No. 773,240. PATENTED OCT. 25, 1904.

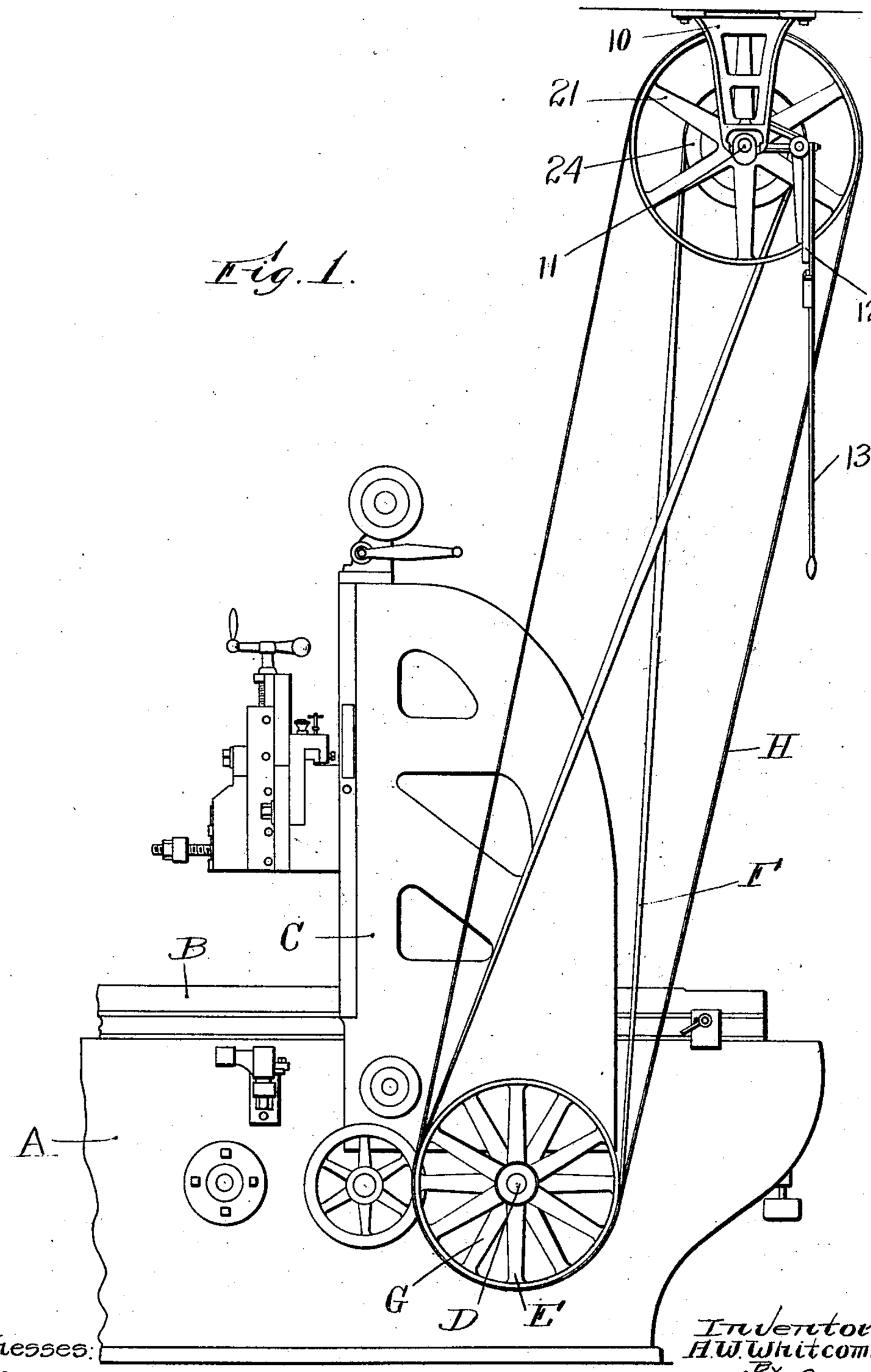
A. W. WHITCOMB.

DRIVING CONNECTION FOR METAL PLANING MACHINES.

APPLICATION FILED JUNE 9, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.



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NO MODEL. 3 SHEETS—SHEET 2.

