

June 1, 1937.

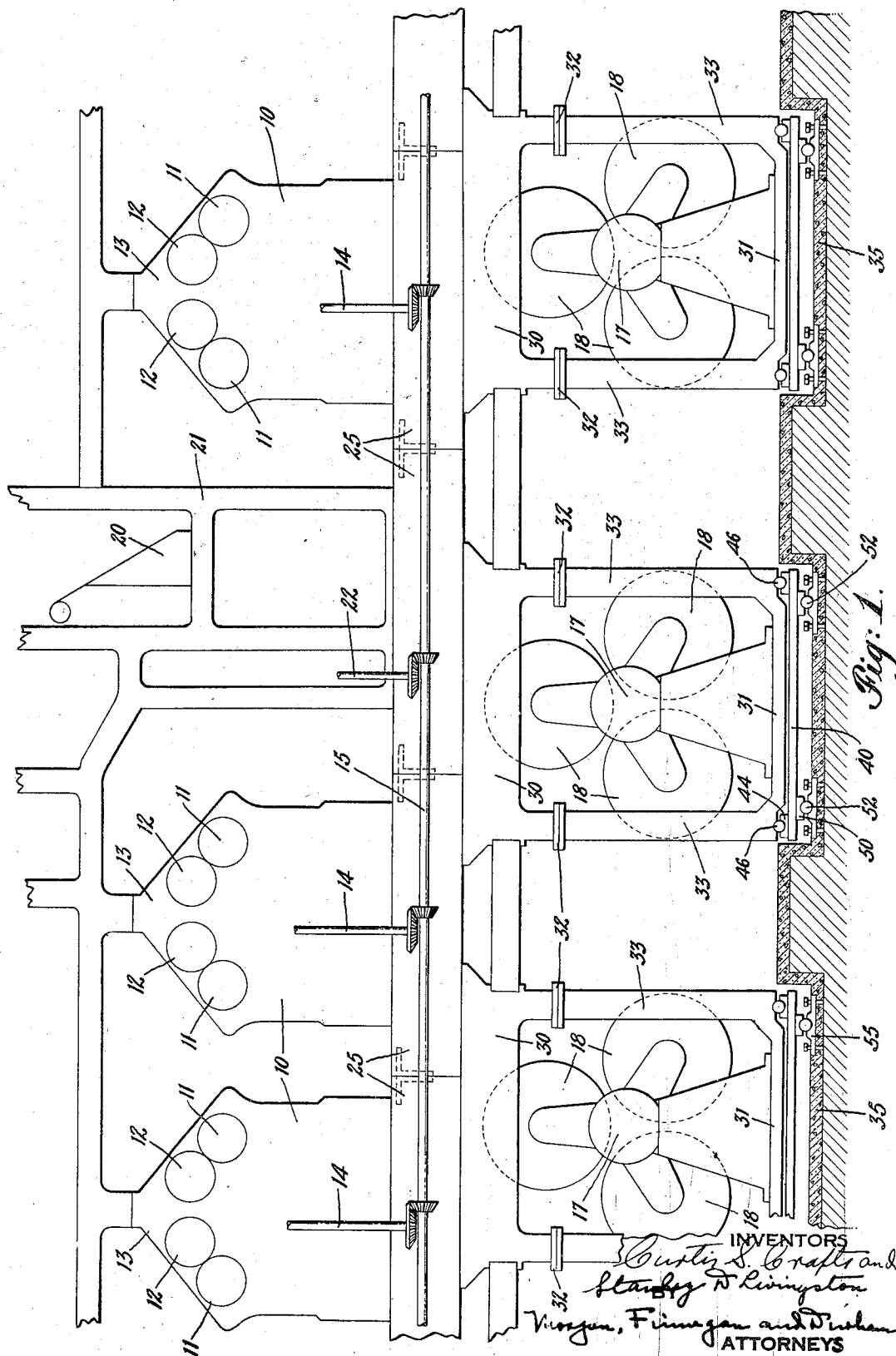
C. S. CRAFTS ET AL

2,082,324

PRINTING PRESS

Filed Aug. 24, 1935

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

Fig. 2.

