

May 6, 1952

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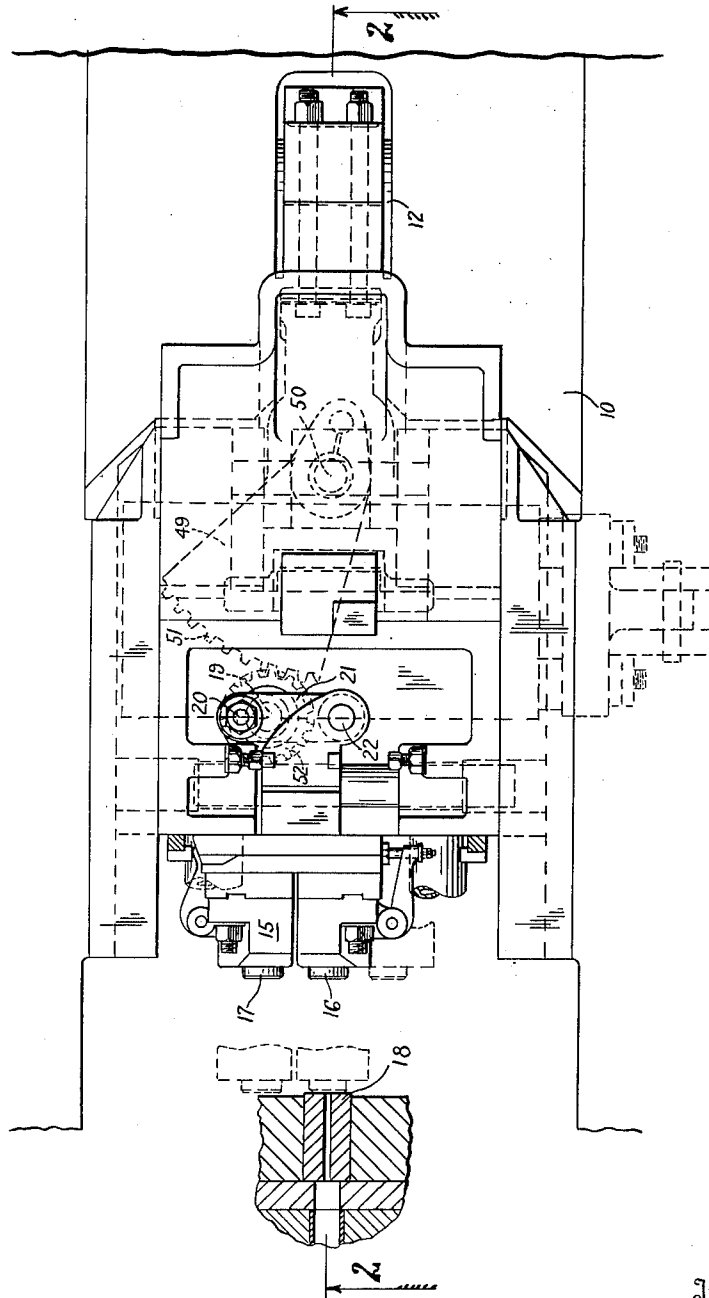
2,595,433

SHAFT DRIVING MECHANISM FOR HEADERS OR LIKE MACHINES

Filed June 18, 1947

4 Sheets-Sheet 1

Fig. 1.