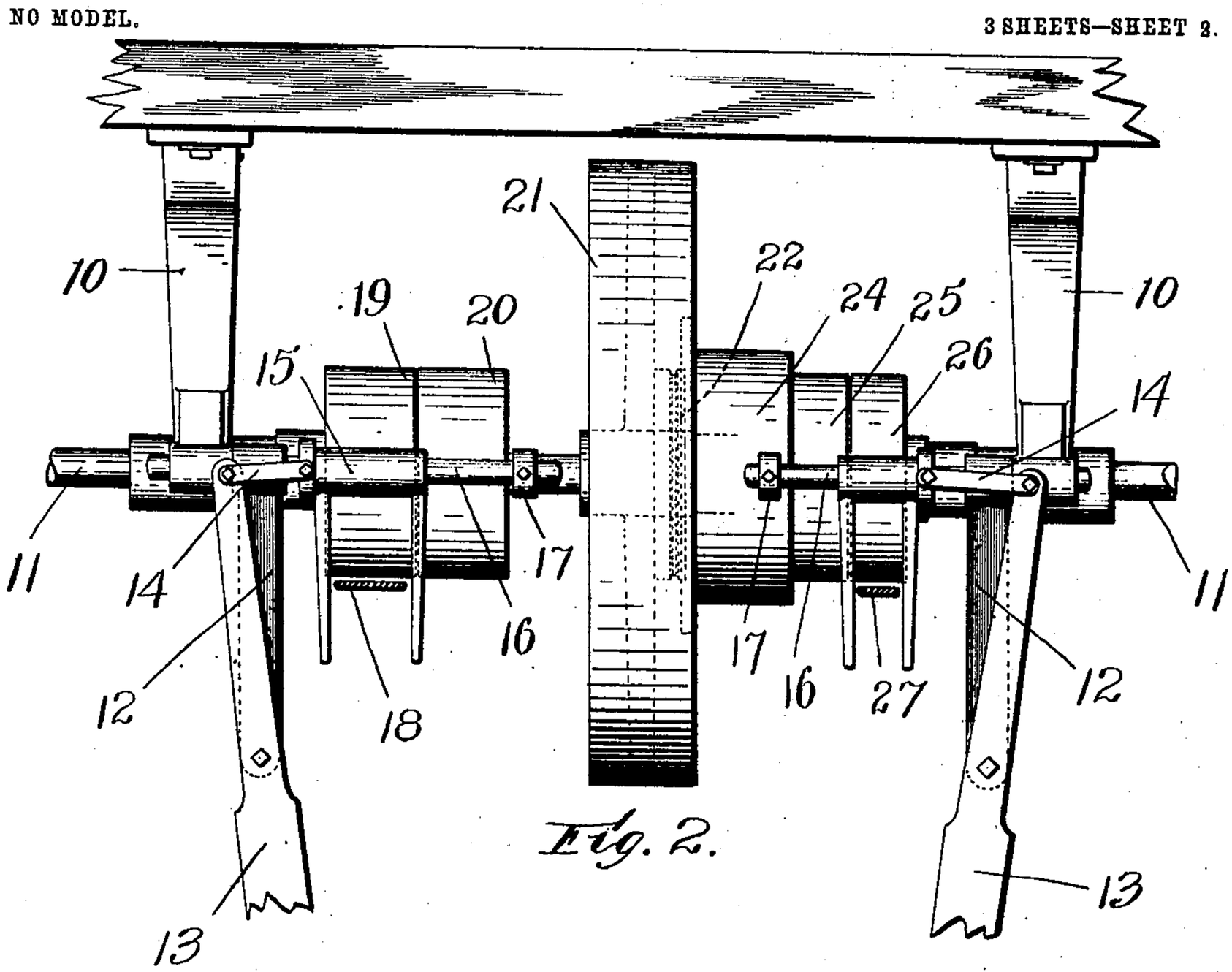

Fig. 2.

