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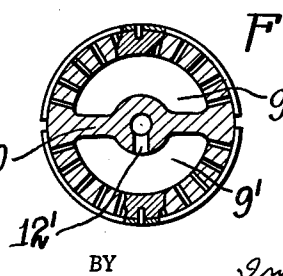
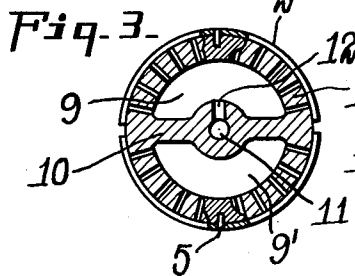
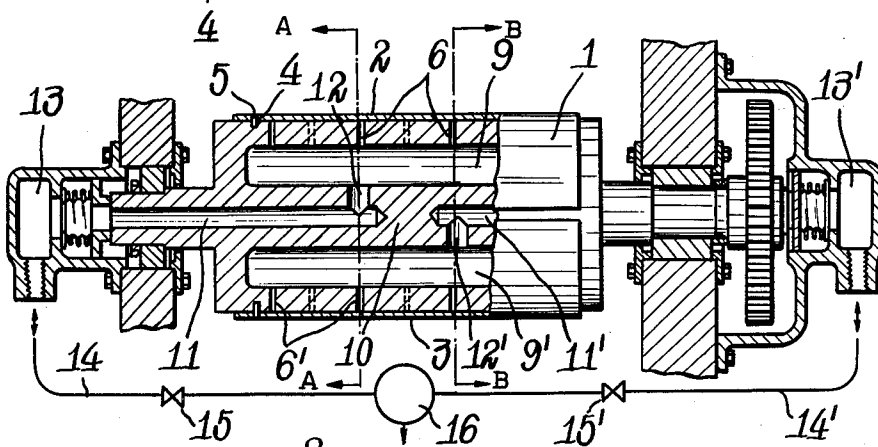
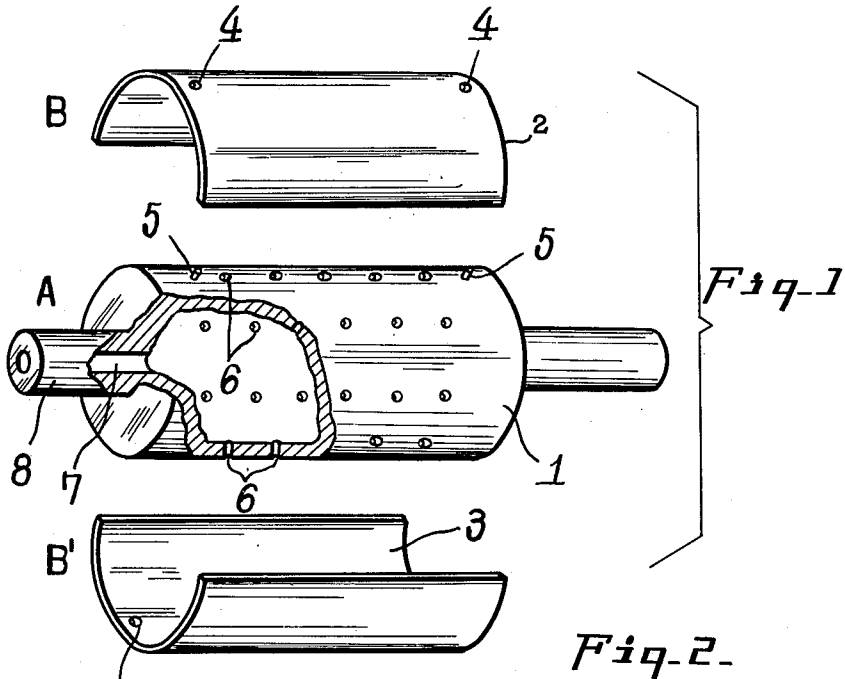
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3,078,796

