Feb. 20, 1934. H. S. MITCHELL 1,947,728

POWER OPERATED FEEDING DEVICE

Filed July 25, 1931 4 Sheets-Sheet 1

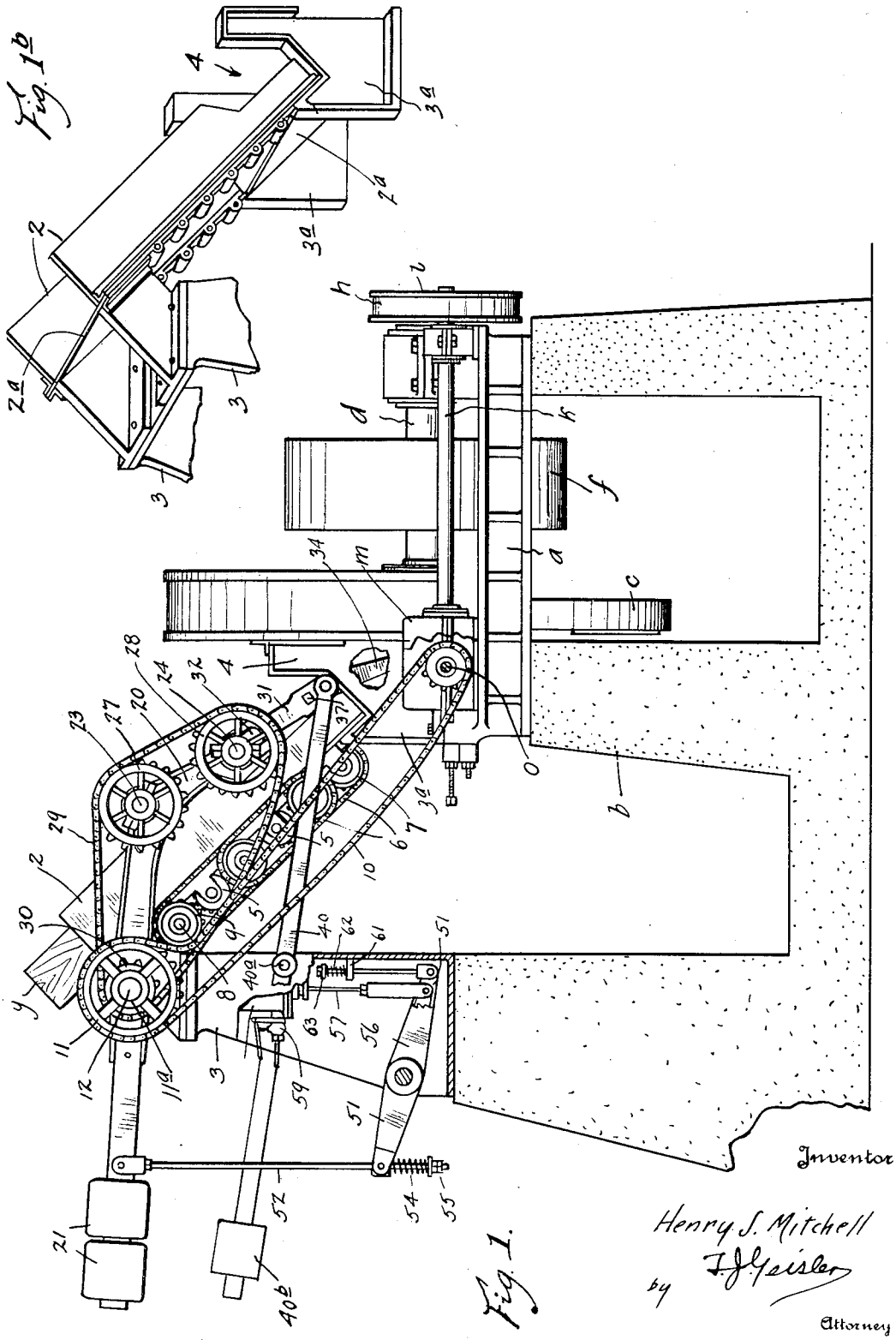


Fig. 1.

