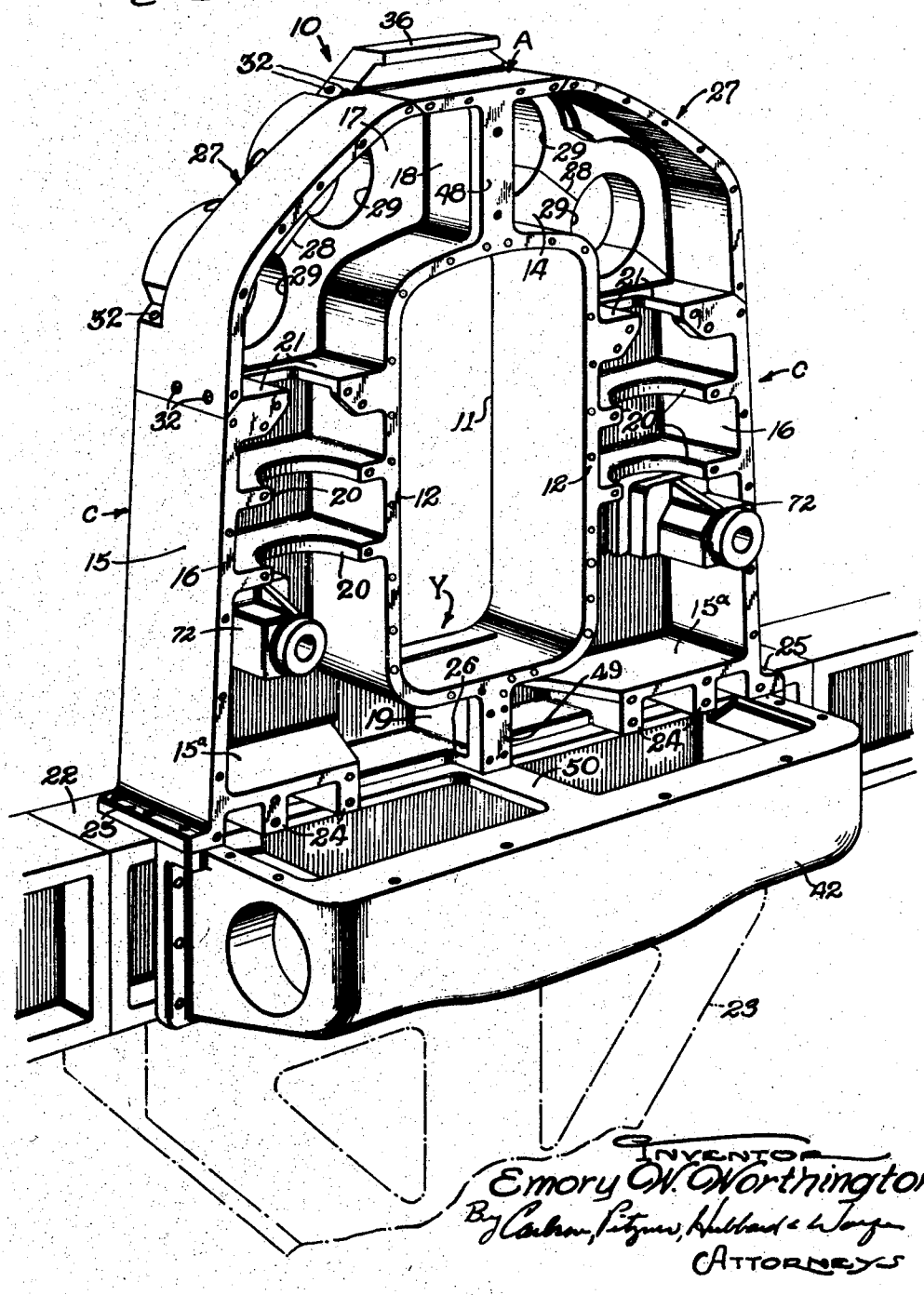
Aug. 24, 1948. E. W. WORTHINGTON 2,447,887

