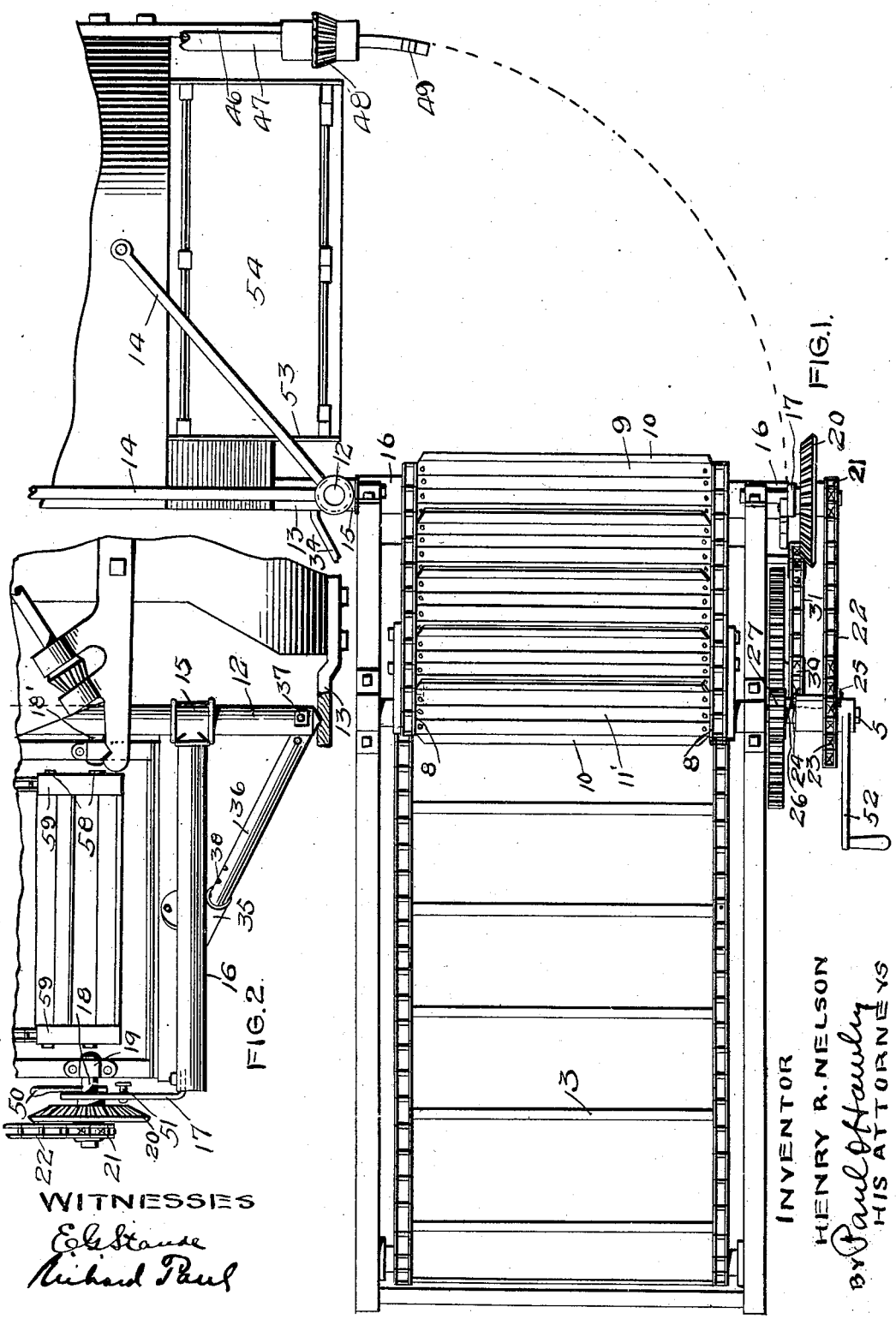
No. 648,777. Patented May 1, 1900.

H. R. NELSON.

STOKER FOR STRAW BURNING FURNACES.

(Application filed Dec. 16, 1899.)

(No Model.) 3 Sheets—Sheet 1.



