July 20, 1937. H. C. HILKE 2,087,321

SPLITTING MACHINE

Filed April 1, 1935 2 Sheets-Sheet 1

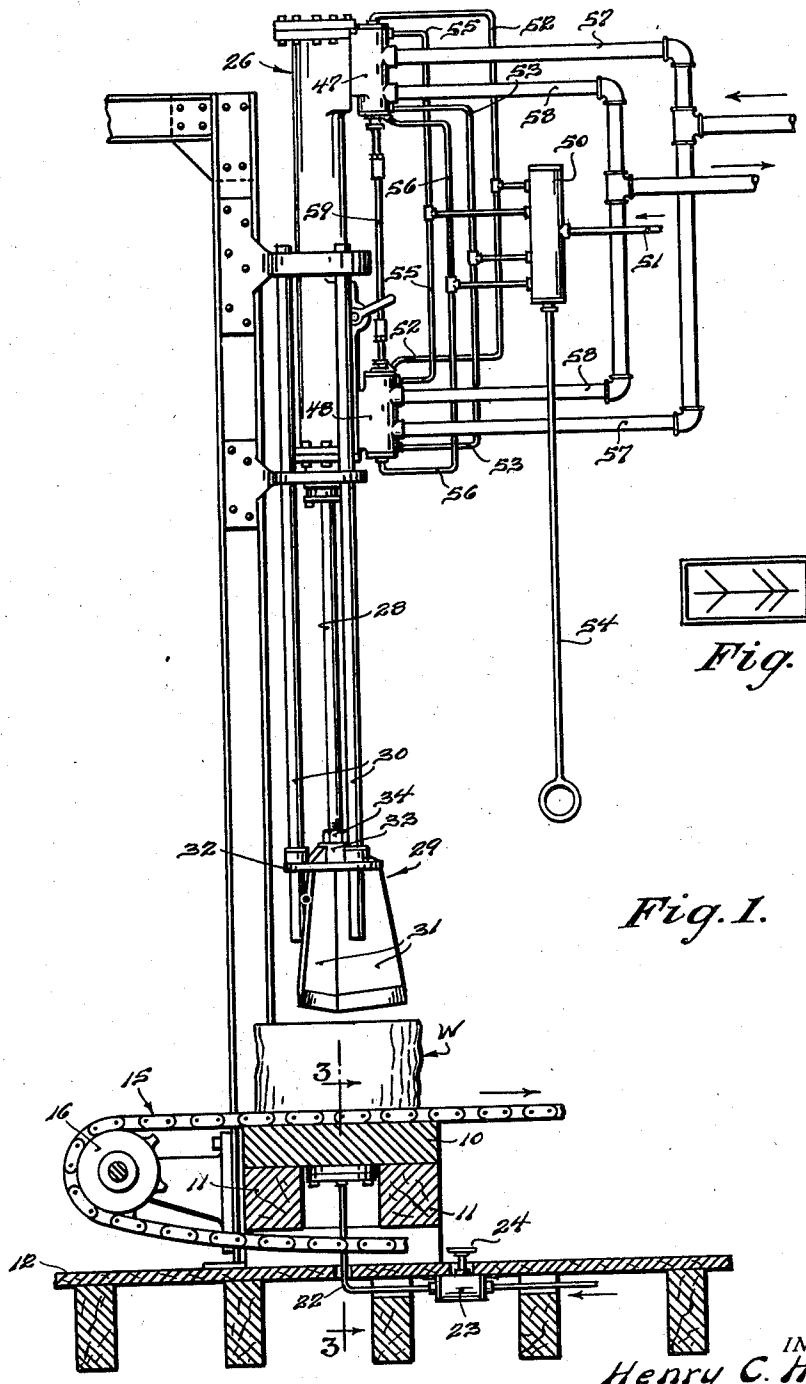


Fig. 6.

Fig. 1.