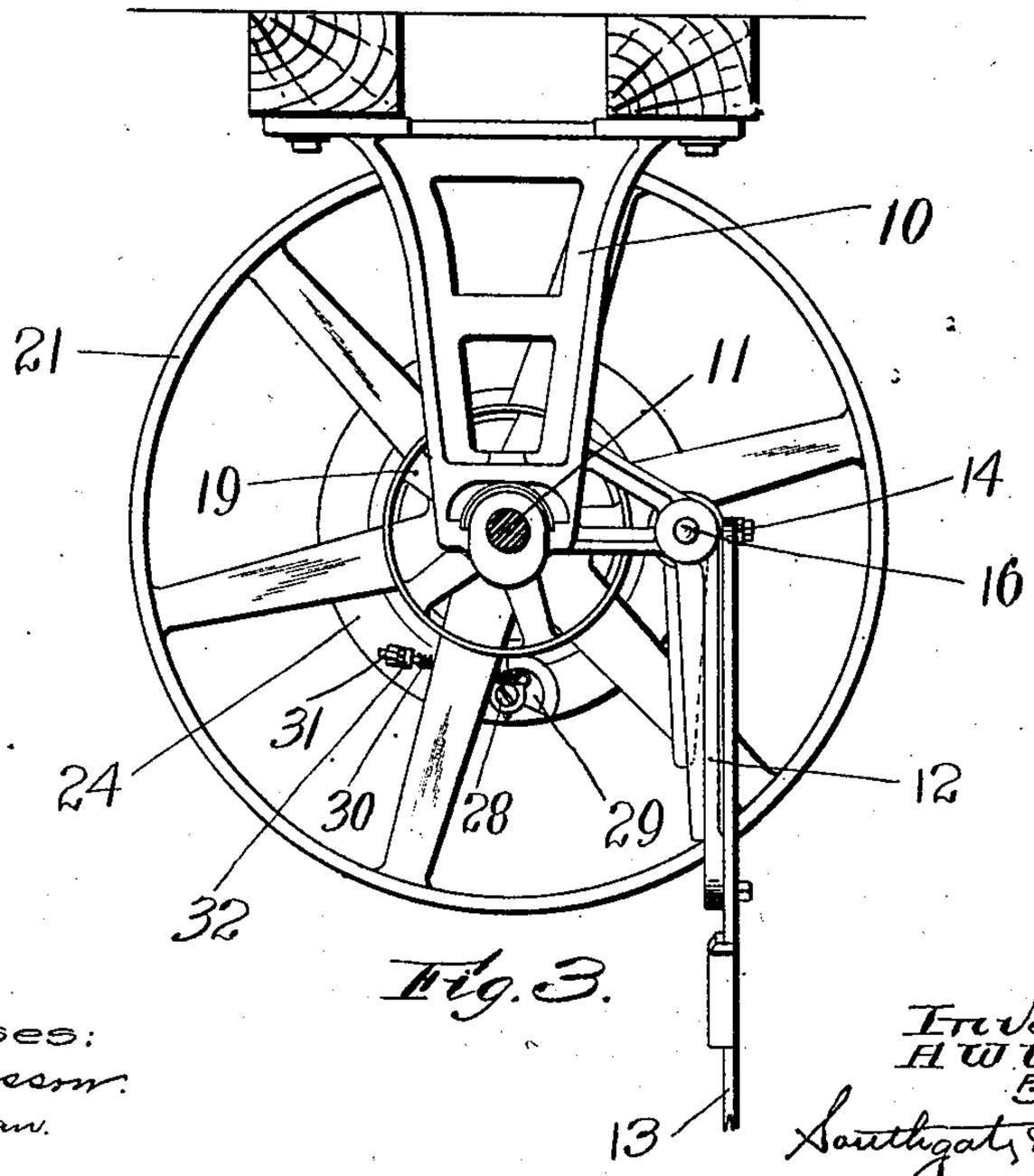

Fig. 3.

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NO MODEL. 3 SHEETS—SHEET 3.

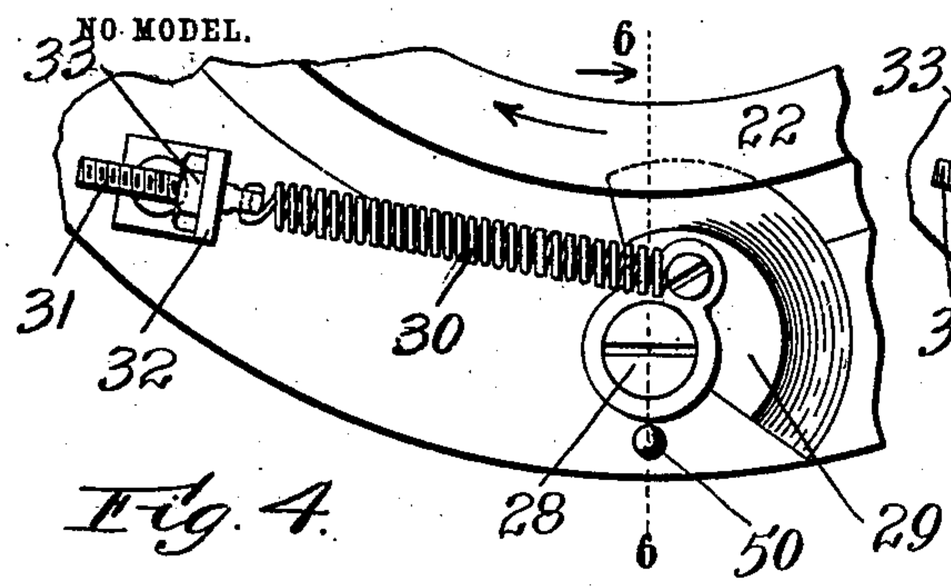

Fig. 4.

