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MECHANISM WHICH PROVIDE OSCILLATING MOTION

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Abstract In the mechanisms described, which produce an oscillating or back and forth rotary motion, there are a number of special features: one mechanism produces rotation that is adjustable for various radii of curvature and will also produce straight line motion or reverse the curvature from convex to concave; several others impart greater or less angular movement to the driven shaft than that of the driving shaft; another produces two oscillations of a shaft for each cycle of a slide; several mechanisms are described for transmitting oscillating motion from one plane to another at right angles to it. A means for providing interrupting control of ocillating movement is also described.
Key Words: mechanism, rotation, shaft, lever

1. CENTERLESS OSCILLATING MOTION

Circular motion, such as rotation or oscillation, is usually obtained by means of a guide or constraining member that utilizes· as a pivot tpe center about which the circular motion takes place. Tliis constraining member surrounds the pivot either wholly or partially and causes the moving object to travel in a circuular manner about the center. In this case, the center must obviously be accessible. here are instances, however, where the center does not lie within the workable confines of a given specimen in which true circular motion is desired, and it is necessary for a sliding constraining member to be used that has been speecially formed to suit that particular curvature, or one very close to it. Even though such a constraining member does, permit some variation in the curvature, the range of differrences is comparatively small, because of difficulties in the practical application of the method.

2. SIMPLE MECHANISM FOR PRODUCING ALL OSCILLATING MOTION IN A SHAFT

In Fig.1 presents four Views of Simple Oscillating Mechanism , Showing How Rotating Shaft E Transmits Oscillating Motion to Shaft S.

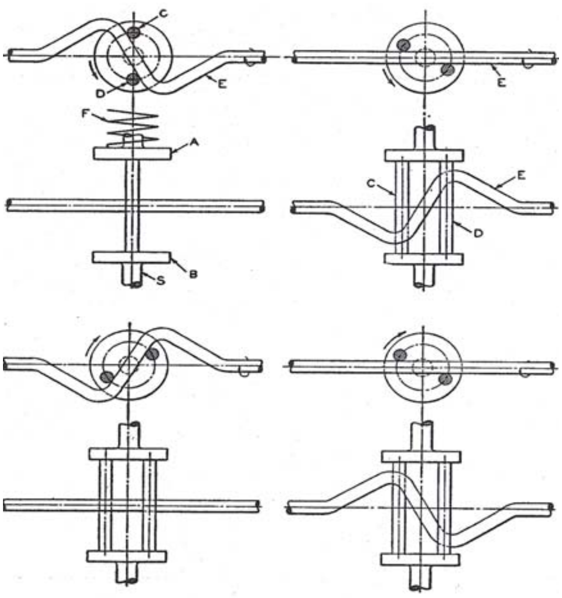


Fig.1 four Views of Simple Oscillating Mechanism

The mechanism shown in Fig.1 was develloped to produce an oscillating motion in the vertically susspended shaft S through the continuously rotating horizontal shaft E. It consists mainly of two disks A and B, both of which are a part of the vertical shaft assembly; the horizonntal shaft E; spring F; and the pins C and D. The horizontal shaft E is bent to the shape indicated in the illustration, and is located between the pins a and D.

The four positions of the horizontal and vertical shafts shown in Fig.1 indicate that the horizontal shaft serves as a cam, with the pins C and D acting as the cam followers. The shaft S is spring-loaded to keep the pins C and D in contact with the shaft E.

The mechanism can be operated at moderate speeds and, with a reasonable amount of tension in spring F, the oscillaations will be imparted to the vertical shaft smoothly and without shock.

By changing the shape of the shaft E, sufficient variation in the oscillations can be obtained to meet different requirements. Some experimental work may be necessary when precise results are desired. However, a fairly accurate lay-out will usually be sufficient to give the desired action.

3. DOUBLE TOGGLE – LEVER MECHANISMS FOR OPERATING PRESSES

The capacity of a straw-baling press designed as shown in Fig. 2 was considerably improved by redesigning the operating mechanism. The machine has an oscillating pressing piston C, actuated by a rod B from a rotating crank A, which is constructed as a gear wheel and rotated by a small gear D. The pressing action takes place when the three links 1, 2, and 3 form practically a straight line, a high pressure then being applied to the straw bale during the interval Y_1-Y_2 of the crank motion. This interval is so short that the baling action is not quite perfect.

The full exerted pressure loads the mechanism. The swinging piston is quickly pushed forward and is already on its return stroke when the knot is tied. Therefore the elasticity of the bale stretches the binding cord and hinders the binding mechanism. High friction in the links increases the wear, and the forward and return strokes are performed at an almost identical speed. In the improved mechanism, shown at the left in Fig. 3, two members E and F are added, and the number of links is thereby increased from four to seven (as the connecting link between the three members B, E, and F must be callculated as two links). The new mechanism has two dead points; therefore, the toggle action shown at the left in Fig. 3 is extended to about three times hat of the older mechanism. The push exerted during the pressing action is taken off the gear and transmitted to the fixed link 5. The speed of the piston is gradually reduced until it is brought to a standstill. It remains in this position until the binding action is completed. The whole drive runs easily and withhout shock. The wear is consequently reduced to a minimum, and the capacity of the new machine is considerably increased.