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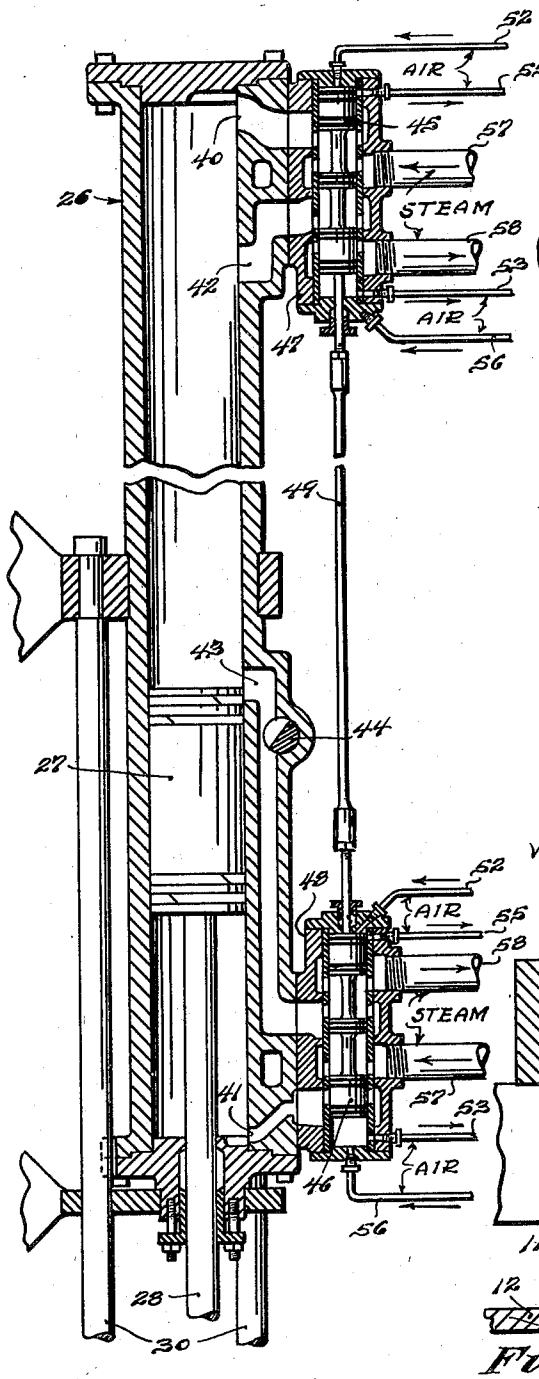


Fig. 2.

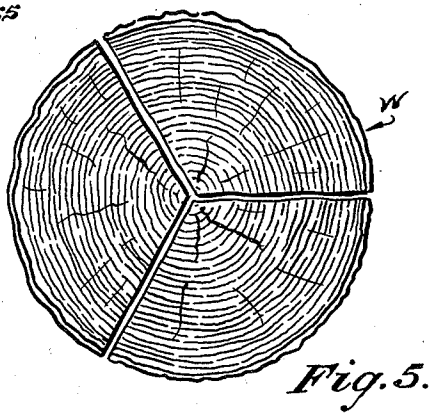


Fig. 5.

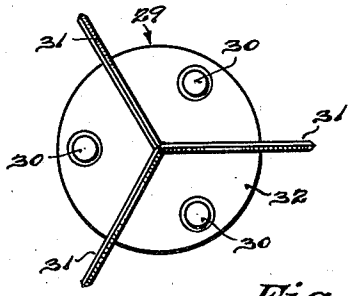


Fig. 4.

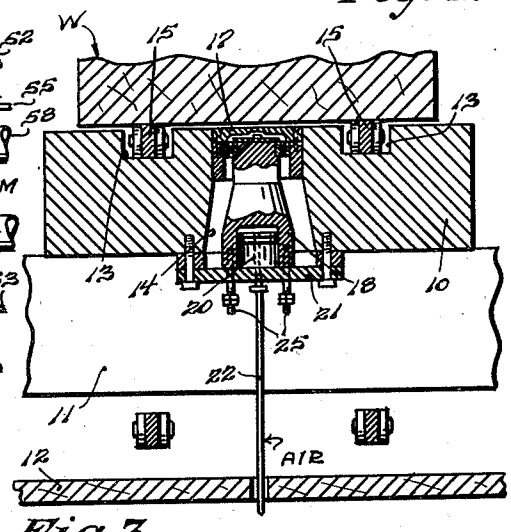


Fig. 3.