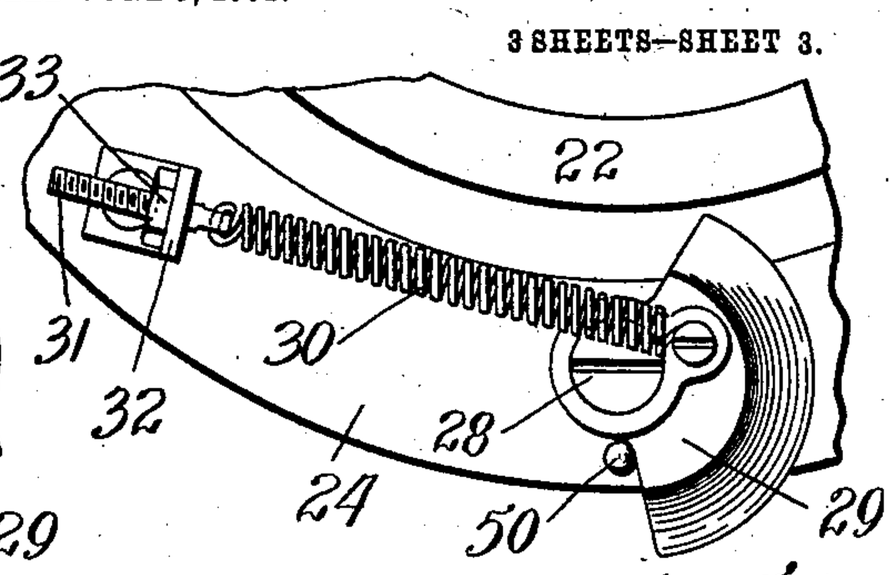

Fig. 5.