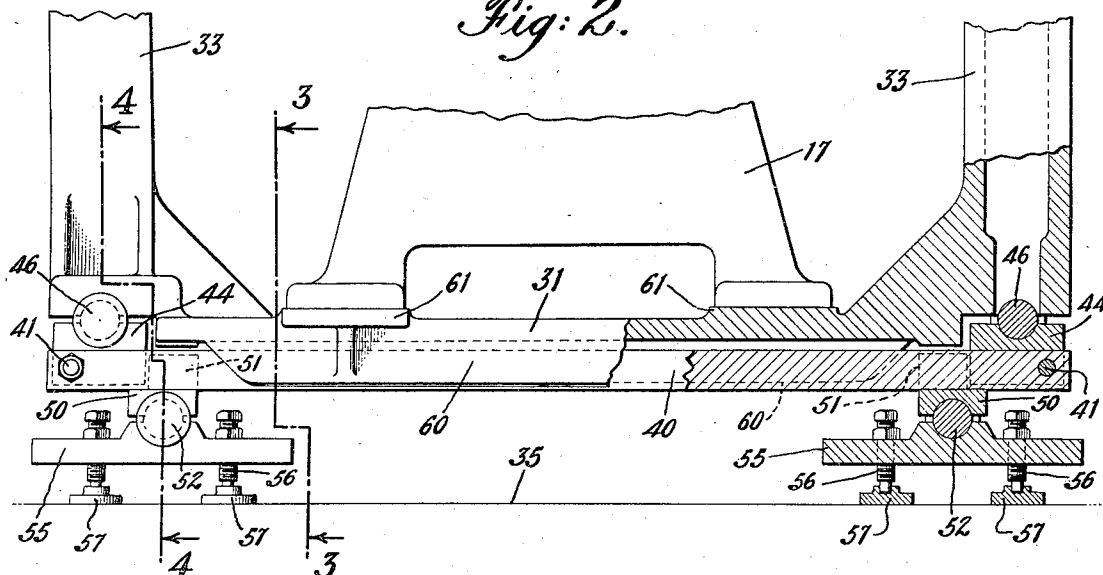


Fig. 3.

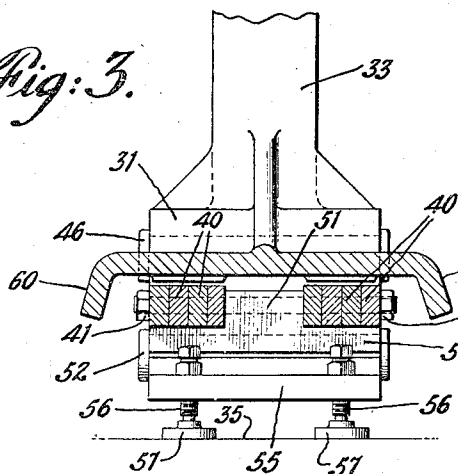


Fig. 4.

