would be fed onto the other end of the belt. This layer of grain would pass off at the end of the belt 10 in the direction of the arrow as shown in Figure 2, the roller 11 rotating in a counter-clockwise direction as viewed in Figure 2.

The jack shaft 23 would be driven through the medium of the chain 29 and sprockets 27 and 28 and from this the lower shaft 15 would be driven through the medium of the sprockets 24 and 25 and the chain 26 and from this shaft 15 the chains 19 will be driven. It will thus be noted that the chains 19 constitute endless travelling elements above the belt 10 and the buckets 20 which are carried thereby will constitute sample collecting elements.

The disposition of the shaft 15 is such that as the buckets 20 pass around the lower sprockets 17 they will pass into proximity to the upper surface of the belt 10 and will travel around these sprockets in a direction opposed to that of the direction of travel of the layer of grain 13 and they will dip right through this layer of grain thereby getting right to the bottom of the stream and catching any seeds or other material which might settle to the bottom of the belt during its travel. The sprockets 17 are spaced apart transversely of the belt so that during operation samples will be taken from various points across the width of the layer of grain. Apart from this it will be noted that the buckets are in spaced relationship on each belt and in staggered relationship with respect to adjacent belts so that samples are collected intermittently across the width of the grain layer, thus providing for the collection of a very true sample.

After the buckets 20 have collected their samples they will travel upwardly with the chains 19 and as they pass over the upper

sprockets 18 they will discharge their collected samples into the hopper 21 which is spaced adjacent to these upper sprockets and positioned so as to receive these discharged samples. From the hopper 21 the collected samples will pass by means of the pipe 22 to be collected in any suitable receptacle.

In the form of apparatus shown in Figures 3, 4, 5 and 6 the principle of operation is the same as that already described except that in this case the apparatus is shown as adapted to collect a sample from an intermediate point in the belt.

In this form the grain conveying belt 33 is driven in the usual manner and is supported upon a roller 34 and adjacent to the sample collecting point of the belt the marginal edges thereof are supported upon inclined rollers 35 which deflect these marginal edges upwardly, as shown in Figure 4.

A layer of grain being conveyed by the belt is indicated by the numeral 35^a and this grain is being discharged onto the belt from a hopper 36 the bottom opening of which is controlled by a gate 37 which gate may be operated in any suitable way as by the lever 38 and the links 39, the lever 38 being connected to a shaft 40.

The sample collecting apparatus in this case is supported upon a vertical frame 41. Journalled in this frame is a lower shaft 42 mounted in spaced relationship above the belt 33 and carried upon this shaft are a number of spaced apart sprockets 43 which are spaced apart transversely of the belt 33.

Also supported in the frame 41 is an upper shaft 44 which is parallel to the lower shaft 42 and carried by this shaft 44 are a plurality of spaced apart sprockets 45 disposed in alignment with the lower sprockets 43 and mounted upon each pair of upper and lower sprockets 44 and 43 is a chain 46 and carried by each of these chains are a plurality of spaced apart sample-collecting buckets 47.

Journalled within the frame 41 is a jack shaft 48 upon which is mounted a sprocket 49 and carried by the upper shaft 44 is a sprocket 50, a chain 51 being operatively mounted upon the sprockets 49 and 50 for operatively connecting the jack shaft 48 and upper shaft 44.

A drive shaft 51^a is also journalled in the frame 41 and carries a sprocket 52, this drive shaft being connected to any suitable source of power and from it would be taken the drive for the apparatus.

Also carried by the jack shaft 48 is a sprocket 53 in alignment with the sprocket 52 and mounted upon the sprockets 52 and 53 is a chain 54.

It will thus be evident that when the drive shaft 51^a is rotated the jack shaft 48 will be rotated thereby through the medium of the chain 54 and sprockets 52 and 53 and from this jack shaft 48 the upper shaft 44 will be

driven through the medium of the sprockets 49 and 50 and chain 51 and from the upper shaft 44 the chains 46 will be driven through the medium of the sprockets 45 and 43.

5 Supported from the frame 41 and at each side of the belt 34 adjacent to the sample collecting apparatus are upstanding guards 55.

Supported adjacent to the upper sprockets 45 is a hopper 56 from which leads a pipe 57 adapted to discharge into a sample receiving receptacle 58.

In order to provide an adjustment for tightening the chains 46, provision is made for vertical adjustment of the lower shaft 42, the ends of which are journaled in bearing blocks 59, which are secured to brackets 60 on the frame 41, the bolts 61 securing these bearing blocks and engaging within slots 62 in the brackets 60. The guards 55 would also be provided with slots 63.

The operation of this apparatus is as follows:—The grain is discharged from the hopper 36, which may be the hopper of a grain car, onto the belt 33 and is carried thereby in the direction of the arrow in Figure 3. Simultaneously therewith the shaft 51^a is driven so that the chains 46 are also driven and during the travel of these chains the buckets 47 in passing over the lower sprockets 43 dip into the layer of grain 35^a and travel in a direction opposite to the direction of the layer of grain and pick up samples from the layer which samples they carry upwardly and in passing over the upper sprockets 45 they discharge these collected samples into the hopper 56 from which the samples are led into the receptacle 58.

The device therefore provides travelling sample collecting means above the belt which are entirely automatic in operation and which during the entire unloading operation continue to collect samples of grain from the belt and discharge them to be finally collected into the receptacle 58.

45 From the foregoing it will be apparent that the improved apparatus provides a novel means of collecting a continuous sample of grain from a car during the entire unloading operation in an entirely automatic manner without any manual attention whatever and whereby a fair average sample of the entire car is obtained and whereby the objects set forth are attained.

Various modifications may be made in this invention without departing from the spirit thereof or the scope of the claim, and therefore the exact forms shown are to be taken as illustrative only and not in a limiting sense, and it is desired that only such limitations shall be placed thereon as are disclosed in the prior art or are set forth in the accompanying claim.

What I claim as my invention is:—

65 An automatic grain sampler comprising the combination with a grain conveyor belt

adapted to carry a layer of grain thereon, of a series of endless travelling elements in uniform spaced relation to each other across the width of the conveyor, sample collecting means carried by the elements in staggered relation to the collecting means on each adjacent element adapted, during a portion of their travel, to dip into the grain layer to intermittently collect a sample of grain at points across and along the layer, means for discharging the collected samples and means for receiving the discharged samples.

In witness whereof I have hereunto set my hand.

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