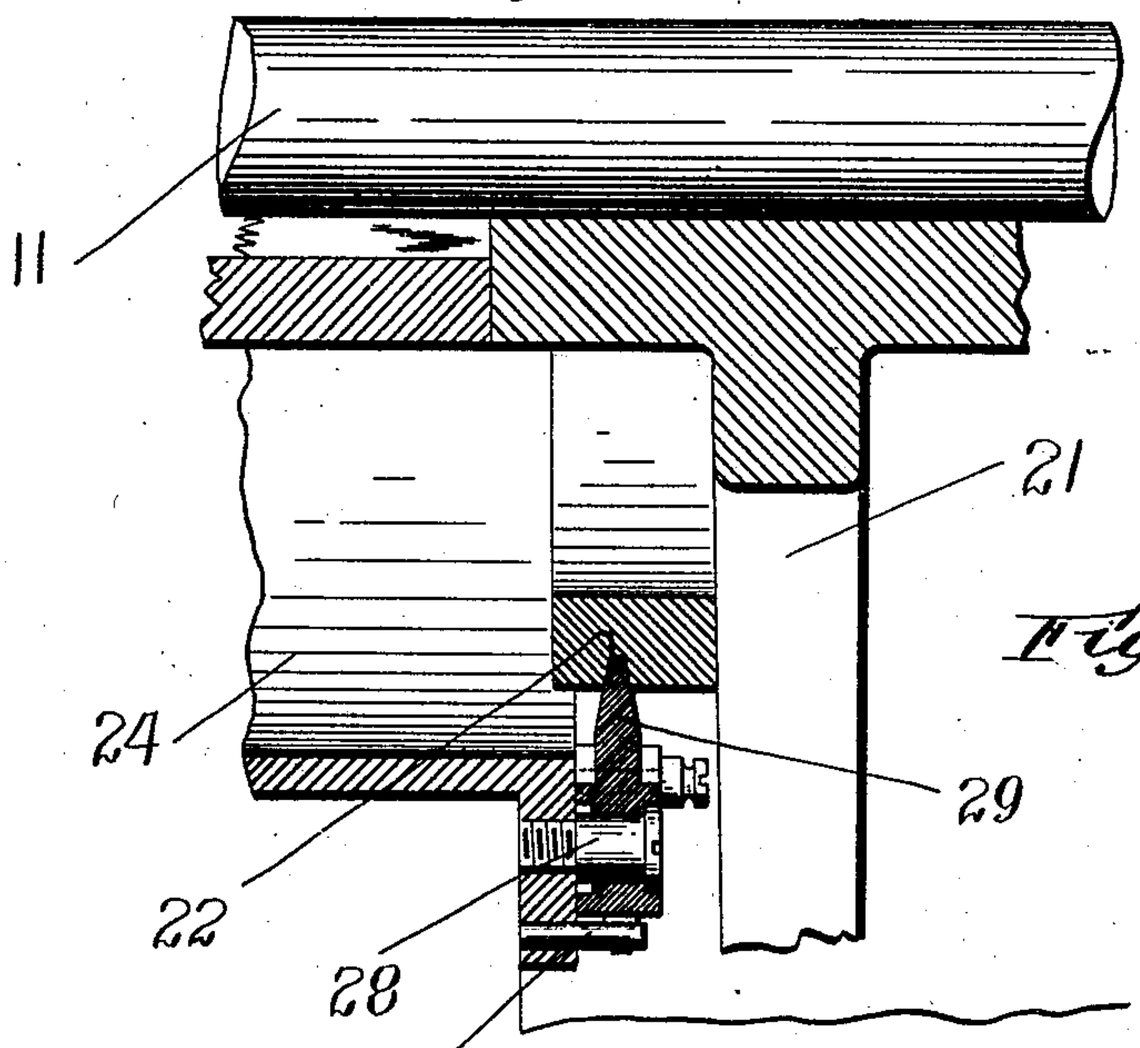

Fig. 6.