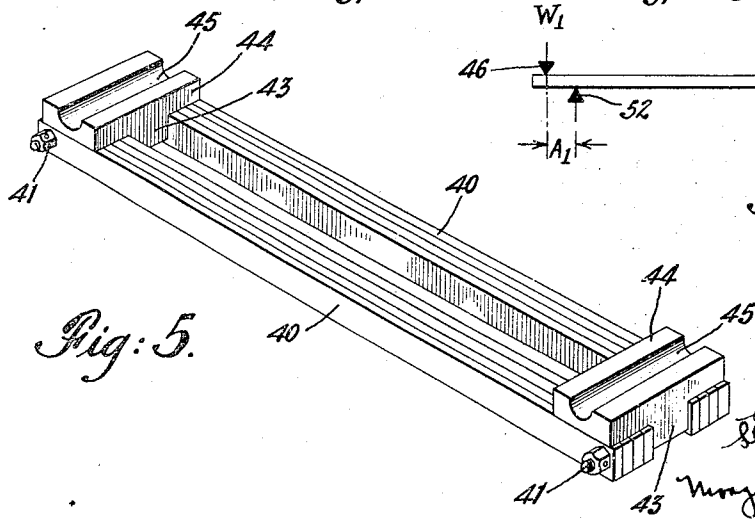
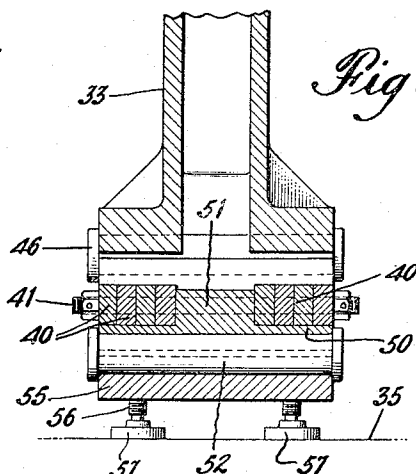


Fig. 5.

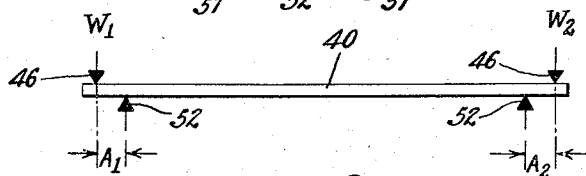


Fig. 6.

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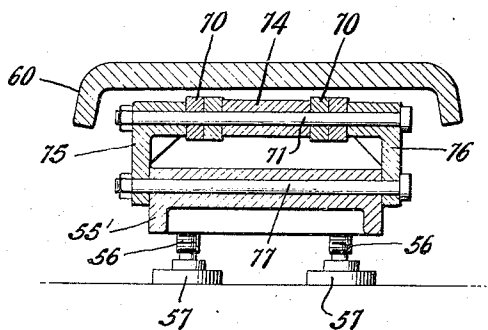
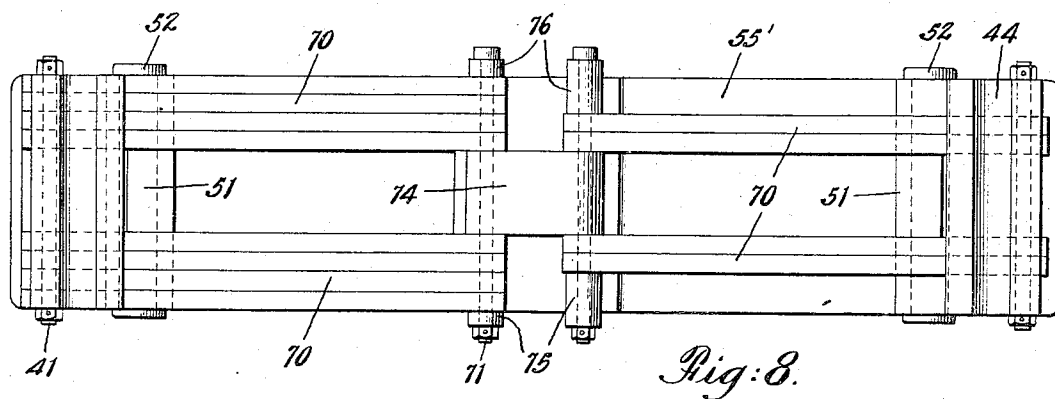
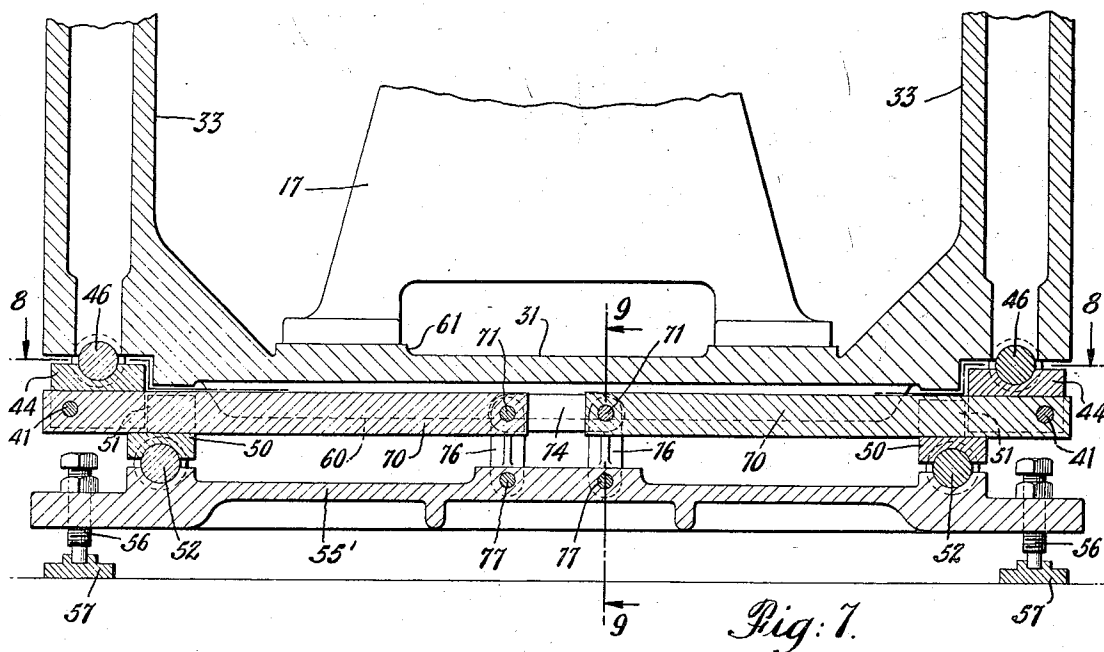
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3 Sheets-Sheet 3