In Fig.2 presents Original design of Mechanism for Straw-baling Press

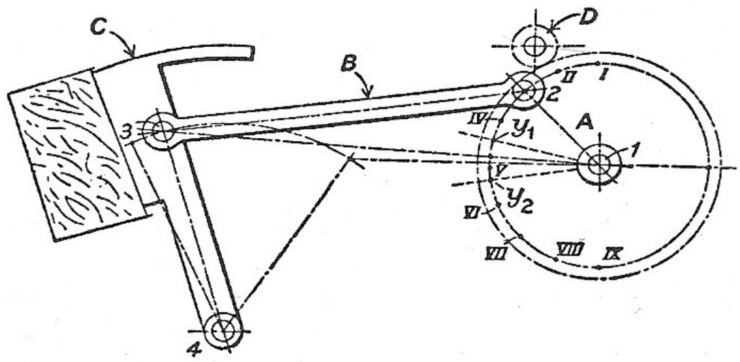
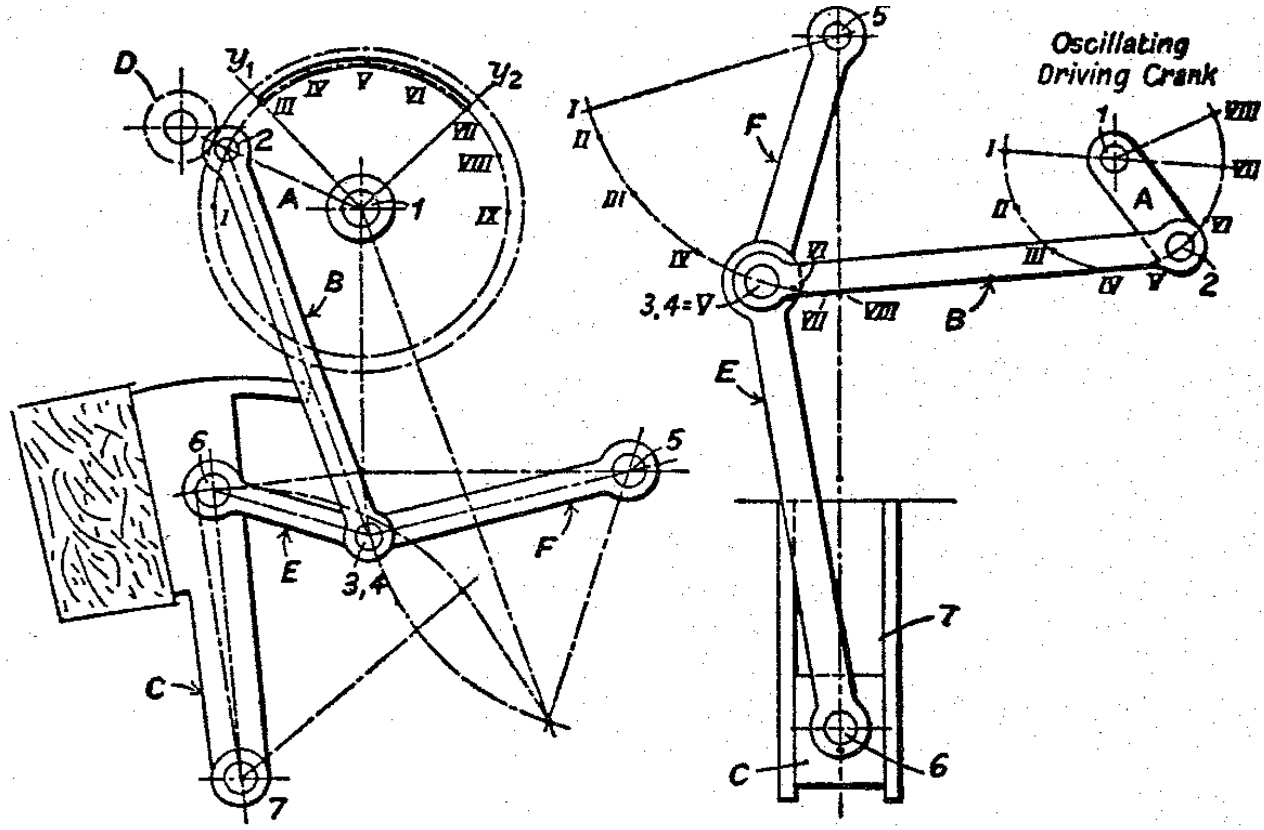


Fig.2 Original Design of Mechanism

Similar mechanisms can be employed in other industries, such as the one shown at the right in Fig. 3 which is used in a press designed for molding plastics.
This mechanism is the same as in Fig. 2 except that the swinging motion of the piston is replaced by the reciprocating sliding moveement of a ram.



a) b)

Fig. 3 Mechanism Double Toggle-lever for Straw-baling Press.
a) Double Toggle-lever for Straw-baling Press.
b) Double Toggle Lever for plastic Molding Press

Owing to its high capacity, better results are obtained with this press than with the older design having a simple crank mechanism.

REFERENCES

[1] Francklin D. Jones - Mechanical Engineering vol 3; New York, U.S.A. 2005
[2] Johaneson, E.C. - Tehnological Engineering; New York, U.S.A. 2005
[3] Stănescu, D.C. - Mechanisms Engineering; Bucharest 2007