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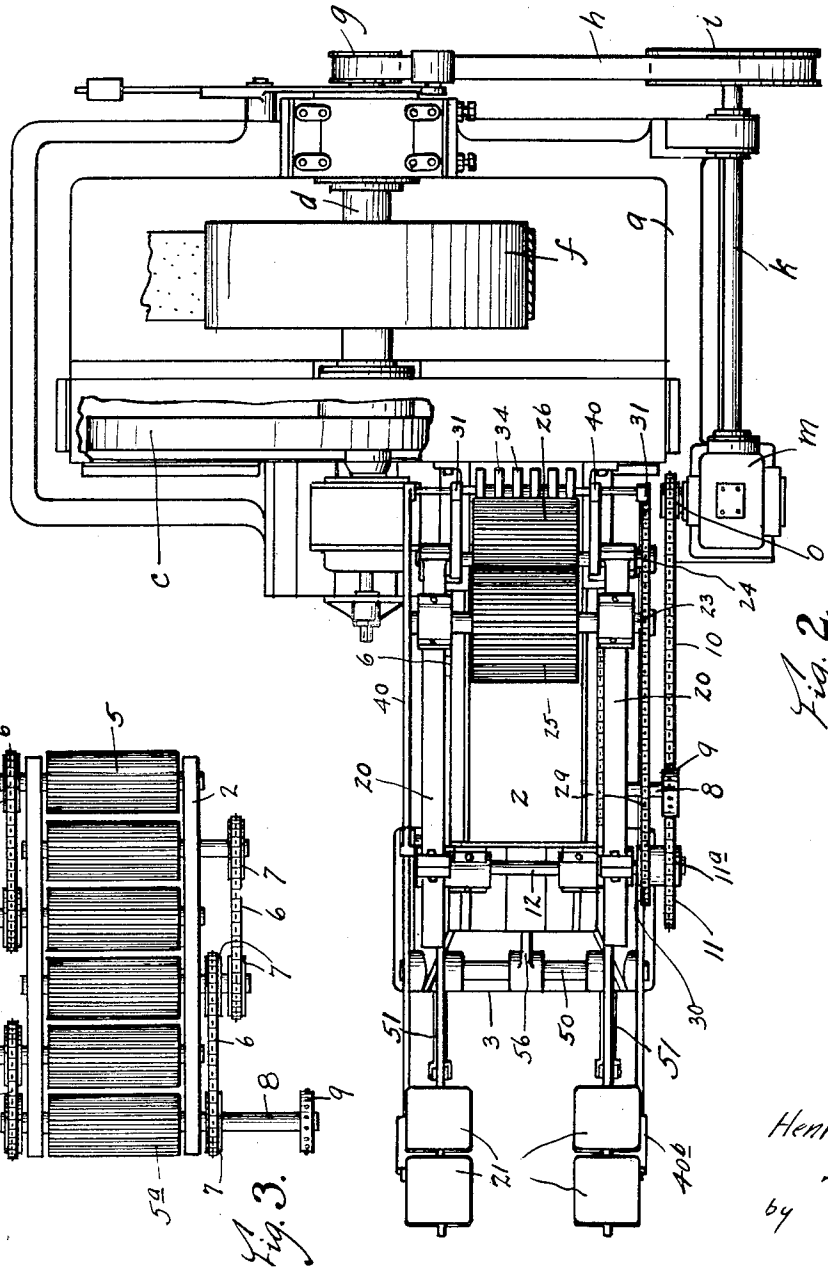


Fig. 2.

Fig. 3.