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May 6, 1952

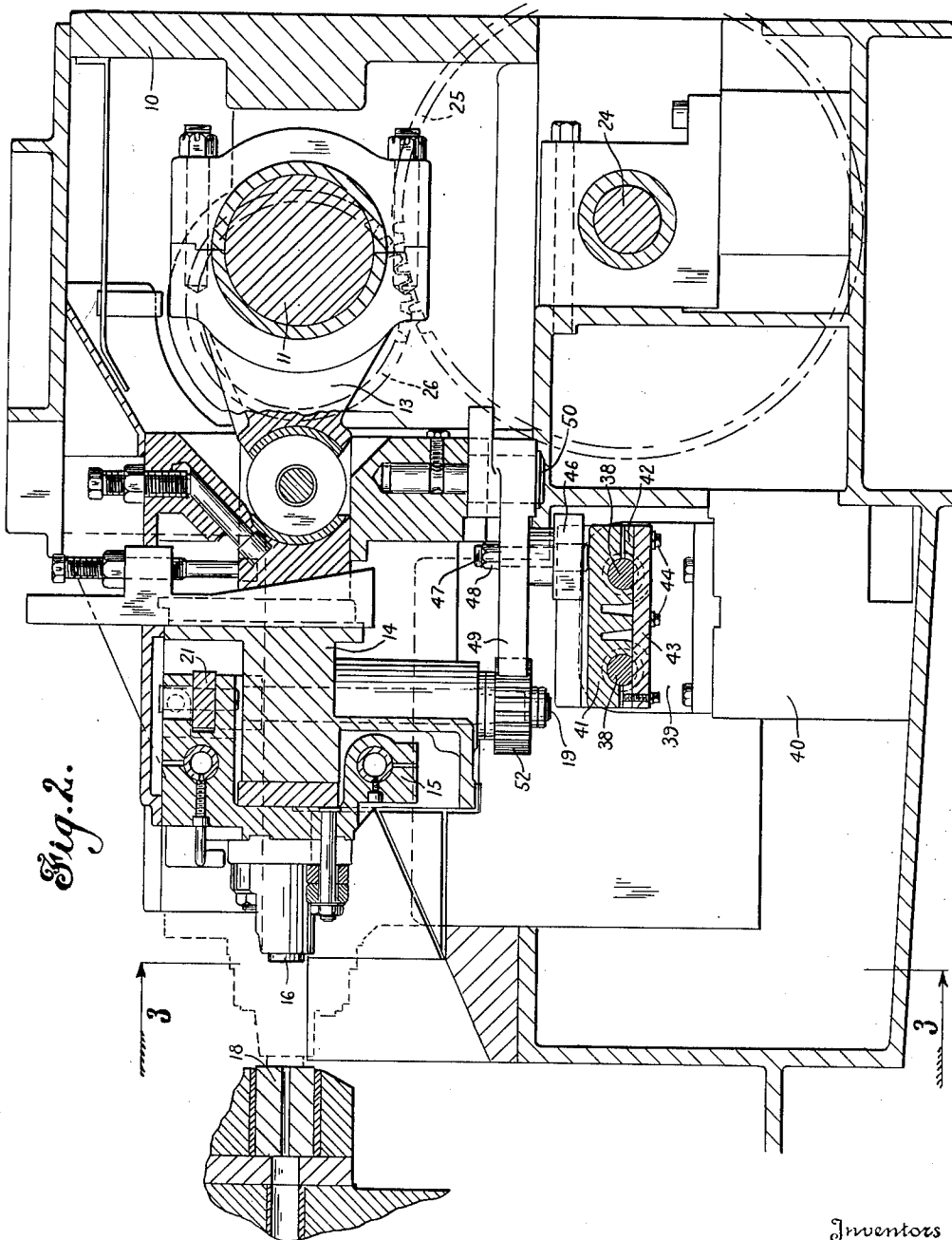
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Filed June 18, 1947