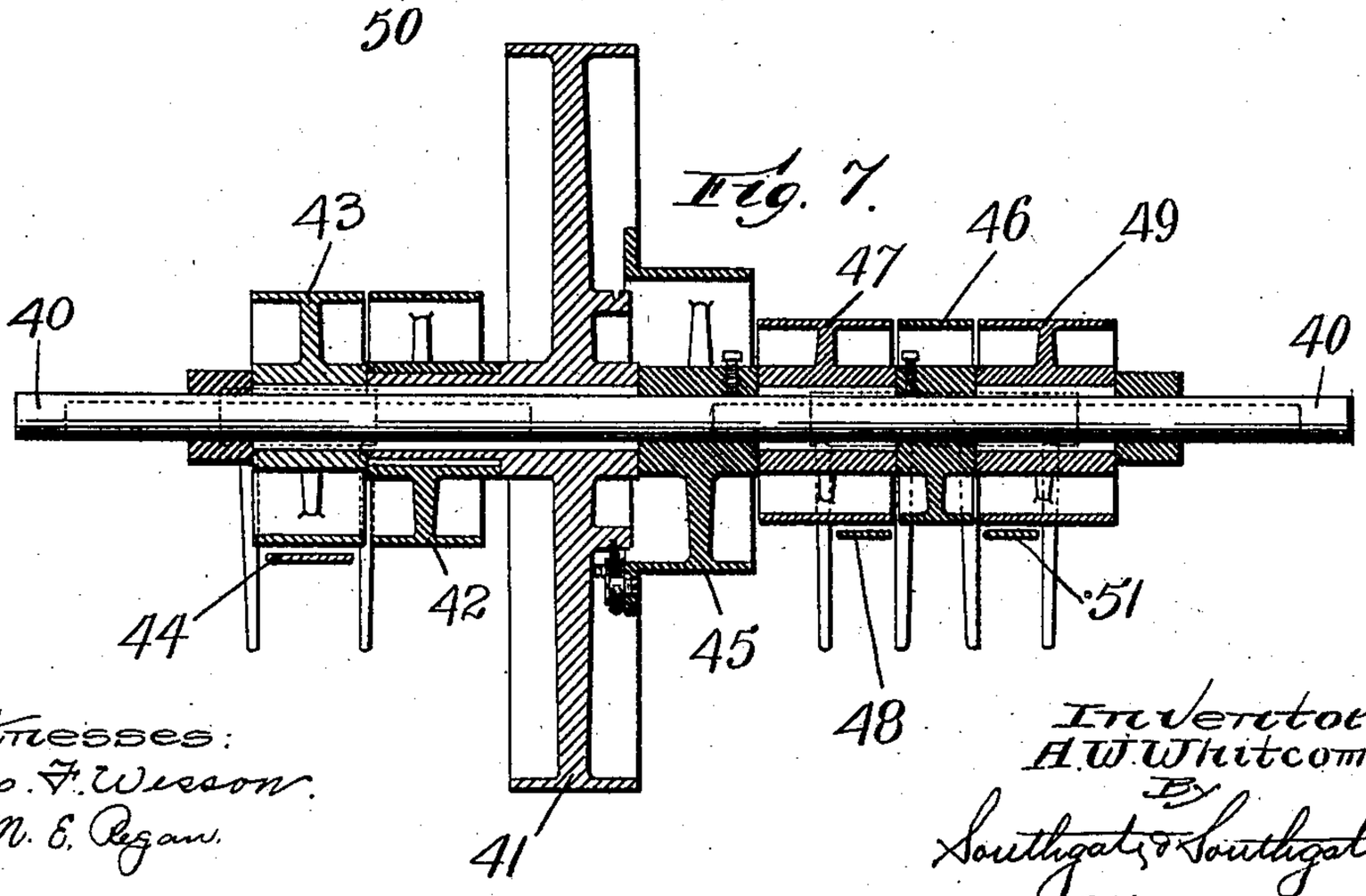

Fig. 7.

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No. 773,240. Patented October 25, 1904.

UNITED STATES PATENT OFFICE.

ALONZO W. WHITCOMB, OF WORCESTER, MASSACHUSETTS.

DRIVING CONNECTION FOR METAL-PLANING MACHINES.

SPECIFICATION forming part of Letters Patent No. 773,240, dated October 25, 1904.

Application filed June 9, 1902. Serial No. 110,742. (No model.)

To all whom it may concern:

Be it known that I, ALONZO W. WHITCOMB, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Driving Connection for Metal-Planing Machines, of which the following is a specification.

This invention relates to a driving mechanism for operating a metal-planing machine.

The especial object of this invention is to provide strong, simple, and efficient driving connections which will increase the range of speed at which a metal-planing machine may be operated on its cutting strokes without changing the speed of the return strokes.

To these ends this invention consists of the driving connections for a metal-planing machine and of the combinations of parts therewith, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

In the accompanying three sheets of drawings, Figure 1 is a side view, partially broken away, of a metal-planing machine provided with driving connections constructed according to this invention. Fig. 2 is an enlarged side view of the counter-shaft and parts carried thereby. Fig. 3 is an end view thereof. Fig. 4 is a detail view of the frictional ratchet connection between the pulley which is belted to drive the planer on its return stroke and the pulley which is belted to drive the planer on its cutting stroke. Fig. 5 is a similar view illustrating the parts in a different relative position. Fig. 6 is a fragmentary sectional view taken on the line 6 6 of Fig. 4, the spring being omitted; and Fig. 7 is a sectional view illustrating a modified form of construction for obtaining a greater range of speed adjustment.

In operating that class of planing-machines to which this invention relates it is now considered the best practice to arrange the driving connections to produce a quick return stroke of the planer-table. In practice the speed of the planer-table during its return stroke is usually as high as the operating connections and gearing of the planer can stand with safety. In all conditions of work on a planing-machine this high-speed return stroke is desirable.

In the actual use of planing-machines which are required to do a considerable variety of work or on which different metals are cut the best results can be produced only when the planer-table can be actuated at different speeds on its cutting stroke. In the driving connections which have heretofore been employed for metal-planing machines it has already been proposed to provide for operating the planers at different speeds; but in most of such constructions the change of the cutting speed of a planing-machine has heretofore involved a corresponding change of return speed.

The especial object of my present invention is to provide a driving mechanism for metal-planing machines which will maintain the return speed of the planer-table at the highest practical limit, while permitting a variation of the cutting speed of the planer-table according to the material which is being worked or the character of the work being performed. To accomplish this object, the driving connections for a metal-planing machine constructed according to this invention comprise a pulley belted to operate the planer-table on its return stroke, a pulley belted to operate the planer-table on its cutting stroke, a special connection between the reversing-pulley and the cutting-stroke pulley for normally causing the cutting-stroke pulley to turn with the reversing-pulley, and means for turning the cutting-stroke pulley at higher speeds when desired, the special connection permitting this to be done without changing the speed of the return-stroke pulley.

Referring to the accompanying drawings for a detail description of the apparatus embodying my invention, as shown in Fig. 1, A designates a planer bed or base; B, the reciprocating table; C, the side frames for supporting the cross-bar and planer-heads; D, the main driving-shaft of the planing-machine; E, a pulley thereon, which in the present instance is driven by an open belt H to operate the planer-table on its return stroke through any of the ordinary connections, and

G a pulley thereon, which in the present instance is operated by a cross-belt F to drive the planer-table on its cutting stroke through any of the ordinary connections.