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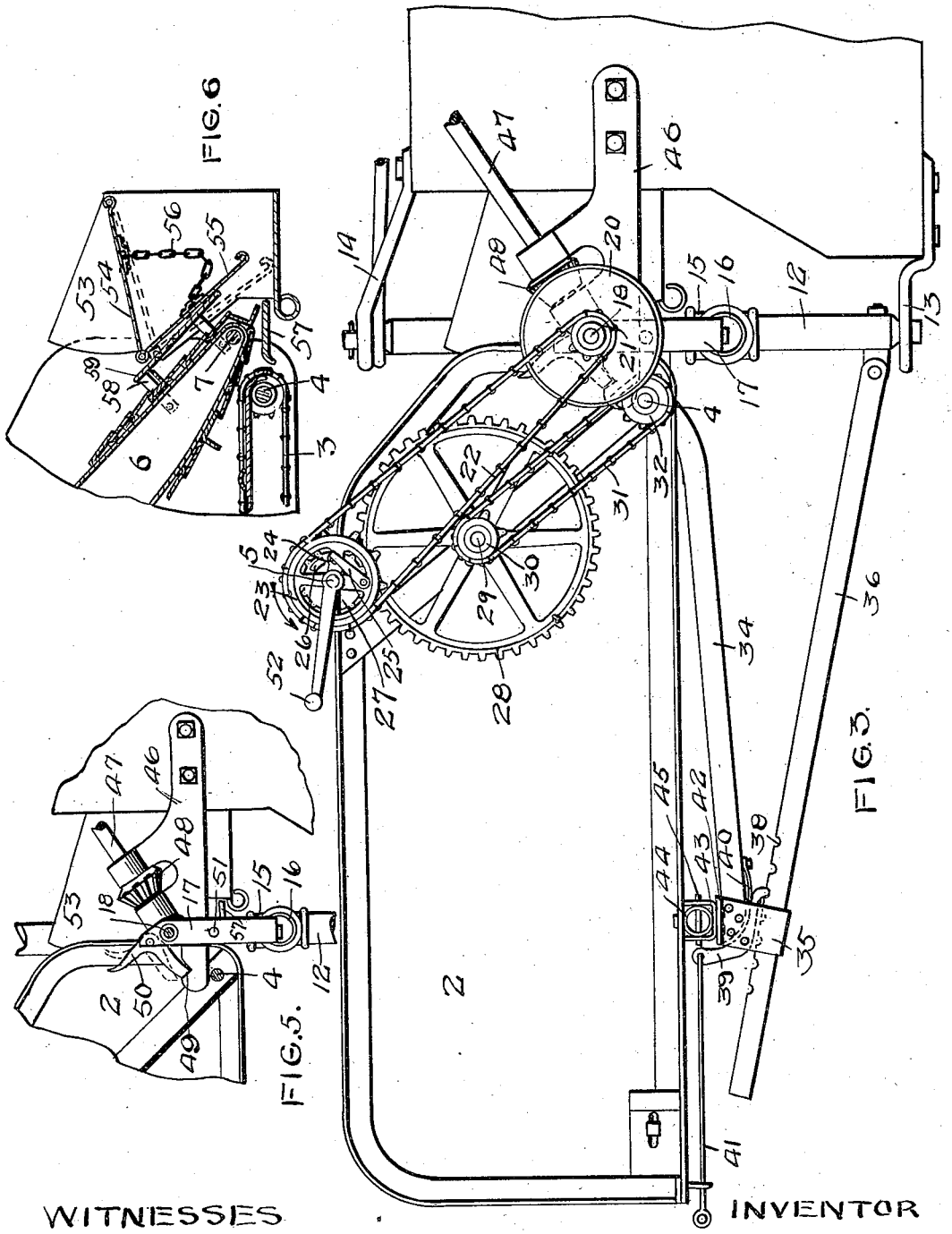

FIG. 6.

FIG. 5.

FIG. 3.

WITNESSES

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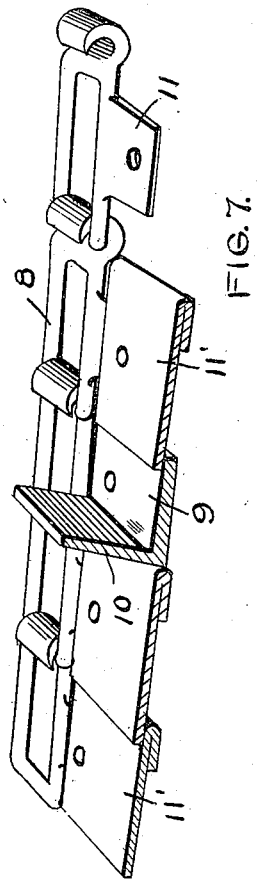

FIG. 7.