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SPLITTING MACHINE

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Application April 1, 1935, Serial No. 14,080

7 Claims. (Cl. 144—194)

This invention relates to mill machinery the purpose of which is to trisect log blocks in the production of sectors. Stated generally, the invention has for its object the provision of improved structure for this purpose which is inexpensive in construction, having increased efficiency and especially simplified operation.

It is, more particularly, an object of the invention to devise means for splitting log blocks and in furtherance thereof, to provide means peculiarly co-acting with power-operated cleaving knives for handling the work to locate the same in the splitting plane of the knives.

The foregoing, together with more specific objects and advantages, will become apparent in the course of the following detailed description and in the claims annexed thereto, the invention consisting in the novel construction, adaptation, and combination of parts hereinafter described and claimed.

In the drawings:—

Figure 1 is a side elevation representing the now preferred embodiment of the invention, parts being broken away and parts shown in longitudinal vertical section.

Fig. 2 is a longitudinal vertical section to an enlarged scale taken through the steam cylinder and related structure by means of which the cleaving knives are operated.

Fig. 3 is a transverse vertical section detailing the block-supporting structure and the elevating foot by means of which the log blocks are located for splitting the same.

Fig. 4 is an underside plan view of the splitting knives.

Fig. 5 is a plan view of a log block representing the manner in which the same is trisected to produce sectors; and

Fig. 6 is a detail view of a slide utilized in connection with a projection lantern for casting a shadow in the splitting plane of the knives upon the surface of the blocks.

In a prior application for Letters Patent of the United States filed October 10th, 1933, Ser. No. 692,944, now Patent No. 2,051,256 issued Aug. 18, 1936, I illustrated an arrangement employing saws for trisecting logs and described therein the peculiar advantages of trisection as compared with the quartering methods generally employed. While such saw arrangement operates to advantage and was especially designed to handle work of relatively extended length, the herein described splitting machine, aside from its simplified construction, negligible cost of up-keep, and rapidity of operation, effects a material increase in shingle output through an elimination of loss by saw-dust.

Having reference to the drawings and particularly to the work-supporting structure, the present invention provides a ring-shaped thrust block, indicated by the numeral 10 and preferably of iron, supported by transverse beams 11 in spaced disposition above a floor 12 upon which the operator stands, said block being formed in its upper surface with parallel longitudinally extending channels 13 lying at opposite sides of the annular opening 14 which extends in a vertical plane through the block, said channels providing bearing surfaces for the links of companion endless chains 15 in the travel of the chains over the thrust-block. The channels are of a depth to locate the upper surface of the chains slightly above the surface of the thrust-block, the chains operating about sprocket wheels 16 with their travel being controlled by the operator through a suitable clutch arrangement (not shown).

Slidably supported for vertical movement in the opening 14 of said thrust-block and normally lying flush or approximately so as respects the surface of the latter is a cap 17 rotatively carried by an elevating foot member 18, said foot member being formed at its lower end with a cylinder acting to receive a piston 20 carried by a stationary base plate 21, the chamber of the cylinder above the piston having communication through the piston with a pipe 22 leading through a control valve 23 to a pressure source of air supply. A foot-operated pedal for the valve is indicated at 24. Bolts 25 extending through the base plate 21 into the foot member 18 operate to limit the elevation of the latter.

Located in spaced disposition above the thrust-block, I provide a stationary vertical cylinder 26 within which is a double-acting trunk piston 27, the piston carrying a connecting rod 28 on the lower end of which is a splitting head 29. Said head, as indicated, is formed with three radially disposed blades 31 lying in vertical planes at angles of 120° to one another, the blades having a knife-forming taper at the lower edge which inclines downwardly from the outer to the inner or meeting termini of the respective blades to locate the leading point of the splitting head on the axial line of the same. The blades are desirably formed integral, one with another, with their root ends being fast to a horizontal plate 32 formed with a hub extension 33 in which the connecting rod 28 is threaded, a lock-nut therefor being indicated at 34. Circumferentially

spaced guides **30** are provided to co-act with the connecting rod in supporting the splitting head for reciprocatory vertical movement.