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2,082,324

PRINTING PRESS

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Application August 24, 1935, Serial No. 37,614

18 Claims. (Cl. 101-1)

The present invention relates to high speed rotary printing presses and the like and more particularly to a novel and improved vibration-isolated rotary printing press particularly adapted for installation and use in steel frame and other buildings.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

Figure 1 is a side elevation, partly diagrammatic, and with certain parts omitted, of a portion of a printing press installation in accordance with the present invention;

Figure 2 is a fragmentary detailed side elevation, partly in section, of the resilient vibration-isolating means embodying the present invention;

Figure 3 is a section taken on the line 3-3 of Figure 2;

Figure 4 is a section taken on the line 4-4 of Figure 2;

Figure 5 is a perspective view of a spring assembly for use in connection with the present embodiment of the invention;

Figure 6 is a load diagram illustrative of the embodiment shown in the other figures of the drawings;

Figure 7 is a sectional view similar to Fig. 2, but showing a modified form of resilient mounting;

Figure 8 is a detached plan on line 8-8 of Fig. 7; and

Figure 9 is a section on line 9-9 of Fig. 7.

The present invention has for an object the provision of a novel and improved high speed rotary printing press adapted for installation and use in buildings in which vibration is objectionable, such as in sky-scrapers. Another object is the provision of a novel and improved vibration isolated rotary newspaper printing press. Still another object is the provision of an improved vibration-isolating mounting for heavy, vibration-producing machinery permitting the installation of such machinery in steel-frame and other types

of buildings. The invention further provides a highly resilient mounting for high speed, rotary, unit-type newspaper printing presses permitting only minute and unobjectionable relative movement between the several units while at the same time permitting unimpeded resilient movement of the several units as an entirety. Also, the invention provides a highly resilient press vibration isolating mounting which isolates the press against external disturbances and also contributes to the long life of the press.