4 Sheets-Sheet 2



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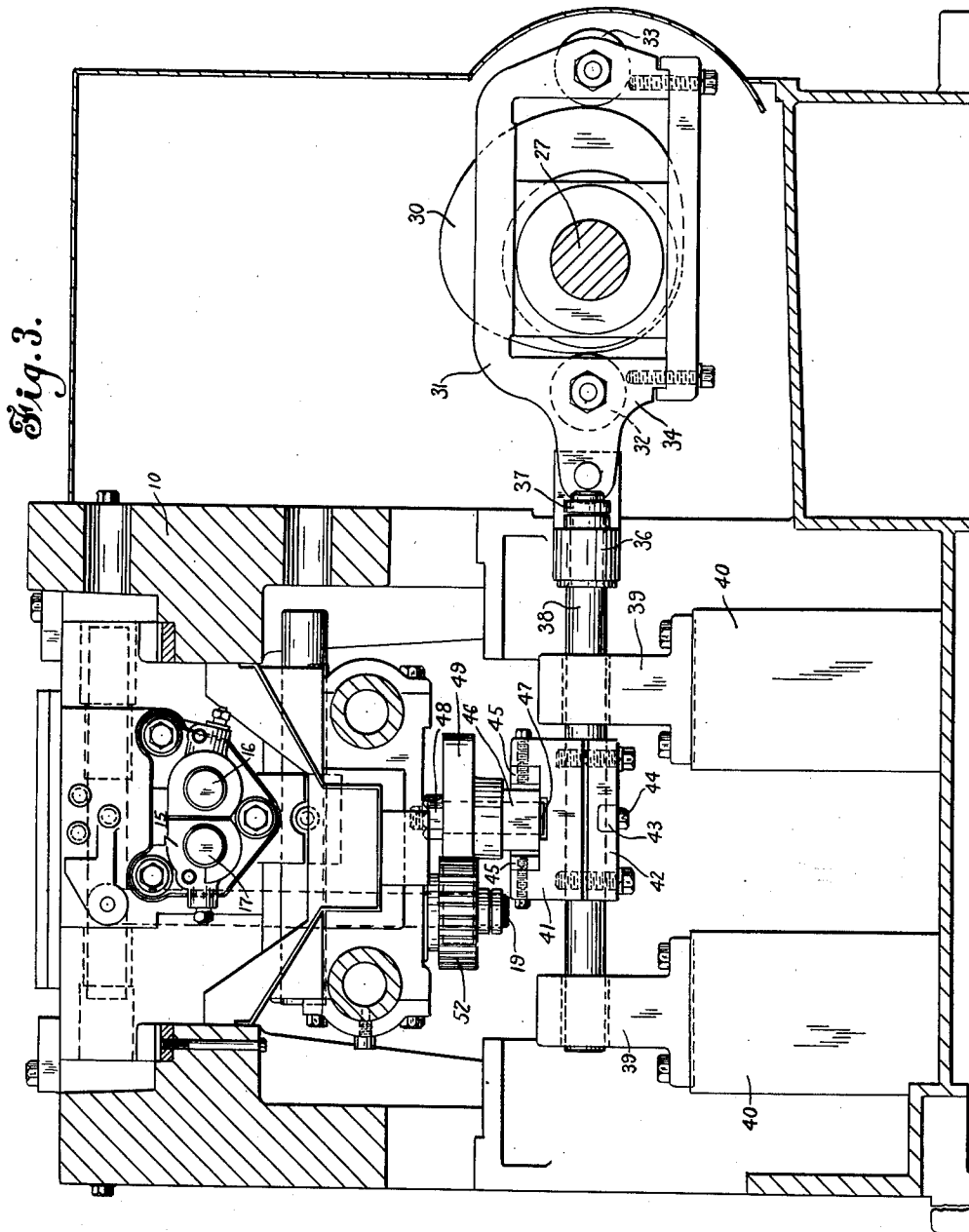
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Filed June 18, 1947