More especially as respects the cylinder **26**, said cylinder being of an extended length to obtain momentum in the splitting travel of the blades, the same is formed with steam-admission ports **40**, **41** and steam-exhaust ports **42**, **43** in opposite ends, the port **43** being spaced a material distance above the lower limits of the piston travel for cushioning purposes and being provided with a rotary valve **44** for regulating the exhaust capacity of the opening. In controlling the admission and discharge of steam through the ports, I employ sliding valves **45** and **46** of the double-ported character working at opposite ends of the cylinder in steam chests **47** and **48**, the valves being designed to operate through the controlled admission to and discharge from the end chambers of the chests of compressed air. For this purpose I provide a master valve comprising a spring-pressed piston (not shown) working in a cylinder **50** and normally lying, under the influence of the spring, to communicatively connect a pressure air line **51** with pipes **52** leading to the upper ends of the steam chests, simultaneously exposing the lower ends of the steam chests to the atmosphere through exhaust pipes **53**. Acting in opposition to the spring, a pull rod **54** controlled by the operator operates the master valve to expose the upper ends of the steam chests to the atmosphere through pipes **55** with pipes **56** being communciatively connected with the supply line **51** to supply air under pressure to the lower ends of the chests. Steam pipes to and from the chests are indicated by **57** and **58**. To assure collective movement of the valves **45** and **46**, the same are coupled through a connecting rod **59**.

In operation the blocks of wood constituting the work and indicated by the letter W are delivered to the admission end of the conveyor chain with the chain travel being interrupted as the block lies above the thrust member. The log blocks, following depression of the foot pedal **24** to elevate the foot member **18**, clear the chains and are easily handled by the operator to rotate or slide the same with proper positioning being obtained through the use of a projection lantern designed to cast a shadow over the surface of the log block. I indicate in Fig. 6 a transparent plate acting as the slide for the lantern and upon the surface of which lines are painted or otherwise provided. Log blocks used in the production of shingles conventionally are of either 16'', 18'', or 24'' depth which means that the surface of these blocks receiving the splitting impact of the knives will lie in one of three vertically-spaced horizontal planes. Were it feasible to locate a shadow-casting device above and in the vertical center line of the work, single shadows for each of the knives could be used from the fact that variation in the plane in which the knife-impinging surface of the work lies would not alter the position of the shadow on the work surface, in other words the vertical projection of the shadow would result in the shadow intersecting each of the three work surfaces in a common vertical plane. It is to be understood, however, that the shadow-casting lantern is located in laterally off-set disposition of the vertical center line of the work in order that the same may lie out of the path of travel of the knives and in order to accommodate this positioning of the lantern I form the slide used therewith such as to provide a medial line adapted to lie in the longitudinal plane of the particular splitting knife which is disposed longitudinally as respects the direction of work feed and, co-active therewith, provide on the slide three companion pairs of lines to extend laterally of the medial line at angles of 120° to the same, the lines of each of said pairs which lie at the same side of the medial line being disposed parallel to one another and to the plane of the knife related thereto and spaced from one another relatively with the various depths of the blocks whereby to cast shadows, the slide being supported obliquely, which intersect the related plane of a knife-impinging work surface in the vertical plane of the related knife. More especially, the medial line which extends the approximate length of the slide projects a shadow which is used by the operator in positioning each of the three block depths while the laterally extending angular lines project shadows which are selectively used in that each pair of the same accommodates a particular depth of block.

The blocks normally are placed to locate the core of the same in the axial center of the splitting head. Where a portion of the block is spongy or otherwise marred, the block is disposed such that the faulty section lies in the space between two of the knives in a manner to remove the faulty portion only. The knives readily cleave knots and, through the design of the splitting head which acts to initiate the split in the center of the block at a point common to each of the several blades, the line of split is substantially rectilineal. The momentum of the head requires movement of the knives through a minor portion only of the block, the splitting shock of the blades, following operation of the pull rod **54** to locate the valves **45** and **46** as shown with an admission of steam to the upper end of the cylinder **26**, being transmitted through the chain links on which the work rests to the thrust-block **10**.

The machine is particularly designed for the purpose of trisecting the log blocks but obviously might be used to advantage for quartering or as might otherwise be desired.

Modifications of the invention will readily suggest themselves and I accordingly intend that the appended claims be given the breadth in their construction which is commensurate with the scope of the invention within the art.