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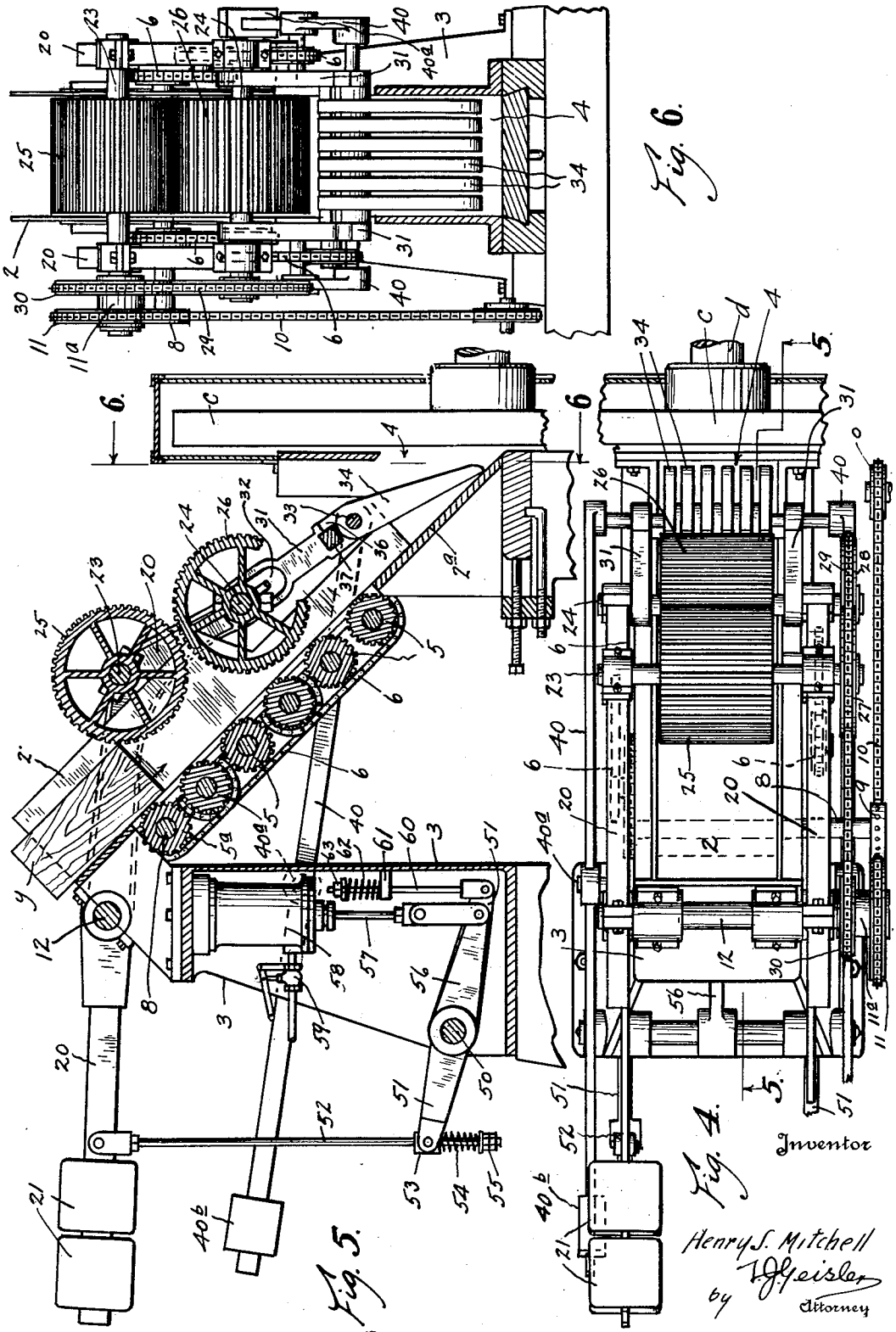


Fig. 6.

Fig. 5.

Fig. 4.

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POWER OPERATED FEEDING DEVICE