In accordance with one embodiment of the invention a plurality of high-speed, rotary, perfecting, newspaper units are arranged in straight line formation, with rotary folding units interposed between certain of the printing units and a foundation is provided beneath all of the units. In said embodiment, the various perfecting printing units, and folder units also, have their frames mounted spaced apart and fixed on a bed plate or frame extending the full length of the press. The bed frame carrying the perfecting and folding units fixed thereto, is carried upon a plurality of separate, spaced-apart unit frames, and these unit frames are carried upon the vibration isolating supports. With the construction above described, the entire press is permitted vertical movement as a whole with only minute and unobjectionable relative movement of the various units, while at the same time the vibrational movement of each frame unit is damped and is isolated from the foundation and building, and this is done with an exceedingly small movement of the respective unit frames. So far as concerns many features of the invention, the perfecting and folding units could be mounted directly on the vibration isolating means.

In said present preferred embodiment, the perfecting printing units and folding units are all driven in unison, or such of the units are driven as may be needed for the particular product to be printed, and preferably a main drive shaft is provided, extending horizontally of the line of units and to one side thereof. The perfecting and folding units are individually supported on their foundation by means of relatively highly resilient mountings of highly elastic material which permit a relatively large spring deflection under the dead weight of the press with only a small movement of any unit, thereby giving the press great stability and insuring absorption of harmful and annoying vibrations while maintaining proper alinement of the several units. Each unit frame cooperating with the vibration isolating means, in this embodiment the frame

units extending downwardly from the bed frame, is supported on a plurality of points which are movable against resilient pressure acting to damp or absorb the vibration. These supporting points for the press frame are supported upon and move about a pivot point, and this movement is preferably opposed by resilient means. Preferably the resilient mounting comprises a longitudinal spring member positioned beneath each unit side frame and supporting the frame on its foundation, and preferably the springs support the frames at or near the spring ends, and are fulcrumed on the foundation by fulcrum pins which are spaced inwardly from the spring ends by only a short distance.

Where the rotary printing press is of the "unit" newspaper type, and is provided with a horizontal main drive shaft interconnecting the several units, the resilient, vibration insulating medium is preferably provided between each side frame, or frame leg, and the foundation and is so proportioned or designed relatively to the load carried by it as to provide substantially the same natural period of vibration for each of the frame supporting means. Preferably, and to further prevent or limit independent relative movement of the units, the resilient supporting means are so constructed and proportioned as to be subject to a resilient deflection much greater than the vibrational movement of the press, and with the illustrative embodiment of the invention, it is possible to obtain a satisfactory natural period with an exceedingly minute movement of the press supports. Due to the minuteness of this movement, the phase relation of the various press units is immaterial. These resilient supporting means, however, permit of a movement of the press sufficient to produce enough momentum to damp the vibrational movement of the press. Similarly, the initial deflection of the springs due to the dead load of the press is relatively great compared with the downward displacement of the press.

It will be understood that the foregoing general description and the following detailed description as well, are exemplary and explanatory of the invention but are not restrictive thereof.

Referring now in detail to the illustrative embodiment of the invention as shown in the accompanying drawings, the invention is shown as embodied in a rotary printing press for printing newspapers, this press being of the unit type in which each pair of rotary perfecting couples is mounted in individual side frames, as are the folding units.

As embodied each of the rotary perfecting units 10 comprises two plate cylinders 11 and two co-operating impression cylinders 12 rotatably mounted in unit side frames 13 and adapted to be driven by means of a unit drive shaft 14, the several unit drive shafts, in turn, being driven from a main drive shaft 15 extending horizontally and to one side of the line of units 10. As many units as are needed may be provided, three only being shown, but in actual practice the number usually varies from 6 to 18 or even more. Beneath the units 10 are mounted the web supply means for the individual units and one magazine reel 17 is provided for each of the units, each reel supporting a plurality of web rolls 18 to be brought sequentially into operative position for feeding the paper web to its proper perfecting unit and from thence to the folder where the webs are associated, longitudinally folded, slit, cut into

sheets, folded transversely and finally delivered as finished products.