PRINTING PRESS FRAME

Filed Jan. 12, 1945 4 Sheets-Sheet 1

Fig. 1



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PRINTING PRESS FRAME

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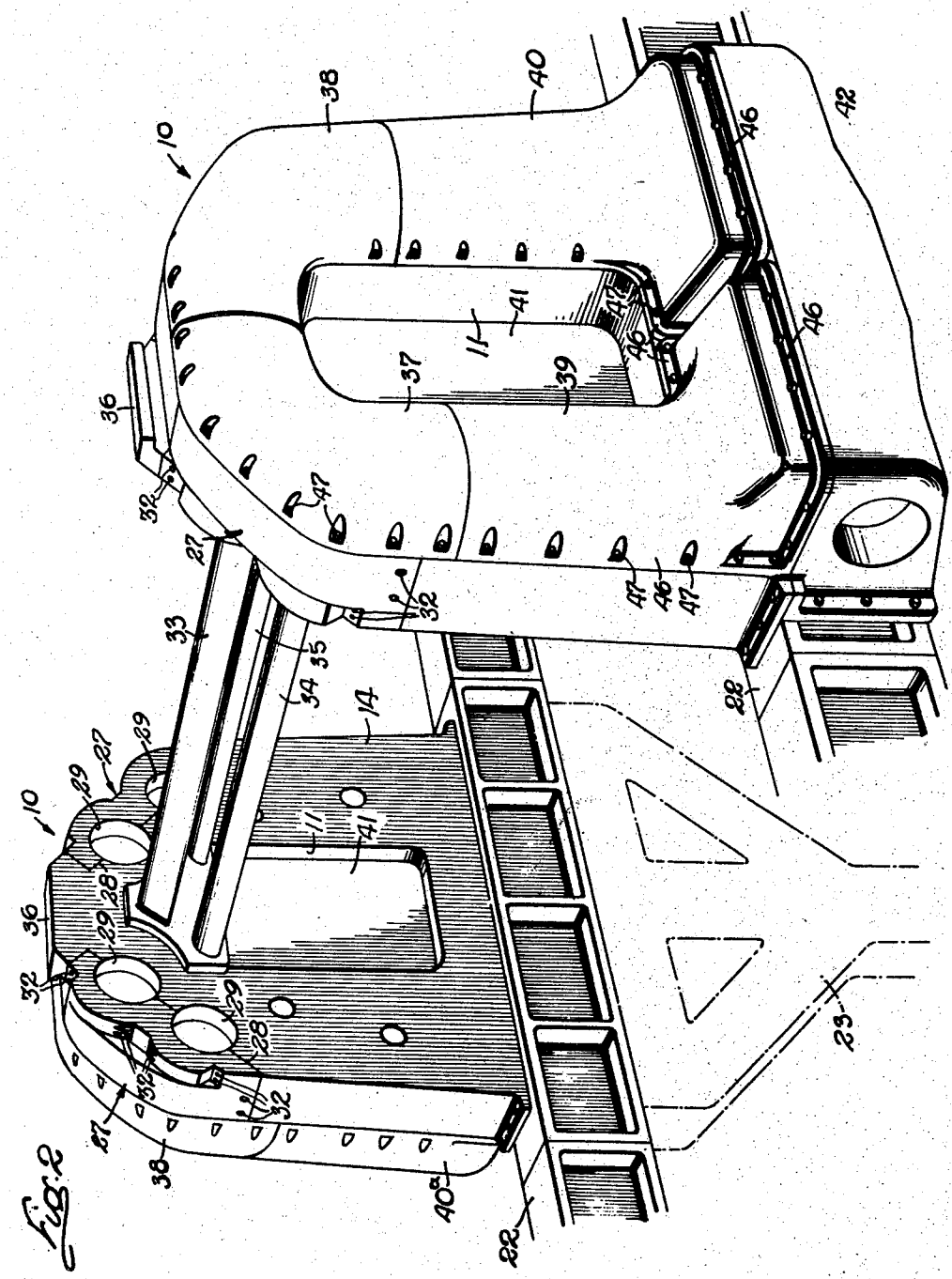