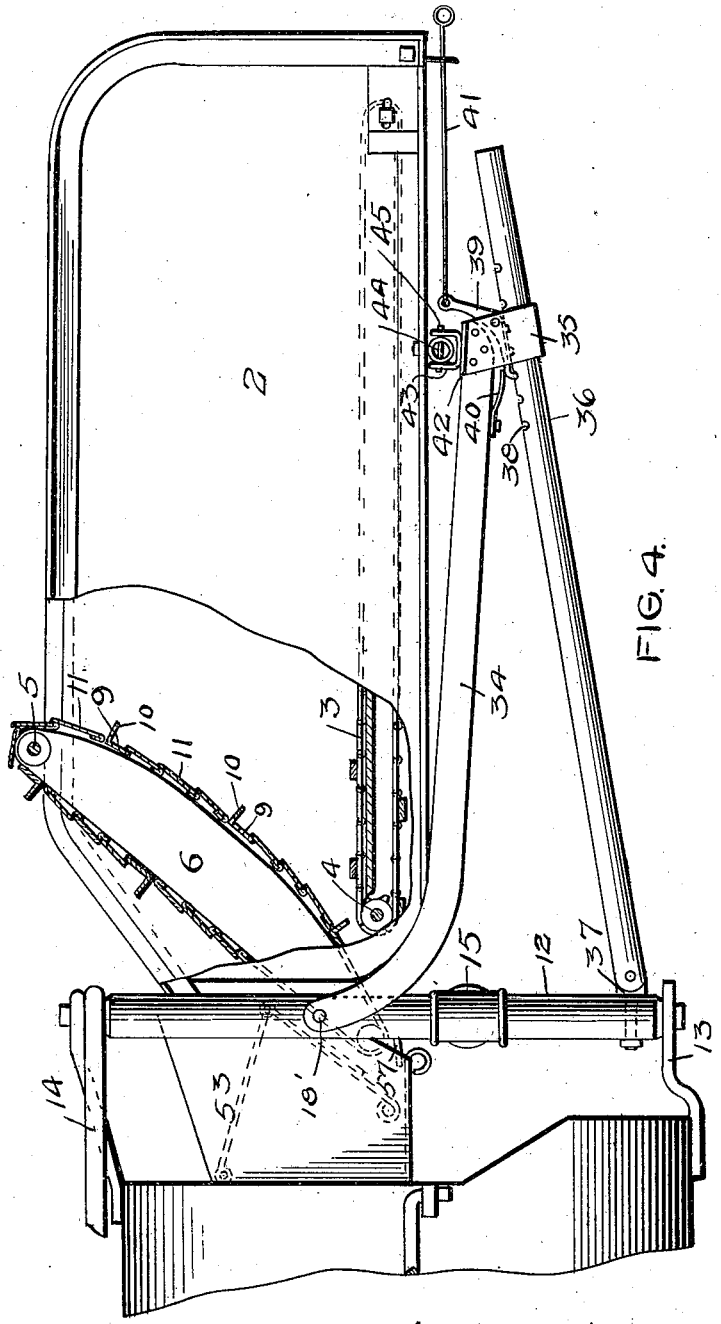

FIG. 4.

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HENRY R. NELSON, OF GALES, MINNESOTA.

STOKER FOR STRAW-BURNING FURNACES.

SPECIFICATION forming part of Letters Patent No. 648,777, dated May 1, 1900.

Application filed December 16, 1899. Serial No. 740,507. (No model.)

To all whom it may concern:

Be it known that I, HENRY R. NELSON, of Gales, Redwood county, Minnesota, have invented certain new and useful Improvements in Stokers for Straw-Burning Furnaces, of which the following is a specification.

The invention relates to mechanical means driven from an engine or other suitable source of power or by hand, if preferred, for feeding fuel into the fire-box of a furnace or boiler and designed especially for use in connection with straw-burners, and hence particularly adapted as an attachment for threshing-engines.

The object of the invention is to improve the mechanism shown and described in Letters Patent of the United States for a similar device, No. 618,717, granted to me January 31, 1899.

The invention consists generally in providing supporting means which will permit the feeding mechanism to be moved away from the front of the fire-box to permit access thereto.

Further, the invention consists in providing an improved floating feed mechanism, between the slats of which the straw cannot catch or lodge.