Referring to Sheets 2 and 3 of the drawings for a detail description of the counter-shaft and connections coöperating therewith for driving the planer-table, as shown in Fig. 2, 10 designates the brackets or shaft-hangers, journaled in which is a counter-shaft 11. Carried by each of the shaft-hangers 10 is a belt-shifting mechanism for shifting one of the driving-belts. These belt-shifters are substantially of the same construction and a description of one of these belt-shifters will be sufficient. As shown, an arm or bracket 12 extends down from each of the shaft-hangers 10, and pivoted on the lower end of the arm 12 is a shifting lever 13, connected by a link 14 to a sliding belt-fork 15, mounted on a rod 16 and held in place thereon by an end stop 17. Controlled by one of these belt-shifters is a main driving-belt 18, normally running on a loose pulley 19 and which can be shifted onto a pulley 20, fastened onto the shaft 11. Also fastened on the shaft 11 is the large return-stroke pulley 21. The return-stroke pulley 21 is provided near its hub with a flange having a V-shaped groove 22 for receiving a friction-dog 29, carried by the pulley 24, which is belted to operate the planer-table on its cutting stroke. The pulley 24 is mounted loosely on the shaft 11 and formed integrally with the pulley 24, or secured thereto is a pulley 25, which may be operated by a supplemental driving-belt 27. The supplemental driving-belt 27 is controlled by the other one of the belt-shifters and normally runs on the loose pulley 26. By means of this construction when the main driving-belt 18 is shifted from its loose pulley onto the tight pulley 20 the counter-shaft 11 will be driven, turning the reversing-pulley 21, which reversing-pulley 21, through the friction pawl-and-ratchet mechanism hereinafter described, will turn the driving-pulley 24, so that the planer-table will be operated on its cutting stroke at one speed and on its return stroke at a higher speed. When it is desired to operate the planer-table at a higher speed on its cutting stroke, the supplemental driving-belt 27 is shifted from its loose pulley 26 onto the pulley 25, so that the high-speed driving-belt 27 will then act to impart a higher speed of rotation to the driving-pulley 24, the pawl connection before referred to permitting this to be done without increasing the speed of the reversing-pulley 21.

The pawl connection which I preferably employ for normally connecting the reversing-pulley 21 with the driving-pulley 24 is most clearly shown in Figs. 4, 5, and 6. A number of different connections may be employed for this purpose; but in practice I preferably provide a friction-pawl mechanism which is adjusted so that when the parts are operated at high speeds the centrifugal force will be sufficient to throw the friction-pawl out from its normal position, so that the same will have no rubbing or retarding action during the high-speed operation. As shown in Fig. 4, a stud 28 is threaded into the flange of the driving-pulley 24, and pivoted on the stud 28 is a pawl 29, having a V-surface which is eccentric to the stud 28. The pawl 29 is normally drawn into engagement with the V-shaped groove 22, before referred to, by a spring 30, connected to a screw 31, which extends through a clip 32 and has an adjusting-nut 33 threaded thereon. The adjusting-nut 33 is preferably turned or set to position so that the tension of the spring 30 will be sufficient to hold the friction-pawl 29 into engagement with its groove during the normal operation of the machine; but the parts are preferably adjusted so that when the speed is increased the centrifugal action will be sufficient to throw the pawl 29 out from its normal position (illustrated in Fig. 4) into engagement with a stop 50, as illustrated in Fig. 5. For example, in practice I have adjusted these parts so that at speeds of less than four hundred revolutions per minute the pawl will be held by its spring in engagement with the V-shaped groove; but when the supplemental driving-belt is brought into action to turn the driving-pulley at higher speeds than four hundred to the minute the pawl will move out to the position illustrated in Fig. 5 and will remain in its thrown-out position so long as the planer is being operated at the high speed, thus preventing any wear, drag, or noise being caused by the friction-pawl.

In many of the ordinary uses for which metal-planing machines are employed a change of two driving speeds for the planer-table will be sufficient for all practical purposes—for example, one cutting speed being employed when cast-iron is being planed and a different cutting speed being employed when steel is being worked. In some cases, however, it may be desirable to secure a still wider range of adjustment, and in Fig. 7 I have illustrated a construction for accomplishing this purpose. As shown in this figure, 40 designates a counter-shaft. Mounted loosely on the counter-shaft 40 is a reversing-pulley 41, and keyed to or otherwise carried by the reversing-pulley 41 is a pulley 42, adapted to receive a main driving-belt 44, which normally runs on the loose pulley 43. Secured rigidly on the counter-shaft 40 at the other side of the reversing-pulley 41 is the driving-pulley 45, which may be connected to the reversing-pulley by substantially the same form of friction-pawl connection which has been already described. Also fastened rigidly onto the counter-shaft 40 is a pulley 46, adapted to receive either one of the higher-speed driving-belts