4 Sheets-Sheet 3



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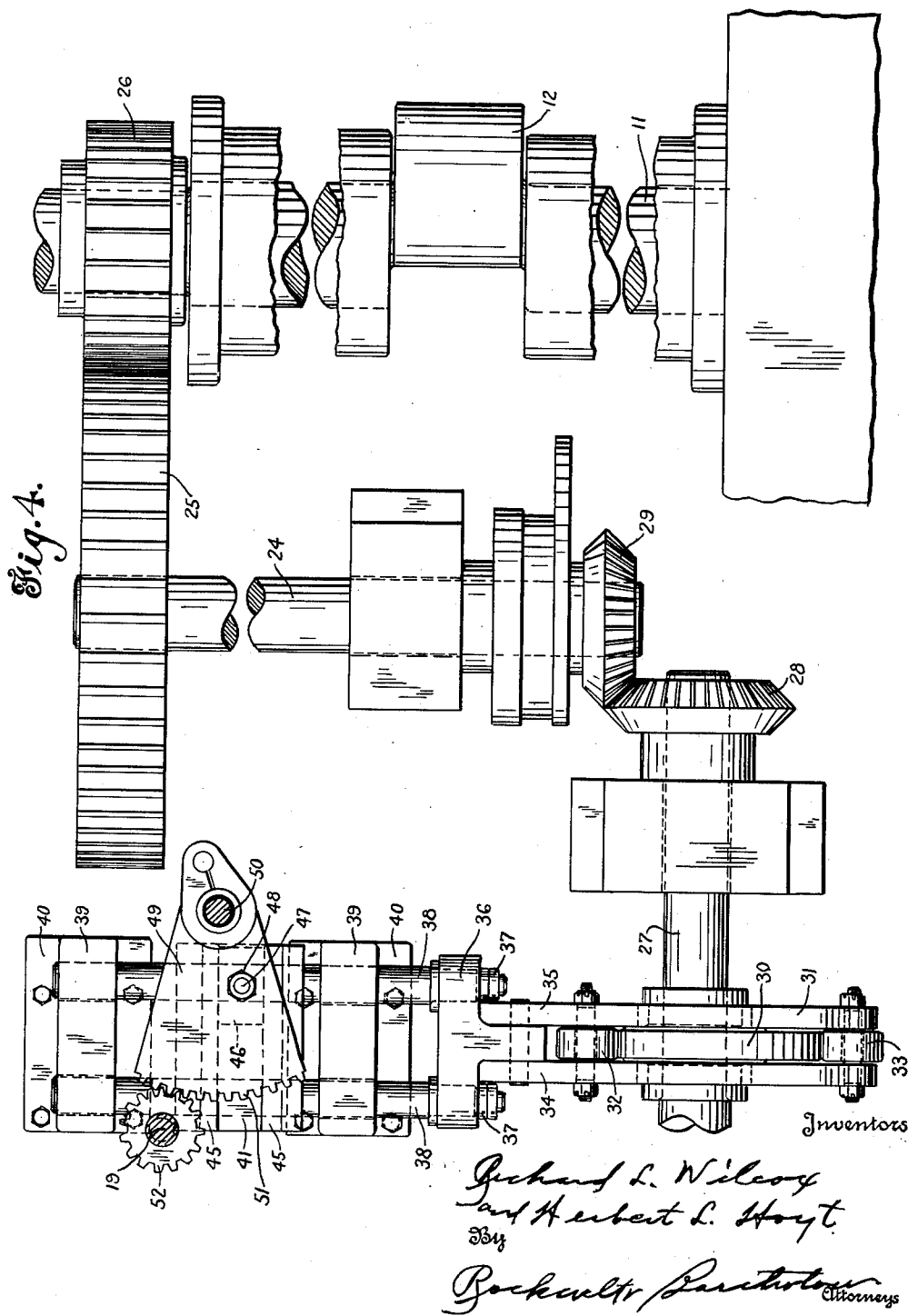
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## UNITED STATES PATENT OFFICE

2,595,433

SHAFT DRIVING MECHANISM FOR HEADERS  
OR LIKE MACHINES

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Application June 18, 1947, Serial No. 755,440

6 Claims. (Cl. 10—12.5)

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This invention relates to shaft driving mechanism for headers or like machines, and more particularly to a machine having a moving or reciprocable gate upon which may be mounted two or more tools or other devices which are required to be shifted or moved during the operation of the gate in order to bring one or another of the tools into registration with a die.