VACUUM CLAMPING OF PLATES FOR A ROTARY PRESS

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2 Sheets-Sheet 1



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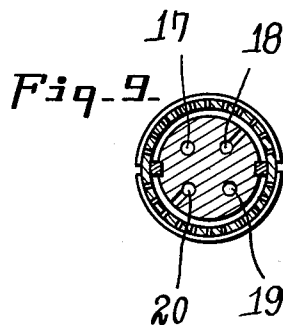
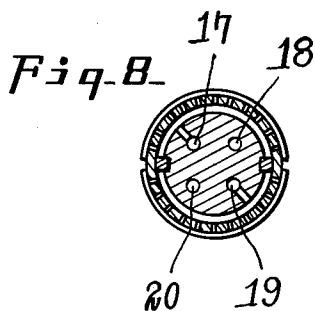
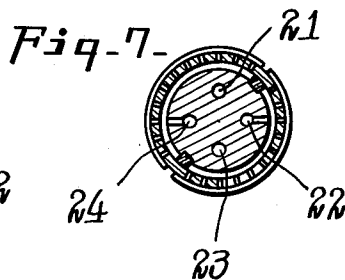
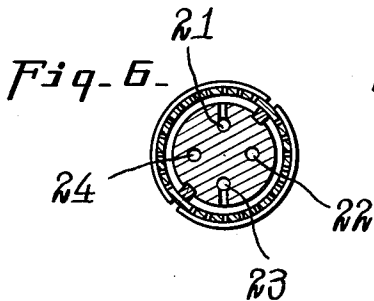
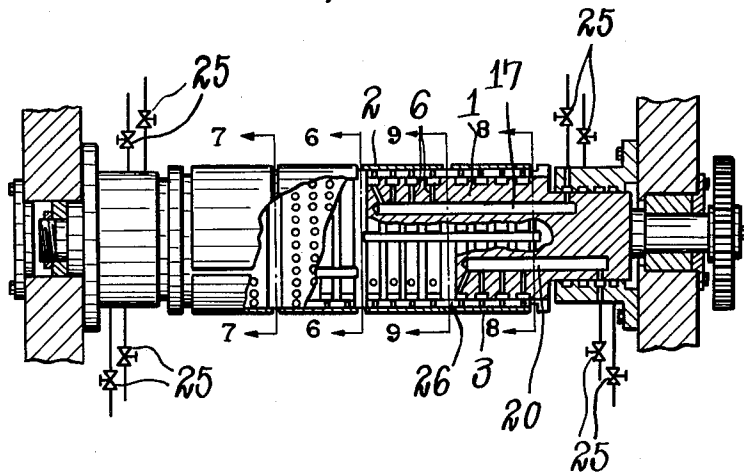
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2 Sheets-Sheet 2

Fig. 5-



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VACUUM CLAMPING OF PLATES FOR A ROTARY PRESS

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1 Claim. (Cl. 101-378)

This invention relates to a vacuum or suction clamping device of plates for a rotary printing press machine and, more particularly, to a device which enables clamping either each plate independently or a number of plates at the same time to a plate drum smoothly without causing an irregular surface.

In the heretofore known rotary press for clamping a thin printing plate to a form cylinder, it has been usually customary to put cross marks on the plate at a predetermined distance and the plate is secured to the form cylinder by mechanical means such as clamping plates or hooks which fit into small metal fittings such as small holes or recesses provided on the surface of the cylinder. Such mechanical clamping devices are complicated in their construction and have the disadvantage that the clamping operation is rather inconvenient, takes a longer time, and is inefficient.

This invention obviates the above disadvantages and is characterized in that the plate is provided with two small holes at a predetermined distance to fit to corresponding small pins projecting from the cylinder and the plate is attached to the cylinder guided by the pin and hole engagement easily and then firmly secured by the action of negative pressure or vacuum automatically.

In order that the invention may be readily carried into effect, it will now be described in detail, by way of example, with reference to the accompanying diagrammatic drawing, in which,

FIG. 1 is a perspective view of a form cylinder with two printing plates, embodying this invention,

FIG. 2 is a partial sectional elevation of the form cylinder embodying this invention,

FIG. 3 is a sectional view taken on the line A—A of FIG. 2.

FIG. 4 is a sectional view taken on the line B—B of FIG. 2.

FIG. 5 is a partial sectional elevation showing another embodiment of this invention as applied to a multiplates cylinder,

FIGS. 6 to 9 illustrate sectional views taken on the different positions of the cylinder.

The same reference numerals designate the same or similar parts throughout the drawings.

In former rotary printing presses, a printing plate is provided with two cross marks at a predetermined distance and the position of the plate is adjusted in such manner that the marks on the different printing plates should be printed at the same positions on a paper so that it is necessary to shift and adjust the plate on the form cylinder until the positions of the marks coincide exactly after proofs are taken several times. Accordingly, it takes a considerable time for adjusting the positions of the plate and also it necessitates a micro adjusting means in the circumferential and axial directions so that it prevents not only efficient operation but also it takes considerable time for making the proof printing and this is uneconomical.

The above disadvantages can be obviated by the present invention.