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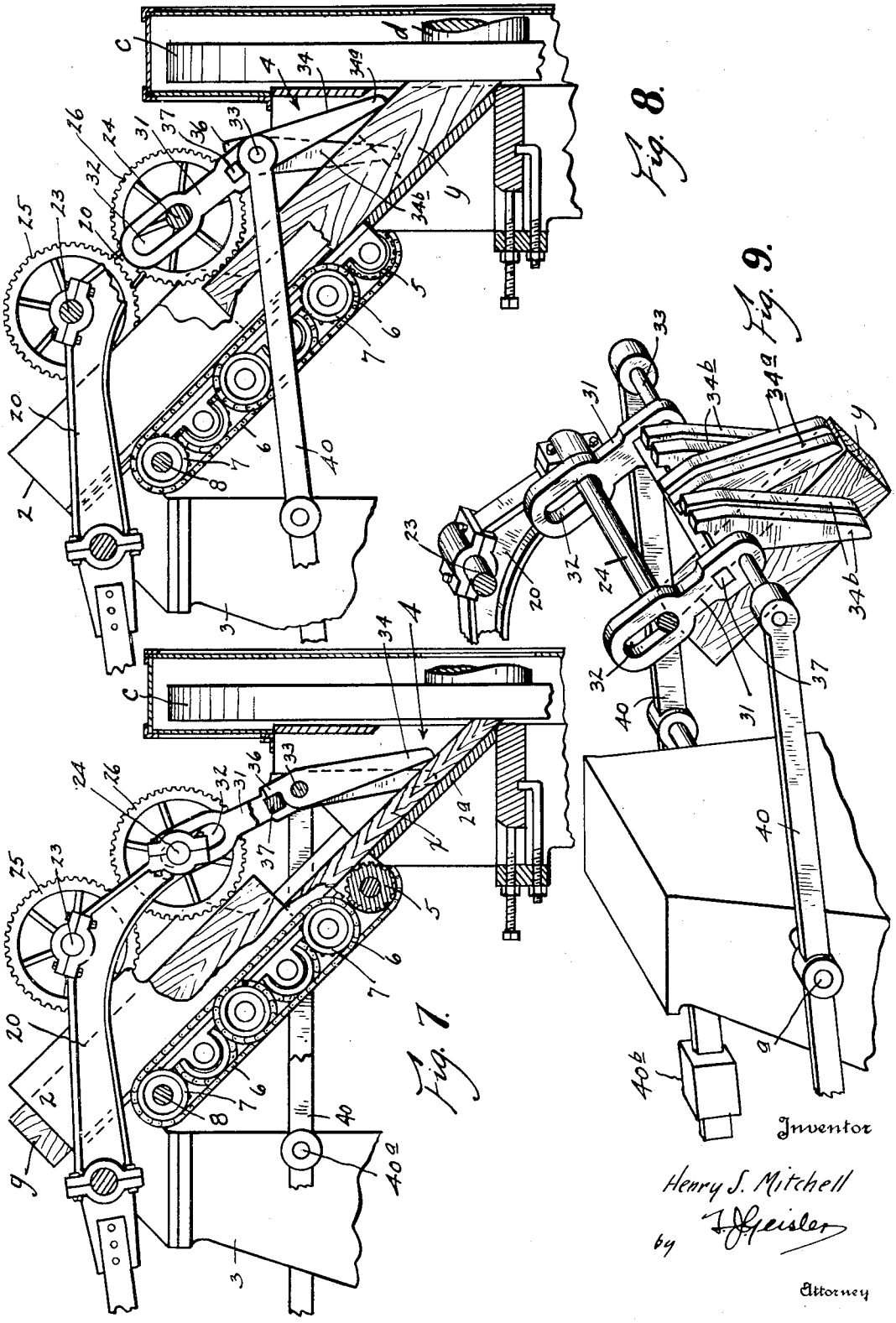


Fig. 7.

Fig. 8.

Fig. 9.

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UNITED STATES PATENT OFFICE

1,947,728

POWER-OPERATED FEEDING DEVICE

Henry S. Mitchell, Portland, Oreg.

Application July 25, 1931. Serial No. 553,226

10 Claims. (Cl. 83—75)

My invention relates to wood chipping machines, and to a power operated feeding device or attachment therefor.

In the chipping machines heretofore used for cutting pulp wood into chips, preparatory to the manufacture of the same into paper and similar products, it has been the practice to feed the wood into the chipping machine through an open spout or hopper, through which the wood falls by gravity into contact with the chipping knives.

By this method, however, the pieces of wood are often forced back into the hopper by the impact of the said knives and in consequence the chips are cut off in irregular lengths. Further, since the pieces of wood become shorter as they are chipped they tend to turn sidewise, so that they are cut into elongate pieces or "slivers". This results in a considerable loss of wood, because the oversize pieces and the slivers are generally discarded and wasted as unsuitable for the manufacture of paper pulp.

Furthermore, if the pieces of wood vary in size and shape they tend to lodge in the hopper one against the other, instead of immediately dropping into contact with the chipping knives; and thus prevent the machine from operating at full capacity, since there would be intervals during which no wood is fed to the chipping knives.