Further, the invention consists in an improved driving mechanism.

Further, the invention consists in an improved fire box, chute, or hopper for use in connection with the feed mechanism.

Further, the invention consists in various constructions and combinations, all as hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view showing the feed mechanism swung to one side away from the front of the fire-box. Fig. 2 is an end view of the same. Fig. 3 is a side elevation showing the feed mechanism in position for operation. Fig. 4 is a similar view looking at the opposite side of the casing. Fig. 5 is a detail of the mechanism for locking the casing when the feed mechanism is in position for operation. Fig. 6 is a detail sectional view of the fire box, chute, or hopper and the floating feed. Fig. 7 is a detail showing the construction of the floating feed.

In the drawings, 2 represents a casing or frame wherein a horizontal slatted straw-conveyer 3 is arranged, driven from a shaft 4 substantially in the manner shown and described in my patent referred to above, and in the upper part of said casing I arrange a shaft 5, whereon the preferably sheet-metal frame 6 of the floating feed is supported. This frame is inclined toward the fire-box and supports a shaft 7 at its lower end. Chains 8 are arranged to pass over sprocket-wheels on said shafts 5 and 7 and are connected by plates 9, having outwardly-turned flanges 10, said plates being secured to lugs 11 on said chains by rivets or in any other suitable way. These plates are arranged at intervals on the floating feed, and the flanges 10, engaging the straw, forces it forward into the fire chute or hopper. To prevent the straw from catching and working in under the edges of said plate, I prefer to fill the spaces between them with a series of thin overlapping plates 11′, secured at their ends to the chains in the same manner as the plates 9 and forming therewith a close floor on which the straw cannot lodge.

It is frequently desirable to obtain access to the fire-box either for the purpose of repair or for feeding fuel thereto by hand, and I therefore prefer to support the casing wherein the feed mechanism is arranged so that it may be moved or swung to one side, and with this end in view I provide an upright post or standard 12, pivotally supported on brackets or braces 13 and 14 on the rear of the engine and provided near its lower end with a T 15, to which a horizontal support 16 is secured. The post 12 and the support 16 are both preferably of gas-pipe to insure strength and rigidity to the frame, while not materially increasing its weight. At the outer end of the pipe 16 is securely bolted an upright standard 17, provided near its upper end with a horizontal stud 18, the inner end of which is loosely attached by a clip 19 to the inner end of the casing 2 and supports one side of the same, while the opposite side is supported by a stud 18″, attached to the casing in a similar manner and projecting through and secured within a hole or socket in the post 12. The casing and feed mechanism supported thereon thus have a lateral swinging movement on the upright post and a similar vertical movement on the studs 18 and 18″ to

permit the operator to adjust the apparatus to the desired angle with respect to the fire-chute or to swing it to one side away from the front of the fire-box when it is desired to obtain access thereto. The outer end of the stud 18 projects beyond the standard 17 and carries a beveled gear-wheel 20, on the hub of which is a sprocket-wheel 21. A chain 22 passes over the sprocket 21 to a sprocket 23, loosely arranged on the shaft 5 and having a pin 24 slidable in a socket in its hub parallel with its shaft and normally pressed in by a spring 25 to engage a lug 26, provided on the pinion 27, secured on said shaft. This lug is provided on one side with a beveled face, which permits the pin to slide over it without operating the feed mechanism when the sprocket 23 is driven in one direction, as when the engine is reversed; but when operated in the other direction the pin 24 will engage the square face of the lug and drive the shaft 5 and the pinion 27 thereon. Beneath and meshing with the pinion 27 is a large gear-wheel 28, supported on a stub-shaft 29 on the casing 2, and a sprocket-wheel 30 is also secured on said shaft, over which a chain 31 passes to a sprocket 32 on the shaft 4 of the straw-conveyer. From this construction it will appear that when the sprocket 23 is revolved in the direction of the arrow, Fig. 3, it will be locked, the floating feed device supported on the same shaft will be operated, and the straw-conveyer, through the medium of the gear 28 and its connections, will be set in motion to advance the straw into position to be engaged by the floating feed. The outer end of the casing is supported on an arm 34, having an upwardly-curved inner end, pivoted, preferably, on the stud 18″, its outer end projecting beneath and beyond the center of the casing and provided with a bracket 35, having a socket to receive a brace 36, that is pivotally connected to an eyebolt 37 at the lower end of the post. The brace 36 is provided with a series of notches 38 to be engaged by a dog 39, pivoted on the bracket 35 and held in engagement with said brace by a spring 40 on the bar 34 and connected to a rod 41, by means of which the dog may be operated to disengage it from the notch and permit the outer end of the casing to be raised or lowered. The bracket 35 is also provided with a lip or flange 42, to which is secured a U-shaped clip 43, wherein a cross-support 44 is pivoted on a pin 45 and having its ends bolted to the casing, both said support and said brace being preferably of gas-pipe.