The folding unit 20 comprises side frames 21 in which are mounted formers and folding cylinders (not shown) and the folder parts are driven from the main drive shaft 15 through the folder drive shaft 22. Only one folding unit is shown, but as many as needed are provided and are interposed in the line of perfecting units in accordance with the various production requirements. In practice, one folding unit 20 is generally provided for each three, four or five perfecting units.

The several perfecting and folding units are all fixed in spaced apart and aligned relation on bed frames 25, extending longitudinally of the press and bolted together, the bed frame units comprising longitudinal side members and cross connecting members between the side members, the side frames of the perfecting units resting upon and being bolted to the side members of the bed frames. Suitable motor driving means are provided for driving the main drive shaft 15. Fixed to and extending downwardly from the bed frames 25 are provided the supporting frame work by which the press is supported on its foundation, and preferably a pair of supporting columns is provided on each side of the press for each perfecting unit 10, the supporting columns for each unit being conveniently positioned around the magazine reel for that unit. As embodied, the supporting frame-work on each side of the press comprises a pair of opposed U-shaped frames 30 and 31, these frames being securely bolted together at their end flanges 32 to form a closed frame-work, the vertical columns 33 of the frame members 31 being positioned so that the magazine reels 17 are centrally disposed with respect to them. The magazine reels 17 are preferably, but need not be, supported on the lower horizontal reaches of frames 31.

The press foundation may be constructed in the usual manner and may be independent of the foundation for the building in which the press is installed, but any suitably firm foundation is satisfactory. The illustrated foundation is finished to provide wells 35 on its upper surface, these wells being positioned immediately below the supporting frames 31, and is finished with concrete or other suitable material.

Intermediate the floor or wells 35 and the horizontal reach of frames 31 are positioned the resilient, vibration-isolating mountings for the press in accordance with the present invention and these mountings serve to support the several units of the press in aligned, substantially unchanging relation to each other thereby insuring proper operation of the driving mechanism, web feeding and web guiding devices.

Figures 2 to 5 of the drawings illustrate in detail the vibration-isolating mountings particularly adapted for use with the press shown in Figure 1, and as shown, these mountings comprise an individual spring system pivotally supporting one unit of the press frame members 31 at the spring ends, and pivotally supported on the press foundation by means of pivot blocks, which are variably vertically positionable with respect to the well floor 35 and pivotally support the springs at points between the frame pivot members, to provide a high degree of resiliency and relatively low frequency natural period of vibration combined with a very minute vibrational and dead weight displacement of the press.

As embodied, the resilient means for supporting the press frames on the foundation comprises

a plurality of long and narrow spring bars 40 of high grade spring steel, of substantially the same length as the lower horizontal reach 31, and these springs are held tightly in assembled, aligned relation by means of bolts 41 passing through apertures in the spring ends. The springs 40, of which eight are shown in Figs. 3 to 5 beneath a side supporting frame, are divided into two groups and these groups are held apart by means of the spacing block 43 formed integrally with fulcrum block or saddle 44 extending across the spring assembly. The spacing block 43 is also apertured to receive the spring-securing bolt 41. On its upper face saddle 44 is provided with a cylindrical recess 45 adapted to receive fulcrum pin 46 which pivotally connects the end of the springs with the side supporting frame, and the side supporting frame is similarly provided with a cylindrical recess immediately below the supporting column 33.

For pivotally supporting the springs 40 on the foundation 35, fulcrum blocks or saddles 50 are provided extending across the width of the spring assembly and provided with an upwardly projecting lug 51 to be fitted between the two groups of springs 40 and closely adjacent to the inner face of spacing block 43. On its lower side saddle 50 is cylindrically recessed to receive a fulcrum pin 52 which is supported in a similar cylindrical recess on the upper surface of the jack-plate 55. Jack-plate 55 is supported on the press foundation 35 by means of the jack-screws 56 threaded into plate 55 and having their lower ends resting in plates 57 secured to the foundation.

