

1,098,280.

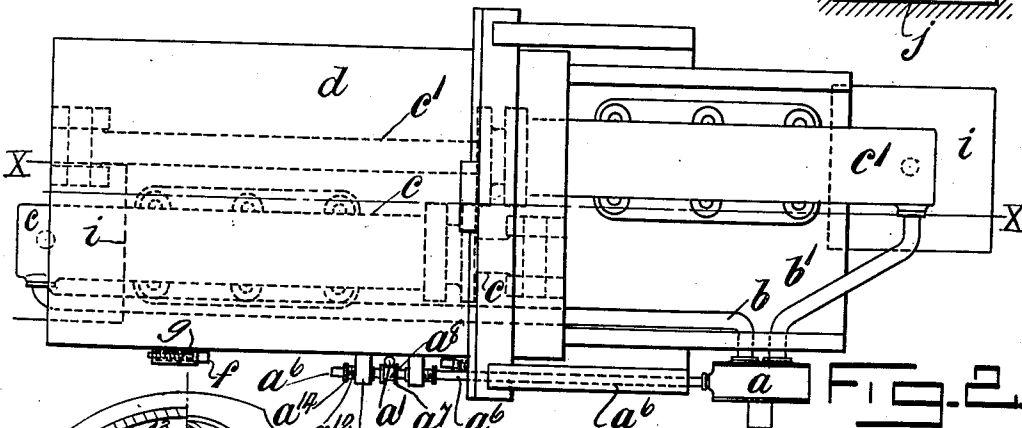
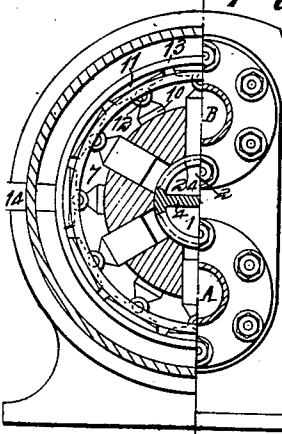
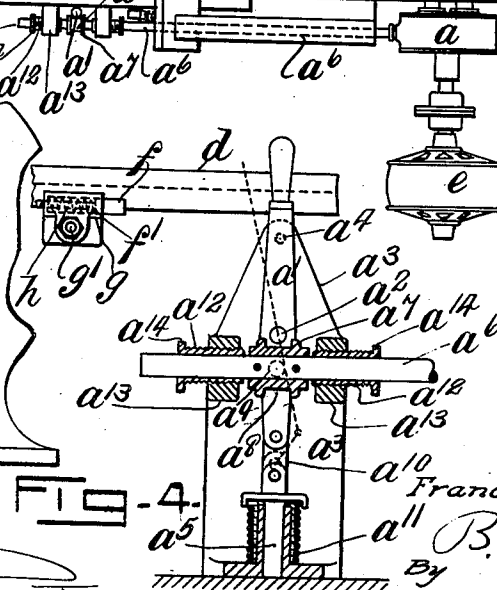


Fig. 3

H. Hunsberger

Fig-4-

Everell Lancaster.

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UNITED STATES PATENT OFFICE.

FRANCIS LEIGH MARTINEAU, OF LONDON, ENGLAND.

HYDRAULIC PLANING-MACHINE.

1,098,280.

Specification of Letters Patent.

Patented May 26, 1914.

Application filed February 25, 1911. Serial No. 610,784.

To all whom it may concern:

Be it known that I, FRANCIS LEIGH MARTINEAU, of 64 Victoria street, London, S. W., England, have invented new and useful Improvements in Hydraulic Planing-Machines, of which the following is a specification.

This invention relates to improvements connected with metal planing machines, and has reference to planing machines of the type wherein a reciprocating work carrying table is employed.

The object of my present invention is to so apply a variable stroke hydraulic pump, preferably of the type described in the specification of British Letters Patent No. 12574/09 granted to H. S. Hele-Shaw, that the movement of the table of the planing machine can be effected and controlled hydraulically.