Mechanism for this purpose is shown in the prior Wilcox Patent No. 2,326,273, and the present application illustrates an alternative method for effecting this result, which in some respects is an improvement over that shown in the patent. As illustrated in the present application, the invention is applied to a header or upsetting machine having a movable gate upon which are mounted two tools, the tools cooperating with a single die upon the bed of the machine, the device being so constructed that upon one stroke of the gate one of the tools registers with the die and acts upon the work, while upon a succeeding stroke of the gate the other tool is brought into registration with the die, the tools being shifted upon each stroke of the gate, so that they alternately cooperate with the die.

In a device of this character, it is desirable that the machine be operated at as high a speed as is practicable in order to increase its output. To this end, it is necessary that the movable parts be so arranged that they are capable of operation at high speed and that the parts may be made as light in weight as is practicable, and that as few parts as possible be mounted upon the moving element or gate of the device so as to enable greater speed of operation.

In the present device, the tools are shifted by means of a shaft mounted in the gate to rock or oscillate, this shaft being connected to a slide also carried by the gate, which slide carries the movable tools. As the rocking of this shaft is to be effected from the main drive of the machine, it is necessary to provide a suitable connection between this drive which is on the stationary frame of the machine and the shaft or other tool-shifting mechanism upon the movable gate. It will be understood, however, that means other than an oscillating shaft upon the gate may be employed to shift the tools without departing from the spirit of the invention and without departing from the use of a similar mechanism to transmit power from the stationary frame to an element on the movable gate.

One object of the present invention is to provide simple and effective mechanism for shifting the tools or other members upon a movable

part of a machine from a source of power on a stationary part of the machine.

A further object of the invention is to provide simple, positive, and effective mechanism to shift the tool carrier of a header or like machine during the reciprocating movements of the gate upon which the tool carrier is mounted.

Still another object of the invention is to provide a tool-shifting mechanism of the character described of such construction that a relatively small part of the mechanism will be mounted upon the movable gate, and, therefore, the weight of the latter will be kept at a minimum.

Still another object of the invention is to provide a tool-shifting mechanism for a header having a gate upon which is mounted a tool-carrying slide, the slide being shifted by means of an oscillatable shaft mounted in the gate, the tool-shifting mechanism being of such construction that its parts will be largely mounted upon the frame of the machine and driven from a source of power upon the frame, while, at the same time, imparting an oscillating motion to the shaft upon the gate to effect the tool-shifting movement.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a plan view of a portion of a header embodying our improvements;

Fig. 2 is a longitudinal sectional view of the device on line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional view substantially on line 3—3 of Fig. 2 at the face of the tools; and

Fig. 4 is a view partly diagrammatic showing the drive of the shifting mechanism from the main drive shaft of the header.

To illustrate a preferred embodiment of our invention, we have shown a heading or upsetting machine comprising a main frame 10 having a crank shaft 11 rotatably mounted therein, this shaft being provided with a crank 12 to which is connected a pitman 13 pivoted to the main gate 14, these parts being of the usual construction.

Adjacent the front portion of the gate is a carrier slide 15 mounted to move transversely of the gate, this slide carrying punches or other tools 16 and 17, which tools are adapted to cooperate with a fixed die 18 mounted on the frame. Movement of the slide to shift the tools is, in the present instance, accomplished by oscillating movements of a shaft 19 journaled in the gate, this shaft carrying at its upper end a crank 20

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to which is connected one end of a link 21, the other end of the link being pivoted to a lug 22 on the carrier slide 15.

The invention of the present application relates particularly to means provided for oscillating the shaft 19 upon the gate from the main shaft 11 on the frame. Journalled in the frame 10 is a transverse shaft 24 having a gear 25 thereon which meshes with a pinion 26 mounted upon the crank shaft 11. It may here be noted that the pinion 26 is one-half the size of the gear 25, so that the shaft 24 will be rotated at one-half the speed of the crank shaft 11, the latter making two rotations to each rotation of the shaft 24.