The object of my invention is to provide a power-operated feeding device or attachment for chipping machines by which the pieces of wood are properly fed to the knives of the chipping machine, and firmly held in contact with the chipping knives, in that way to prevent the pieces being forced back into the hopper, and from twisting and turning under the impact of the chipping knives, which, as mentioned, would cause slivers and irregular size chips.

A further object of my invention is to provide a power-operated feeding device of the character mentioned adapted to feed pieces of wood of different sizes, and to hold each piece in firm contact with the chipping knives.

A further object of my invention is to provide a power operated feeding device of the character mentioned adapted to be timed with the chipping knives so that the speed of operation of the machine as a whole may be regulated according to the kind of wood being chipped and the desired output.

The device by which I attain above described specific features of my invention and incidental features, the details of construction and mode of operation of my device are hereinafter fully described with reference to the accompanying drawings.

In the drawings:

Fig. 1 shows a side elevation of a conventional chipping machine with my feeding device connected thereto;

Fig. 1*b* shows a perspective view of the trough-like hopper separated from the rest of the machine;

Fig. 2 shows a plan view of the chipping machine with my feeding device connected thereto;

Fig. 3 shows a detached plan view of the bottom of the frame-like hopper and illustrates the relative arrangement of the secondary feed rollers carried thereby;

Fig. 4 shows a plan view of my feeding device partly in section and illustrates further details of construction;

Fig. 5 shows a section taken on the line 5—5 of Fig. 4 and illustrates the relative arangement of the feed rollers and the holding fingers;

Fig. 6 shows a section taken on the line 6—6 of Fig. 5 and illustrates further details of construction;

Figs. 7 and 8 show fragmentary side elevations of my machine and illustrates respectively its operation when successive pieces of wood of different dimensions are passing therethrough; and

Fig. 9 shows a fragmentary, perspective view of the holding fingers and adjacent parts of the machine.

Referring to Figures 1 and 2, I have shown a conventional chipping machine consisting of a base *a* mounted upon a suitable foundation *b* and provided with a rotary chipper *c* carried upon a shaft *d* journaled on the base and driven by a pulley *f*.

The shaft *d* is also provided with a pulley *g* at the end opposite from the rotary chipper *c*. A parallel shaft *k* is journaled on the base at the side of the machine, on the end of which is secured a pulley *i*. A belt *h* is mounted over the two pulleys *g* and *i*, and the other end of the shaft *k* is connected to a suitable transmission *m* having a driven sprocket *o*. These means constitute one form of driving connection for my feeding device.

My feeding device comprises an inclined trough-like hopper 2 supported at one end upon a suitable frame or support 3 and at the other end upon a support 3*a* which is secured to the feed inlet 4 of the chipping machine; the usual open hopper or spout having been removed. The floor 2*a* of the hopper 2 is partly cut away and a series of feed rollers 5 are rotatably journaled there-

in and are driven by a series of chains 6 and sprockets 7 from a driven shaft 8 on which the first feed roller 5a is carried. The shaft 8 is provided with a sprocket 9 driven by a chain 10 arranged over the said driven sprocket o on the chipping machine and a sprocket 11 is rotatably mounted upon a stationary transverse shaft 12 carried by the upper end of the trough-like hopper 2.

Parallel curved arms 20 pivotally mounted at their middle at each side of the machine upon the said shaft 12 constitute a supplemental frame which overhangs the hopper 2 and is counterbalanced by weights 21. Transverse shafts 23 and 24 are journaled in the said arms 20 and carry corrugated feed rollers 25, 26, respectively, arranged between the side walls of the said hopper. The feed roller 25, as shown by Fig. 1, is spaced a greater distance above the bottom of said hopper than the feed roller 26. The ends of the shafts 23, 24 carry sprockets 27, 28 on which runs a chain 29 driven by a sprocket 30 mounted on the said stationary shaft 12 and secured to the hub 11a of the driven sprocket 11.

The extremities of the arms 20 are provided with movable links or extensions 31 having elongate slots 32 and supported on said shaft 24. The extensions 31 are rigidly connected at their forward ends by a transverse shaft 33 upon which are pivoted a series of fingers 34; the forward ends of the said fingers 34 being free to fall by gravity on the floor 2a of the said frame-like hopper 2. Shoulders 36 are provided on the rear ends of the said fingers 34, see Figs. 7 and 9, adapted to bear when in raised position against a square transverse bar 37 carried by the forward ends of said extensions 31.