In accordance with my invention I provide a variable stroke pump associated with hydraulic rams, and I arrange a cam or cams or other suitable devices carried by or traveling with the table and coöperating with a lever so controlling the direction of the flow of liquid that the direction of movement of the table is automatically reversed. I may and preferably do provide means whereby the speed of travel of the table can be regulated so that the table travels at the required speed in its planing direction and has a quicker return.

In order that my invention may be more readily understood and carried into practice, reference is hereby made to the accompanying sheets of illustrative drawings wherein:—

Figure 1 is an elevation of a planing machine adapted to my invention on the line X—X of Fig. 2. Fig. 2 is a plan thereof, while Fig. 3 illustrates a detail. Fig. 4 is a cross sectional view of the variable stroke pump employed in carrying out my invention.

Referring to these drawings, throughout which like letters of reference indicate corresponding parts wherever occurring, *a* designates a pump of the type set forth above, the inlet and outlet pipes *b* and *b*¹ of which lead each to a different one of a pair of hydraulic rams *c* and *c*¹, which when under pressure drive the planing table *d*

in opposite directions. Pressure is supplied to these rams *c* and *c*¹ alternately by the pump *a* which is continuously driven by the electric or other motor *e*, and thus the table *d* is given the desired reciprocating motion.

The aforesaid pipes *b* and *b*¹ connect the rams *c* and *c*¹ one to each side of the pump *a*, so that whatever be the direction and output of the pump either one or other of the rams *c* or *c*¹ will be driven by the liquid exhausted from the other.

By automatically reversing the direction of the pump discharge at the end of each stroke of the rams *c* and *c*¹ the reciprocating motion of the table will be continuously maintained.

Suitable apparatus may be attached to and operate in conjunction with the table by means of which the center of the eccentric stroke setting ring of the pump *a* is thrown off center at or toward the end of each movement of the table. A convenient means for effecting this object is illustrated in Fig. 3 and consists of an adjustable spring controlled stop *f* or the like carried by the table and adapted to operate the pump lever *a*¹ at the end of each movement of the table *d*. The stop *f* is housed in the box *g* in which it is free to reciprocate. Within the box *g* the stop *f* is reduced as at *f*¹ to form a shoulder against which abuts the spring *h* which is retained between said shoulder and the end of the box *g*. Two of these stops *f* are provided and they are adapted to be adjusted to any positions along the edge of the table *d* by the clamping nuts *g*¹ in order to determine the stroke of the machine.

The pump lever *a*¹ is journaled at *a*² in the standard *a*³ and is held in its central position by the taper pin *a*⁴ which takes in a tapered recess in the standard and is adapted to be freed therefrom by a pressure at right angles to the lever or thereabout in its plane of rotation. This force is applied on either side by the stops *f*. Fast upon the controlling shaft *a*⁵ is a collar *a*⁷ in the groove *a*⁸ of which takes a pin *a*⁹ projecting from the lever *a*¹. By this pin the shaft *a*⁵ is thrust in either direction by the lever *a*¹ and the pump *a* thereby reversed. The lower extremity of the lever *a*¹ is connected by the link *a*¹⁰ to the plun-

ger a^5 which tends to rise under the influence of the spring a^{11} . The portion of the lever a^1 below the pivot a^2 together with the link a^{10} constitutes a pair of toggles. Therefore as soon as the lever a^1 is thrown out of the vertical position it continues its motion until stopped by some extraneous means. Stops are provided in the shape of bushings a^{12} in the blocks a^{13} . These bushings are threaded into the blocks a^{13} and may be adjusted from the flanges a^{14} which may be provided with suitable appliances to enable easy adjustment to be effected. By the adjustment of the bushings the motion of the controlling ring of the pump a may be varied at will and thereby the stroke of the pump may also be varied. To start the machine it is only necessary (assuming the motor e to be running) to throw over the lever a^1 when the table d will move in either direction according to the direction in which said lever is thrown.