As shown more particularly in Figs. 3 and 4, a cam shaft 27 extends longitudinally of the machine, this cam shaft being driven from the shaft 24 by suitable means, such as bevel gears 28 and 29. Upon the shaft 27 is secured a suitable cam 30, this cam operating in a slide 31, which slide carries cam followers or rollers 32 and 33, the arrangement being such that these rollers are at all times in engagement with the surface of the cam, and the latter being so shaped as to move the slide transversely of the frame or to the right and left, as shown in Fig. 3, upon each revolution of the shaft 27. Thus, it will be apparent that upon one rotation of the crank shaft 11 the slide 31 will be shifted in one direction, and upon a succeeding rotation of the shaft 11 the slide 31 will be shifted in the other direction. The cam is provided with suitable dwells, so that after the shifting of the slide the latter will remain at rest in order to give the tool opportunity to contact and withdraw from the work.

As shown more especially in Fig. 4, the slide 31 comprises yoke members 34 and 35, and to one end of these members is secured a block 36, to which block is secured by nuts 37 a pair of parallel rods 38. The rods 38 are slidably mounted in guide blocks 39 mounted upon projecting bosses 40 on the frame of the machine, so that these rods reciprocate with the slide 31.

Secured to the rods 38 between the guide blocks 39 is a guide block 41 secured in place by a co-operating clamping jaw 42. In order to insure against any movement of the block 41 upon the rods 38, a key 43 is secured to the member 42 by screws 44, this key being seated in grooves in the under side of the rods 38.

The block 41 is provided with an opening or recess in its upper face, and at each side of this opening is secured a gib 45. Between these gibs is slidably mounted a bronze block 46, the latter being pivoted to a stud 47, this stud being securely fastened by a nut 48 to a segment gear 49. The gear 49 is pivotally mounted upon a stud 50 secured to the bottom of the gate 14 of the header.

With the above construction, it will be apparent that, when the machine is in operation and the gate is reciprocated longitudinally of the frame, the block 46 secured at the lower side of the segment gear 49, which is carried by the gear, will reciprocate longitudinally in the opening in the block 41, while, at the same time, rotation of the shaft 27 will effect reciprocation of the block 46, which will in turn effect oscillation of the segment gear 49. The sliding movement of the block 46 in the block 41 permits longitudinal reciprocating movement of the gate relatively to the slide 31 and block 41, while oscillating movements of the segment gear 49 about the

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stud are effected by transverse movement of the slide 31.

The segment gear 49 is provided with teeth 51 which mesh with those of a pinion 52 secured upon the lower end of the oscillating shaft 19 mounted in the gate. It will be apparent, therefore, that, while the shaft 19, pinion 52, segment gear 49, and block 46 are carried by the gate, the remaining elements of the drive mechanism are carried upon the frame of the machine, thus reducing to a minimum the movable parts carried by the gate.

In the operation of the device, the main shaft 11 is driven by any suitable means, such as an electric motor (not shown), and rotation of this shaft through the crank 12 and pitman 13 effects reciprocation of the gate 14 to effect contact of the tools 16 and 17 with the work in the die 18. It will be apparent that each rotation of the shaft 11 will, through the drive mechanism shown in Fig. 4, effect one-half a revolution of the shaft 24 and also one-half revolution of the shaft 27, thus moving the cam 30 from one extreme position to the other and, therefore, shifting the block 46 and effecting oscillation of the segment gear 49. The oscillation of this gear will in turn effect oscillation of the shaft 19, which through the link 21 will effect shifting of the tool slide 15 and, therefore, of the tools 16 and 17 to bring the proper tool into registration with the die 18. It will also be apparent that the shifting of the tools will take place upon each revolution of the drive shaft, so that one tool will cooperate with the die upon one stroke of the gate, while the other tool will cooperate with the die upon the succeeding stroke of the gate.