48 and 51, which belts 48 and 51 normally run on loose pulleys 47 and 49, respectively. By means of this construction when the driving-belt 48 is moved onto the pulley 46 the cutting speed of the planer-table may be increased to one speed, while when the other high-speed driving-belt is moved onto the pulley 46 the cutting speed of the planer-table may be still further increased. This same principle of construction may be carried still further, if desired, by providing additional tight and loose pulleys on the counter-shaft 40, the number of variations of speed which can be secured being limited only by the number of high-speed driving-belts which it is desirable to operate in connection with each counter-shaft of the machine.

In both of the modifications which I have illustrated herein the constructions each comprise a counter-shaft and a sleeve mounted upon the counter-shaft, together with means for causing a transmitting-pulley to be driven from the counter-shaft when one cutting speed is desired and to be driven with the sleeve when a different cutting speed is desired.

In practicing my invention I have usually provided the loose pulleys with bushings of self-lubricating material, so that the counter-shaft equipped according to my invention may be operated for considerable periods without special attention. For example, as illustrated in Fig. 7, the pulleys 41, 43, 47, and 49 are illustrated as provided with special bushings. It is to be understood, however, that such bushings are not essential to practicing my invention and can be omitted when desired.

I am aware that numerous changes may be made in driving connections for metal-planing machines by those who are skilled in the art without departing from the scope of my invention as expressed in the claims. I do not wish, therefore, to be limited to the constructions I have herein shown and described; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. In an apparatus of the class described, the combination of a pulley, a belt extending therefrom to operate the planer-table on its return stroke, a pulley, a belt extending therefrom to operate the planer-table on its cutting stroke, and a connection between said pulleys, comprising a pawl pivoted eccentrically on the cutting-stroke pulley, and a spring normally holding said pawl into engagement with a groove in the reversing-pulley, said parts being adjusted so that the pawl will be thrown out of its groove when the cutting-stroke pulley is turning faster than its normal speed.

2. The combination of a counter-shaft, a tight pulley and a loose pulley mounted thereon, an additional pulley loosely mounted with reference to the counter-shaft, means to rotate this additional pulley at a speed different from the speed of the tight pulley, and means for operatively connecting the additional pulley to the counter-shaft.

3. The combination of counter-shaft, a transmitting-pulley rigidly mounted thereon, a tight pulley to rotate the counter-shaft, a loose pulley for this tight pulley, an additional pulley loosely mounted with reference to the counter-shaft, means to rotate this additional pulley at a speed different from the speed of the tight pulley mentioned and means for operatively connecting the same with the counter-shaft.

4. The combination of a counter-shaft, a tight pulley and a loose pulley mounted thereon, a rigidly-attached transmitting-pulley also mounted on the counter-shaft, a sleeve loosely mounted on the counter-shaft, a pulley tight on this sleeve to rotate the same, such pulley being driven at a speed different from the speed of the tight pulley on the counter-shaft and means for detachably locking the sleeve to the counter-shaft.

5. The combination of a counter-shaft, two driving-pulleys, either one of which may rotate said counter-shaft, one of these pulleys being loosely mounted with reference to the other pulley and rotatable at a speed different therefrom, a third pulley mounted on the shaft to transmit the rotation which the shaft receives from either of the two driving-pulleys mentioned, and means arranged and operating so that the transmitting-pulley is caused to be rotated by either of the two driving-pulleys and to transmit different speeds accordingly.

6. The combination of a counter-shaft, a sleeve loosely carried thereon, a transmitting-pulley on the counter-shaft and a transmitting-pulley on the sleeve, both rigidly mounted, means for rotating each, the counter-shaft and the sleeve at speeds different from each other and mechanism operating in a manner to cause sleeve and counter-shaft to rotate together and at the same speed.

7. The combination of a counter-shaft, a transmitting-pulley rigidly mounted thereon, a sleeve loosely carried on the counter-shaft, a transmitting-pulley rigidly mounted on the sleeve, a driving-pulley for the counter-shaft and a driving-pulley for the sleeve, both of them operating at a speed different from each other, a loose pulley for each, means for shifting the belts of these pulleys and mechanism to operatively connect the sleeve to the counter-shaft to drive the latter from the former, or to disconnect it therefrom.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALONZO W. WHITCOMB.

Witnesses:
PHILIP W. SOUTHGATE,
LOUIS W. SOUTHGATE.