The feed mechanism is preferably operated from the engine, and I therefore provide a bracket 46 on the rear of the engine and having bearings wherein a shaft 47, provided with a beveled pinion 48, is mounted, said shaft being connected in any suitable manner with the driving mechanism of the engine. The pinion 48 is in position to engage the teeth of the beveled gear 20 when the feed mechanism is swung around in front of the fire-box, and in order that it may be locked in that position I provide a notch 49 in the bracket 46 to be engaged by a dog 50, pivoted on the standard 17, which also carries a pin 51 to engage and serve as a guide for the lower edge of the bracket 46. I prefer also to provide a crank 52 on the shaft 5, by means of which the mechanism may be operated by hand when desired. In front of the fire-box I arrange the fire chute or hopper 53, preferably the full width of the box and having a double hinged door composed of plates 54 and 55, the former having its inner edge hinged to the chute and its outer to the plate 55, and a chain 56, connecting said plates, prevents the lower from swinging out away from the chute. Between the chute and the casing I arrange a feed-plate 57, over which the straw is shoved by the floating feed, and on the frame of said feed are standards 58, whereon a plate 59 is arranged, upon which the double door is supported and slides as the feed forces the straw into the chute, raising to allow a bunch of straw to pass in and dropping back when only a small quantity is presented, thus accommodating itself to the volume of the feed and preventing cold air from passing into the fire-box. When the feed mechanism is swung to one side, the door will drop down to the position indicated by dotted lines in Fig. 6, completely closing the front of the chute and excluding air from the fire.

The device being in the position shown in Fig. 3 of the drawings, the engine is started, driving the pinion 48 and the gears connected therewith, setting the straw-carrier in motion to advance the straw toward the fire-chute, and operating the floating feed to engage the straw as it is delivered upon the feed-plate and advance it through the chute into the fire-box. It will be noted that as the straw passes over the feed-plate the lower end of the floating feed will be raised by it, carrying the double door, which will rise and fall on its hinges and accommodate itself to the different positions of the floating feed. When the engine is reversed, the sprocket 23 will turn on its shaft, the pin on its hub sliding over the beveled surface of the lug 26 and permitting the pinion 48 and the gear meshing therewith to be driven backward without operating the straw-carrier or the floating feed. Should the operator desire to obtain access to the fire-box for the purpose of repairs or for feeding fuel thereto by hand, by tripping the dog 50 the entire feed mechanism may be swung around to one side away from the front of the fire-box.

In various ways the mechanism of the device that I have herein shown and described may be modified by any one skilled in the art, and I therefore do not wish to be confined to the details of construction which I have herein set forth.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with a furnace or boiler, of a laterally and vertically swinging

casing supported in front of the fuel-door opening, a straw-conveyer mounted in said casing, a floating feed also mounted in said casing, and means for operating said conveyer and feed, substantially as described.

2. The combination, with a threshing-machine engine, of a laterally-swinging casing thereon over the fuel-door opening, a straw-conveyer mounted in said casing, a floating feed, gears mounted in said casing and operatively connected with said conveyer and said feed, and a gear provided on the engine and driven thereby and adapted to engage one of the gears on said casing when it is in position before the fuel-door opening, whereby said conveyer and feed are operated, substantially as described.

3. The combination, with a threshing-machine engine, of a laterally and vertically swinging casing supported thereon over the fuel-door opening, a straw-conveyer carried by said casing, a floating feed also carried by said casing, a gear mechanism mounted in said casing and operatively connected with said conveyer and feed, and a gear provided on the engine and driven thereby and adapted to engage the gear mechanism on said casing when it is in its normal position before the fuel-door opening, whereby said conveyer and feed are operated to advance fuel into the fire-box, substantially as described.