As the tool-shifting mechanism is composed of relatively few parts and is of simple construction and as a comparatively small number of parts of this mechanism is mounted upon the movable gate, the device will be capable of high-speed operation, thus increasing its output, while, at the same time, the mechanism may be manufactured more economically than the more complex structures which have been used in the past.

While we have shown and described a preferred embodiment of our invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the claims.

What we claim is:

1. In a header or like machine, a frame, an element reciprocably mounted thereon, a tool carrier slidably mounted on said element to move in a direction transverse to the movement of the element, a shaft rockably mounted in the element and connected to the carrier to move the same, a reciprocating member mounted on the frame to move in a direction parallel to said carrier, means on the frame connected to said member to reciprocate the same in timed relation with the reciprocation of said element, and means connecting said member with said shaft to rock the same, said last-named means comprising a sector gear rockably mounted on the element and connected with said shaft.

2. In a header or like machine, a frame, an element reciprocably mounted thereon, a tool carrier slidably mounted on said element to move in a direction transverse to the movement of the element, a shaft rockably mounted in the element and connected to the carrier to move the same, a reciprocating member mounted on the

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frame to move in a direction parallel to said carrier, means on the frame connected to said member to reciprocate the same in timed relation with the reciprocation of said element, means connecting said member with said shaft to rock the same, said last-named means comprising a sector gear rockably mounted on the element and connected with said shaft, and a part connected to said sector gear and slidably engaged with said reciprocating member.

3. In a header or like machine, a frame, an element reciprocably mounted thereon, a tool carrier slidably mounted on said element to move in a direction transverse to the movement of the element, a shaft rockably mounted in the element and connected to the carrier to move the same, a reciprocating member mounted on the frame, means on the frame operatively connected to said member to reciprocate the same in timed relation with the reciprocation of said element, means connecting said member with said shaft to rock the same, said last-named means comprising a sector gear rockably mounted on the element and connected with said shaft, and a block pivotally connected to the sector gear and slidably engaged with said reciprocating member.

4. In a header or the like, a frame, a gate mounted to reciprocate thereon, a tool carrier slidably mounted on the gate, means to reciprocate the gate, means to move said carrier in a path transverse to that of the movement of the gate, including a slide mounted on the frame, means on the frame operatively connected to said slide to reciprocate the same, means connecting said slide to the tool carrier comprising a member pivoted on the gate and slidably engaged with the slide, said member having gear teeth thereon, a shaft mounted on the gate and connected to the tool carrier, and said shaft having a gear thereon engaged by the gear teeth of said pivoted member.

5. In a header or the like, a frame, a gate mounted to reciprocate thereon, a tool carrier slidably mounted on the gate, means to reciprocate the gate, means to move said carrier in a path transverse to that of the movement of the

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gate, including a slide mounted on the frame, means on the frame operatively connected to said slide in a direction transverse to that of the movement of the gate, means connecting said slide to the tool carrier comprising a member pivoted on the gate and slidably engaged with the slide, a shaft mounted to oscillate on the gate, a link connecting said shaft to the tool carrier, said shaft having a gear thereon, and said pivoted member having gear teeth engaged with those of said gear.

6. In a header or the like, a frame, a gate mounted to reciprocate thereon, a tool carrier slidably mounted on the gate, means operatively connected to said gate to reciprocate the same, means to move said carrier in a path transverse to that of the movement of the gate, including a slide mounted on the frame, means operatively connected to said slide to reciprocate the same, and means connecting said slide to the tool carrier comprising a member pivoted on the gate, a shaft mounted to oscillate on the gate, a link connecting said shaft to the tool carrier, said shaft having a gear thereon, said pivoted member having gear teeth engaged with those of the gear and having a block pivoted thereto and slidably engaged with the slide.

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