Fulcrum pins 52 are preferably positioned between fulcrum pins 46, although this relative relation of the pins may be reversed if desired, and the horizontal distance between pins 46 and 52 is determined by the resiliency of the assembled springs 40, the load carried by the pivot pin 46 and the natural period of vibration desired.

The lower horizontal reach 31 of the side supporting frames is channeled, and the downwardly extending sides 60 of this channel enclose the major portion of the spring assembly 40, while on its upper surface the horizontal reach 31 is provided with machined pads 61 to which the feet of the magazine reel 17 may be bolted. Fulcrum pins 46 and 52 are provided with enlarged heads to prevent endwise movement of the pins and to hold the side frames and spring assembly against sidewise movement on the foundation.

Figure 6 of the drawings is a load diagram showing the relation of the fulcrums to the spring 40. The location of the fulcrum points 52 in relation to the fulcrum points 46 is such as to give the proper spring deflections under the loadings W_1 and W_2 . In installing the press, the jack-plates 55 are so positioned to produce the desired spacing of the fulcrum pins 52, and the jack-plates are then raised to the proper level to support the units 10 and 20 in substantially exact alignment. Preferably the distance between the fulcrum pins 52 is not an integral multiple of the distance (A_1 or A_2) between either fulcrum pin 52 and the corresponding pin 46, thereby avoiding harmonic vibration of the springs which might occur were the inner pair of pins 52 placed at nodal points.

In Figs. 7, 8, and 9, a different form of the resilient means for supporting the press frames on the foundation is shown, and it will be understood that the showing of this form is likewise illustrative and not restrictive. In said form the canti-

lever spring bars 70, corresponding to the spring bars 40 in Figs. 1 to 6, terminate intermediately beneath the press and do not extend entirely across as in the precedingly described form. In Figs. 7 to 9 the spring bars 70 extend inwardly from either side to a point closely adjacent to the center line of the press, and the inner ends of the bars 70 are mounted on a rod 71 which is centrally supported in block or pedestal 74 supported on the bottom reach of the side frame of the press, and is supported at either side in brackets 75 and 76, which in turn are carried by a bolt 77 passing through the frame 55'. Fig. 8 illustrates the use of different numbers of the spring bars, as may be required or advisable to meet the widely different load conditions on different ends of the spring.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What we claim is:—

1. A high speed rotary newspaper printing press unit installation including in combination a rotary perfecting newspaper couple, side frames in which the cylinders of the couple are rotatably mounted, a press foundation, and relatively long springs bars on which the side frames are supported on the foundation.

2. A high speed rotary newspaper printing press unit installation including in combination a rotary perfecting newspaper couple, side frames in which the cylinders of the couple are rotatably mounted, a press foundation, and relatively long spring bars between the side frames and foundation, said springs being fulcrumed to the foundation and to the frames with one set of fulcrums spaced closer together than the other set of fulcrums.

3. A high speed rotary newspaper press installation including in combination a plurality of rotary perfecting printing units, a plurality of folding units interposed between the printing units, said units being arranged in line-formation and having supporting frames by which the unit parts are mounted, a press foundation and a spring mounting between each frame and the foundation for isolating the press vibration with respect to the foundation.

4. A high speed rotary newspaper press installation including in combination a plurality of rotary perfecting printing units, a plurality of folding units interposed between the printing units, said units being arranged in line-formation and having supporting frames by which the unit parts are mounted, a press foundation and a resilient mounting between each supporting frame and the foundation, said resilient mountings each comprising a spring having a deflection larger than the frame movement accompanying the deflection.

5. A high speed rotary newspaper press installation including in combination a plurality of rotary perfecting printing units, a plurality of folding units interposed between the printing units, said units being arranged in line-formation and having supporting frames by which the unit parts are mounted, a press foundation and a resilient mounting between each supporting frame and the foundation, said resilient mountings each comprising a spring having a deflection larger than the frame movement accompanying the

deflection, and a main drive shaft extending longitudinally of the press and geared to each of the units.