Rods 40, see Fig. 9, are pivotally connected to the extending ends of the shaft 33, and intermediate their ends to the support 3 upon a shaft 40a.

The rear ends of the rods 40 are provided with counter weights 40b, whereby the fingers 34 are prevented from bearing upon the pieces of wood so heavily as to restrain the pieces of wood from passing forwardly to the knives.

In the operation of my feeding device, assuming a small sized piece of wood, as x, see Fig. 7, is first fed into the trough like hopper 2, such would be carried by the driven rollers 5 under the second feed roller 26 of the supplemental frame 20, the first feed roller 25 being spaced too far above the roller 5 to touch the piece x. The roller 25 of the supplemental frame 20, however, is lifted by the piece x and bears on it, and the roller 25 being driven moves the piece x under the fingers 34 raising those fingers which bear on the piece x so that the shoulders 36 of the fingers 34 are brought into contact with the square bar 37 of the frame members 31 which holds said fingers firmly on the piece x.

Thus the piece x as it is brought into contact with the rotary chipper c, is held against endwise movement away from the cutter knives by the fingers 34a, which bear upon it and is held against twisting, or lateral movement, by the other fingers 34b which lie against its sides.

In case the thickness of the piece x is such as to lift the fingers further than sufficient to bring their shoulders 36 into contact with the bar 37, the latter will be lifted, such movement being permitted by the elongate slots 32 of said links which ride on the shaft 24.

Further, when a larger piece, as y, see Fig. 7, follows the piece x into the hopper, such under ordinary circumstances would tend to raise the fingers 34 so far above the preceding small piece x that they would only rest upon it by gravity and would not hold it firmly against the chipping knives. But, by providing the elongate slots 32 in the links 31 and connecting the latter to the support 3 by the rods 40, the said links and fingers 34 will move upwardly and rearwardly in an arcuate path, thus holding the shoulders 36 of the fingers 34 on the bar 37 and cause the fingers to bear firmly on the smaller piece x.

Further, the fingers 34 are prevented from coming into contact with the chipping knives when raised by the pieces of wood, by the rods 40 which pull the fingers backward in an arcuate path, as mentioned, clear of the said chipping knives.

A shaft 50 provided with levers 51 is rotatably mounted in the lower portion of the support 3. The levers 51 are connected with the arms 20 intermediate their rear ends and the shaft 12, by rods 52, which are slidably connected to the said levers 51 in a pivoted bushing 53. Springs 54 are provided on the extremities of the rods 52, and are held in place by nuts 55, whereby downward movement of the forward end of the arms 20 carrying the feed rollers 25 and 26, and the consequent upward movement of the rear ends will be resisted, and thus protect the said arms 20 from sudden shocks, as when a large piece of wood passes from under the roller 26.

The shaft 50 is also provided with a lever 56 connected with the piston rod 57, of a pressure cylinder 58 whereby the said arms 20 may be raised by admitting pressure in said cylinder through a control valve 59, thereby to raise the forward ends of said arms 20 for the removal of a piece of wood which may become lodged in the hopper 2, or for inspection.

To prevent a sudden release of pressure in the cylinder 58 dropping the arms 20 too quickly, I have connected the inner ends of the lever 56 with a rod 60, slidable in a lug 61 on the standard 3, and provided a spring 62 between the said lug and nut 63.

I claim:

1. In a feeding device for chipping machine, the combination with a trough-like feeding hopper, of a rockable frame overhanging said hopper, driven feed rollers journaled in said frame at different elevations above the bottom of said hopper, a series of independently pivoted fingers carried by the forward end of said frame, and means for holding said fingers yieldingly in engagement with the material fed in said hopper, thereby to hold such material firmly in contact with the knives of the chipping machine.

2. In a feeding device for chipping machine, the combination with a trough-like feeding hopper, of a rockable counter-balanced frame overhanging said hopper, driven feed rollers journaled in said frame at different elevations above the bottom of said hopper, a series of independently pivoted fingers carried by the forward end of said frame, and means for holding said fingers yieldingly in engagement with the material fed in said hopper, thereby to hold such material firmly in contact with the knives of the chipping machine.