What I claim, is:—

1. In a machine for splitting log sections, in combination with a splitting knife arranged for reciprocatory movement in a vertical plane, a block channeled in its upper surface and located below the knife for supporting the work in the path of travel of the knife, a conveyor chain for the work arranged for movement through the channel of the block to locate the upper surface of the chain above the surface of the block, and power-operated elevating means journaled for rotary movement to lift the work from the chain to facilitate regulation of the work in positioning the same relative to the splitting plane of the knife.

2. In a machine for splitting log sections, in combination with a splitting knife arranged for reciprocatory movement in a vertical plane, a thrust-receiving member located below the knife for supporting the work in the path of travel of the knife, and vertically-movable elevating means normally disposed below the work-supporting surface of the thrust-receiving member and disposed co-axially as respects the splitting knife for elevating the work from the surface of the

block, said elevating means being journaled for rotary movement and operating to facilitate regulation of the work in positioning the same relative to the splitting plane of the knife.

3. In a machine for splitting log sections, in combination with a splitting knife arranged for reciprocatory movement in a vertical plane, non-rotary thrust-receiving means located in the vertical plane of the knife adapted to support the work, and means independent of said thrust-receiving means normally supported below the work-supporting surface of the same and arranged to elevate the work above the work-supporting surface of the thrust-receiving means to facilitate regulation of the work in positioning the work relative to the splitting plane of the knife.

4. In a splitting machine adapted for use with varying standard depths of log sections, the combination of a splitting head arranged for reciprocatory movement in a vertical plane and formed with a plurality of blades extending angularly from one another radially of the axial center of the head, a work-support disposed below the head to locate the work in the path of travel of the head, and means operating to facilitate regulation of the varying standard depths of log sections on said support for positioning the same relative to the splitting planes of the blades, said means comprising a transparent slide adapted for use with a projection lantern and provided on its surface with longitudinally spaced sets of lines, the lines of each of said sets being disposed at angles to one another conforming to the angular relativity between the blades with the related lines of the several sets being disposed in parallel planes, said plural sets of lines operating to accommodate location of the lantern above the blade-impinging surface of the supported work and laterally of the splitting head to cast plural longitudinally spaced sets of shadows at an oblique angle to the path of travel of the splitting head in defining work-regulating lines upon the surface of the work, a selected set of which are used by the operator according to the depth of the block being split.

5. In a machine for splitting log sections of variable predetermined lengths, in combination with a splitting head arranged for reciprocatory vertical movement and providing a plurality of blades disposed angularly of one another in fixed vertical planes, a support for the work disposed below the blades to locate the blade-impinging surfaces of the several depths of work in predetermined vertically-spaced horizontal planes, and means disposed above the work and in laterally offset disposition of the line of travel of the splitting blades to facilitate regulation of the work on the support for locating the work relative to the splitting planes of the blades, said means comprising a transparent slide formed with plural sets of lines thereon and adapted for use with a source of light to cast obliquely-projected shadows upon the blade-impinging surface of the supported work, said sets of lines being disposed to project selectively used shadows which severally define, in the intersected horizontal planes in which the blade-impinging surfaces of the several depths of work lie, the splitting planes of the blades.

6. In a machine for splitting log sections, in combination with a splitting knife arranged for reciprocatory vertical movement, means for supporting the work in the vertical plane of the knife travel and acting to receive the thrust of the knife in the splitting action of the same, and means relatively co-axial with the knife and independent of the last-named means for elevating the work above the surface of the supporting means for positioning the work relative to the knife, said positioning means having, as respects the diameter of the work, a proportionately smaller surface area to facilitate movement of the work relative to the positioning means.

7. A machine for splitting log sections comprising the combination of a work-support, a splitting head arranged for reciprocatory movement into and from the space occupied by the supported work, said head providing a plurality of fixed splitting blades extending radially from the axial center of the head, and means by which shadows, designating lines which lie in the path of reciprocatory travel of the radially disposed splitting blades, are cast on the surface of the supported work, said shadows acting as gages to facilitate a location of the work in definite correlation to the blades of the splitting head to have such blades strike the work on predetermined lines, the splitting head being guidably supported against rotary movement to maintain the path of travel of the blades in constant planes to which the cast shadows are related.

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