6. A high speed rotary printing press installation including in combination rotary printing couples, relatively long bed frames on which said couples are rotatably mounted, a foundation, and spaced resilient mountings for supporting said frames on said foundation, each of said resilient mountings having a natural period of vibration which is low with respect to press speed, and each of said mountings being subject to a relatively large deflection with a relatively small movement of the press frame.

7. A high speed rotary printing press installation including in combination rotary printing couples, relatively long bed frames for holding said couples in a predetermined spaced relation while rotating, a foundation, and spaced resilient mountings supporting said frames on said foundation, each of said mountings including a spring having a spring deflection larger than the frame movement accompanying the deflection.

8. A high speed printing press installation including in combination a plurality of unit-type rotary printing couples arranged in line-formation, unit-type rotary folding mechanism interposed between said printing units, each of said units having frames in which their parts are rotatably journaled and supporting frames, a foundation and means for holding said frames in substantially a predetermined relation, said means including spring mountings interposed between the unit supporting frames and the foundation, said mountings having a spring deflection larger than the frame movement producing the deflection.

9. A vibration-isolating mounting for printing presses including in combination a relatively long spring, means for pivotally supporting a press frame adjacent to the spring ends and means adjacent to the first means for pivotally supporting the spring on a foundation.

10. A vibration-isolating mounting for printing presses including in combination a relatively long spring, vertically movable fulcrum blocks beneath the spring and means for pivotally connecting the spring with the press frame and the fulcrum blocks, the connections being close to the end of the spring and spaced slightly from each other.

11. A vibration-isolating mounting for printing presses including in combination a plurality of long narrow springs, means for holding said springs in assembled relation, a saddle at each end of the spring assembly, a second saddle closely adjacent to each of the first saddles, and fulcrum pins pivotally connecting the saddles with the press frame and foundation.

12. A vibration-isolating mounting for print-

ing presses including in combination a plurality of long narrow springs divided into two groups, means for holding said springs in assembled relation, a saddle at each end of the spring spacing said groups, saddles closely adjacent to each of the first saddles but on the other side of the spring assembly and fulcrum pins pivotally supporting the one set of saddles and supporting the press frame on the other set of saddles.

13. A vibration-isolating mounting for heavy vibration-producing machinery including in combination a relatively long spring, means for pivotally supporting the machine adjacent to the spring ends and means adjacent to the first means for pivotally supporting the spring on a foundation.

14. A vibration-isolating mounting for heavy vibration-producing machinery including in combination a plurality of long narrow springs, means for holding said springs in assembled relation, a saddle at each end of the spring assembly, a second saddle closely adjacent to each of the first saddles, and fulcrum pins pivotally connecting the saddles with the machine frame and foundation.

15. A vibration-isolating mounting for heavy vibration-producing machinery including in combination a plurality of long narrow springs divided into two groups, means for holding said springs in assembled relation, a saddle at each end of the spring assembly to receive a fulcrum pin and to space the spring groups, and a spring support intermediate the saddles.

16. A vibration-isolating mounting for heavy vibration-producing machinery including in combination a relatively long spring, means for supporting the spring at widely spaced points on a foundation, means for supporting the machinery at widely spaced points on the spring, the spring supporting and machinery supporting points being spaced slightly from each other.

17. A vibration-isolating mounting for heavy vibrating machinery including in combination a relatively long spring, means for pivotally supporting the machinery on the spring at widely spaced pivot points and means for pivotally supporting the loaded spring at widely spaced pivot points.

18. A vibration-isolating mounting for heavy vibrating machinery including in combination a relatively long laminated spring, a pair of spaced, machinery supporting, saddle-blocks secured to the spring, a pair of spaced, spring-supporting saddles slidable along said spring whereby the spring-supporting saddles may be positioned close to the machinery-supporting saddles with one pair of saddles within the other pair.

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