4. The combination, with a threshing-machine engine, of a swinging casing supported thereon at one side of the fire-box, a feed mechanism supported by said casing, a gear mechanism mounted in said casing, and operatively connected with said feed mechanism and a gear mounted in bearings on said engine and driven thereby, and adapted to engage said gear mechanism when the feed mechanism is in position to advance fuel into said fire-box, substantially as described.

5. The combination, with a threshing-engine, of a swinging casing supported therein in front of the fuel-door opening, a feed mechanism mounted in said casing and means driven by said engine to engage and operate said feed mechanism when it is in position to advance fuel into the fire-box of said engine, substantially as described.

6. The combination, with a straw-burning furnace or boiler, of a swinging frame supported thereon, a casing pivotally supported on said frame and having a lateral swinging movement with said frame and a similar vertical movement on its pivots, a feed mechanism provided within said casing, means for driving said feed mechanism to advance fuel into the fire-box.

7. The combination, with a straw-burning furnace or boiler, of a swinging frame pivotally supported thereon, a casing carried by said frame, a feed mechanism provided within said casing, means for driving said feed mechanism to advance fuel into the furnace or boiler, and means for adjusting the vertical angle or pitch of said feed mechanism with respect to said furnace or boiler, substantially as described.

8. The combination, with a straw-burning furnace or boiler, of a frame pivotally supported thereon, a feed mechanism carried by said frame, means for driving said feed mechanism, means for locking said feed mechanism in position before the fire-box, and means for raising or lowering its outer end to permit the angle with respect to the fire-box to be changed at will, substantially as described.

9. The combination, with a threshing-engine, of a swinging frame supported thereon at one side of the fire-box, a feed mechanism carried by said frame, gears supported on said frame and connected with said feed mechanism, a gear mounted in bearings on said engine in position to engage a gear on said frame when the feed mechanism is in position to advance fuel into the fire-box of the engine, and means for locking said engine-gear in engagement with the gear of said feed mechanism, substantially as described.

10. The combination, with a threshing-engine, of a swinging frame supported thereon, a feed mechanism carried by said frame, the gears also carried by said frame and wherefrom said feed mechanism is operated, a shaft mounted in bearings on said engine, a pinion thereon to engage the gear of said feed mechanism, a notched arm or bracket provided on said engine, and a locking-dog supported on said swinging frame in position to enter said notch and lock the gear of said feed mechanism in engagement with the pinion on said engine, substantially as described.

11. In a device of the class described, the combination, with an upright post, of a casing pivotally supported thereon, a brace pivotally connected to said post and having a series of notches, a bracket having a socket wherein said brace is slidable, a spring-actuated dog pivoted on said bracket in position to engage said notches, and means for tripping said dog to permit said brace to slide in its socket and the outer end of said casing to be raised or lowered, substantially as described.

12. In a device of the class described, the combination, with an upright post having a lateral extension, of a casing pivotally supported upon said post and said extension, a bar also pivoted on said post and extending beneath said casing, a bracket carried by said bar, a brace pivotally connected to the lower end of said post and slidable in a socket in said bracket, and means for adjusting said brace within said socket, whereby the outer end of said casing is rendered vertically adjustable.

13. In a device of the class described, a floating feed provided with a series of angle-plates arranged at intervals, and overlapping plates filling the spaces between said angle-plates, for the purpose specified.

14. In a device of the class described, a floating feed having sprocket-chains provid-

ed with lugs or ears, a series of transverse angle-plates secured to lugs at intervals upon said chains, and a series of overlapping plates filling the spaces between said angle-plates and secured to the lugs between the same, substantially as described.

15. In a device of the class described, a floating feed, comprising belts and means arranged at intervals on said belts and engaging the straw to advance the same into the fire-box, and overlapping plates provided on said belts and filling the spaces between said engaging means, substantially as described.

16. The combination, with a threshing-engine, of a laterally-swinging casing supported thereon in front of the fuel-door opening, a feed mechanism mounted in said casing, means upon said engine and driven thereby to engage and operate said feed mechanism when it is in position to advance fuel into the fire-box, and a locking device to prevent the accidental disengagement of said operating means and said feed mechanism, substantially as described.

17. In a device of the class described, the combination, with a floating feed-frame, of a fire-chute, a double hinged door provided thereon, a plate carried by the frame of said feed and whereon the lower leaf or portion of said door is supported when the device is in use, substantially as described.

In witness whereof I have hereunto set my hand this 11th day of December, 1899.

HENRY R. NELSON.

In presence of—
N. O. PETERSON,
G. H. JESSUP.