Referring to FIG. 1, 1 represents a form cylinder which is made hollow for the reason as hereinafter explained. 2 and 3 designate half sections of the printing plates to be clamped on the cylinder 1. According to this invention, a pair of small pin holes 4 of a definite dimension are drilled through the plates 2 and 3 and the corresponding

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pins 5 are secured to and projected from the form cylinder 1 to fit into the pin holes 4 of the plate. By this arrangement, the plates 2 and 3 can be attached to the cylinder in the correct position by means of the standard pin holes and pin gauges fitting with each other so that it needs neither troublesome adjustment in fitting the plate nor proof printings and the position of the plate on the form cylinder can be determined at once. The plate can be easily secured to the form cylinder without adjusting the position even when the plate is replaced and accordingly, the operation for securing the plate in position can be very economically and efficiently carried out if compared with former securing devices. Moreover, the plate thus located on the cylinder can be firmly secured to the cylinder by the action of vacuum automatically without any other mechanical clamping means.

To this end, the form cylinder 1 is made hollow and provided with a number of small holes 6 (refer to FIG. 1) and the inside of the cylinder communicates with a suitable vacuum source through a central hole 7 of the shaft 8. After the plates 2 and 3 are put on the cylinder at definite positions, the inside of the cylinder is subjected to the action of vacuum from a vacuum source so that the plates are clamped securely and automatically on the cylinder.

The hollow chamber inside the cylinder may be divided into two or more compartments in order to fix a number of printing plates independently or simultaneously therealong and thereon. Such an embodiment is shown in FIG. 2, wherein the hollow chamber of cylinder 1 is divided into two compartments 9 and 9' by means of central partition wall 10 and the upper chamber 9 in FIG. 3 is communicated with the axial hole 11 through a radial opening 12 and then through the end box 13, pipe line 14 and a control valve 15 to a vacuum source 16, while the lower chamber 9' is communicated with the axial passage 11' through a radial opening 12' and then through end box 13', pipe line 14' and valve 15' to the vacuum source 16. The cylinder 1 is provided with a suitable number of small holes 6 and 6' which communicate with the hollow chambers 9 and 9' respectively. Thus if the plates 2 and/or 3 are attached to the cylinder 1 at a definite position as defined by the small holes provided on the plate and the pins secured to the cylinder and the chamber 9 and/or 9' are connected to the vacuum source by operating the valve 15 and/or 15', the plates 2 and/or 3 can be automatically secured to the cylinder 1 by the negative pressure so that either or both of the plates 2 and/or 3 can be secured to the form cylinder very easily and quickly.

According to this invention, any suitable number of plates can be secured to a single form cylinder by the same principle as described with reference to FIGS. 5 to 9. In this case, the form cylinder 1 should be divided into a required number of independent hollow sections axially and radially. In the embodiment of this invention as shown in FIGS. 5 to 9, eight plates can be secured to one cylinder by means of negative pressure. For this purpose, eight axial grooves 17, 18, 19, 20, 21, 22, 23 and 24 are provided in the form cylinder 1 and each of these grooves is communicated to a vacuum source through a valve 25 and each axial space 17, for instance, is communicated to each independent plate 2, for instance, through small holes 6 so that the plate 2 can be firmly secured to the cylinder 1 by vacuum after it has been put on a definite position on the cylinder. 26 represents a liner firmly fitted on the cylinder 1 in order to provide a smooth supporting surface for the thin printing plates.

According to the construction of the form cylinder as shown in FIG. 5 all plates can be fitted or removed at the same time and also each plate can be fitted independently to a predetermined position correctly and can be

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taken out by releasing the vacuum. Such cylinder can be advantageously used for multi-color rotary press.

What we claim is:

A means for accurately and selectively clamping one or more of a plurality of printing plates onto a printing press, said means comprising a rotatable shaft, a first set of axial passages in said shaft extending from one end toward its center, a second set of axial passages in said shaft extending from its other end toward its center, a rotary cylinder surrounding said shaft and integral therewith, a plurality of separate, independent hollow compartments within said rotary cylinder, each of said compartments having a semi-annular cross section, apertures in substantially the entire outer surface of said rotary cylinder communicating between its outer surface and said compartments, a plurality of locating pins extending radially from the outer surface of said rotary cylinder at predetermined positions thereon, each of said compartments having one radial duct connecting it to a single one of said axial passages of said first and said second sets, a plurality of semi-annular printing plates, each of said plates being mounted upon the outer surface of said cylinder and in registry with a different one of said compartments, each plate having at least one hole at a predeter-

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mined location therein engaging at least one of said locating pins, a first plurality of control valves, a source of vacuum, means for coupling the outer ends of the passages of said first set through corresponding control valves of said first plurality to said vacuum source, a second plurality of control valves, and means for coupling the outer ends of the passages of said second set through corresponding control valves of said second plurality to said vacuum source, whereby said plates are located accurately on said rotary cylinder and clamped and released thereon through the action of said vacuum source applied selectively by means of said control valves.

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