3. In a feeding device for chipping machine, the combination with a trough-like feeding hopper, of a rockable frame overhanging said hopper, driven feed rollers journaled in said frame at different elevations above the bottom of said hopper, a series of independently pivoted rearwardly movable fingers carried by the forward end of said frame,

and means for holding said fingers yieldingly in engagement with the material fed in said hopper, thereby to hold such material firmly in contact with the knives of the chipping machine.

4. In a feeding device for chipping machine, the combination with a trough-like feeding hopper, of a rockable counter-balanced frame overhanging said hopper, driven feed rollers journaled in said frame at different elevations above the bottom of said hopper, a series of independently pivoted rearwardly movable fingers carried by the forward end of said frame, and means for holding said fingers yieldingly in engagement with the material fed in said hopper, thereby to hold such material firmly in contact with the knives of the chipping machine.

5. In a feeding device for chipping machine, the combination with a trough-like feeding hopper, of a rockable counter-balanced frame overhanging said hopper, driven feed rollers journaled in said frame at different elevations above the bottom of said hopper, a series of independently pivoted rearwardly movable fingers carried by the forward end of said frame, means for holding said fingers yieldingly in engagement with the material fed in said hopper, thereby to hold such material firmly in contact with the knives of the chipping machine, and means for raising the forward end of said pivoted frame to disengage the fingers from said material.

6. In a feeding device for chipping machine, the combination with a trough-like feeding hopper, of a rockable frame overhanging said hopper, driven feed rollers journaled in said frame at different elevations above the bottom of said hopper, an extension movably carried by the forward end of said frame, a series of fingers independently pivoted in said extension, means limiting the lifting of said fingers, and means for yieldingly holding the forward end of said extension relatively to the bottom of said hopper, whereby to cause said fingers to hold the material fed in said hopper firmly in contact with the knives of the chipping machine.

7. In a feeding device for chipping machine, the combination with a trough-like feeding hopper, of a rockable counter-balanced frame overhanging said hopper, driven feed rollers journaled in said frame at different elevations above the bottom of said hopper, an extension movably carried by the forward end of said frame, a series of fingers independently pivoted in said extension, means limiting the lifting of said fingers, and means for yieldingly holding the forward end of said extension relatively to the bottom of said hopper, whereby to cause said fingers to hold the material fed in said hopper firmly in contact with the knives of the chipping machine.

8. In a feeding device for chipping machine, the combination with a trough-like feeding hopper, of a rockable frame overhanging said hopper, driven feed rollers journaled in said frame at different elevations above the bottom of said hopper, an extension movably carried by the forward end of said frame, a series of fingers independently pivoted in said extension, means limiting the lifting of said fingers, means for yieldingly holding the forward end of said extension relatively to the bottom of said hopper, whereby to cause said fingers to hold the material fed in said hopper firmly in contact with the knives of the chipping machine, and means for raising the forward end of said pivoted frame to disengage the fingers from said material.

9. In a feeding device for chipping machine, the combination with a trough-like feeding hopper, of a rockable frame overhanging said hopper, driven feed rollers journaled in said frame at different elevations above the bottom of said hopper, an extension movably carried by the forward end of said frame, a series of fingers independently pivoted in said extension, means limiting the lifting of said fingers, means for yieldingly holding the forward end of said extension relatively to the bottom of said hopper, whereby to cause said fingers to hold the material fed in said hopper firmly in contact with the knives of the chipping machine, and power operated means for raising the forward end of said pivoted frame to disengage the fingers from said material and means to prevent the too sudden release of said frame after having been raised.

10. In a feeding device for chipping machine, the combination with a trough-like feeding hopper, of a rockable counter-balanced frame overhanging said hopper, driven feed rollers journaled in said frame at different elevations above the bottom of said hopper, an extension movably carried by the forward end of said frame, a series of fingers independently pivoted in said extension, means limiting the lifting of said fingers, and a counter-weighted lever arm holding the forward end of said extension relatively to the bottom of said hopper, whereby to cause said fingers to hold the material fed in said hopper firmly in contact with the knives of the chipping machine.

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