It is essential that the connections be such that the table is driven from the left to right when the lever is thrown to the left, and conversely from the right to left when the lever is thrown to the right. Inspection of Figs. 2 and 3 will render these conditions obvious for the lever a^1 is operated by the stops f and must be thrown over by them alternately. When started the table will continue to reciprocate at a predetermined equal or unequal speed in either direction until the lever a^1 is again placed in the vertical position by the attendant. The spring h relieves the shock incident to the contact of the stop with the lever.

By this device means are provided whereby the eccentric stroke setting ring of the pump a is automatically thrown to unequal eccentricities on either side of the axial line of the pump and thus a "quick return" motion is provided.

The rams c and c^1 , are in order to economize space, preferably mounted upon different parallel axes as shown so that they overlap and are connected to and by the table d .

Auxiliary supply tanks such as i are provided to eliminate air gaps in the system consequent upon leakage. The outlets from this tank must of course be provided with non-return valves j .

While I have herein shown and described one specific form of my invention, I do not wish to be limited thereto except for such limitations as the claims may import.

I claim—

1. The combination with a planing machine, of a reciprocating table therefor, a reversible hydraulic variable stroke pump, hydraulic mechanism connected with the table and driven by the liquid circulated by

the pump, and devices carried by the table for automatically reversing the pump and controlling its stroke to reverse the movement of the table and regulate its speed of travel.

2. The combination with a planing machine, of a reciprocating table therefor, a hydraulic reversible variable stroke pump, hydraulic mechanism connected with the table and driven by liquid circulated by the pump, devices carried by the table for automatically reversing the pump and controlling its stroke to reverse the movement of the table and regulate its speed of travel, and manual means for initially starting and finally stopping the pump, substantially as described.

3. The combination with a planing machine, of a reciprocating table therefor, a hydraulic reversible variable stroke pump, hydraulic mechanism connected with the table and driven by liquid pressure circulated by the pump, a hand lever for starting or stopping the pump, and devices carried by the table for automatically operating said lever to reverse the pump and determine its stroke and cause reverse movement of the table at the desired speed, substantially as described.

4. The combination with a planing machine, of a reciprocating table therefor, a hydraulic reversible pump, hydraulic mechanism connected with the table and driven by liquid circulated by the pump, a lever for reversing or stopping the pump, devices carried by the table for actuating the lever to automatically reverse the pump and the movement of the table, and mechanism for continuing the operation of the lever when beyond the influence of said devices, and means for arresting the lever and determining the position at which it shall be arrested, whereby the stroke given the pump may be controlled.

5. In a planing machine, rams for driving the table of the machine, a reversible circulating pump, pipe connections between said rams and said reversible circulating pump, a lever for reversing said reversible circulating pump, stops carried by the table of the machine for automatically operating said lever, means for continuing the operation of said lever when beyond the influence of said stops, means for arresting said lever, means for determining the positions at which said lever is arrested, and means for enabling said lever to be held at the position necessary for the reversible circulating pump to run idly.

6. In a planing machine, rams for driving the table of the machine, a reversible circulating pump, pipe connections between said rams and said reversible circulating pump, adjustable stops carried by the table

of the machine for automatically operating
said lever, cushioning springs behind said
stops, a pivoted lever for reversing said re-
versible circulating pump, a plunger, a link
5 between said lever and said plunger, a
spring exerting a force on said plunger so
directed as to maintain said link in com-
pression, adjustable stops for limiting the
movement of said lever and a taper pin for

enabling said lever to be frictionally held 10
in the position necessary for the reversible
circulating pump to run idly.

In testimony whereof I affix my signature,
in presence of two witnesses.

FRANCIS LEIGH MARTINEAU.

Witnesses:

ALFRED AUGUSTUS THORNTON,
CLARENCE P. LIDDON.