Fig. 2

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Fig. 3

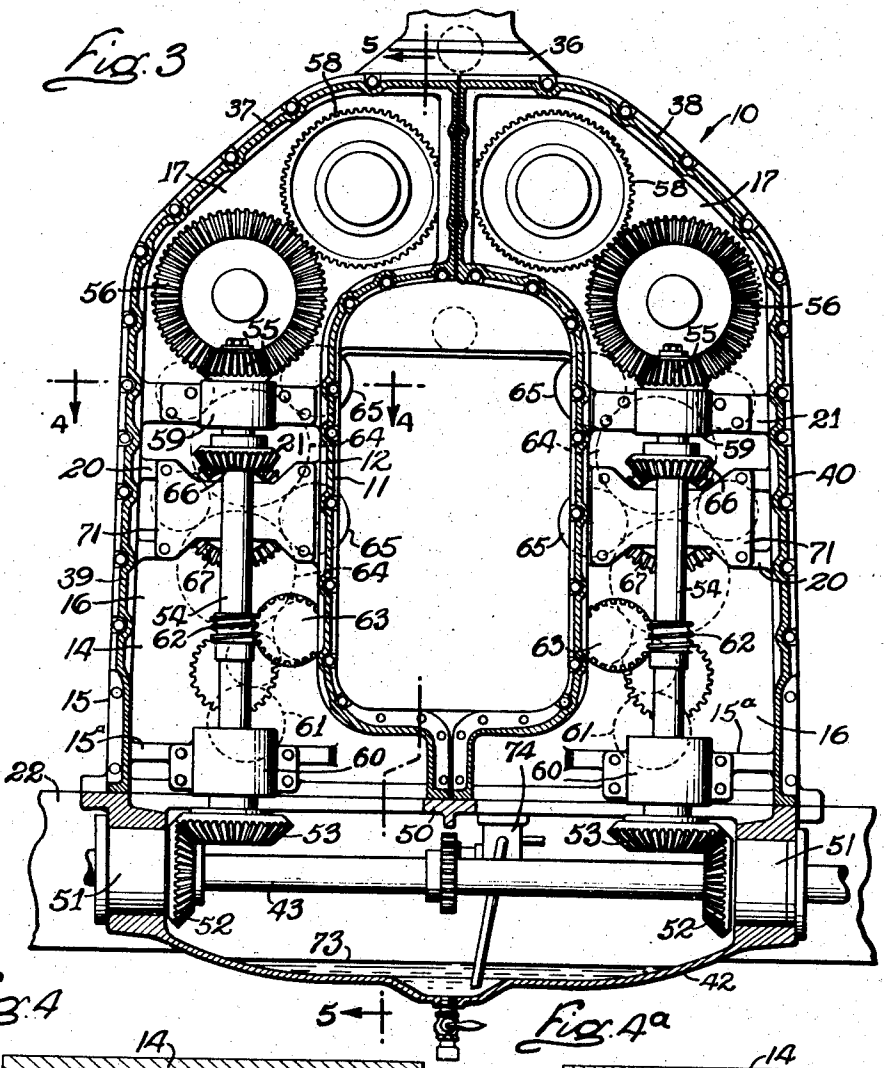


Fig. 4

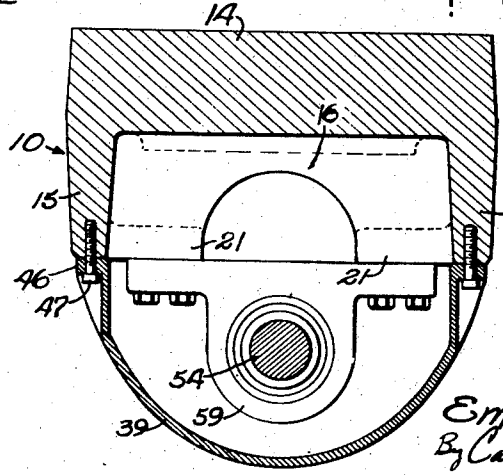
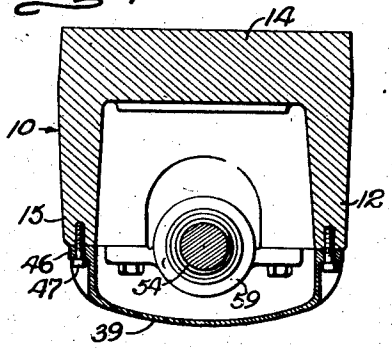


Fig. 4a



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Fig. 5

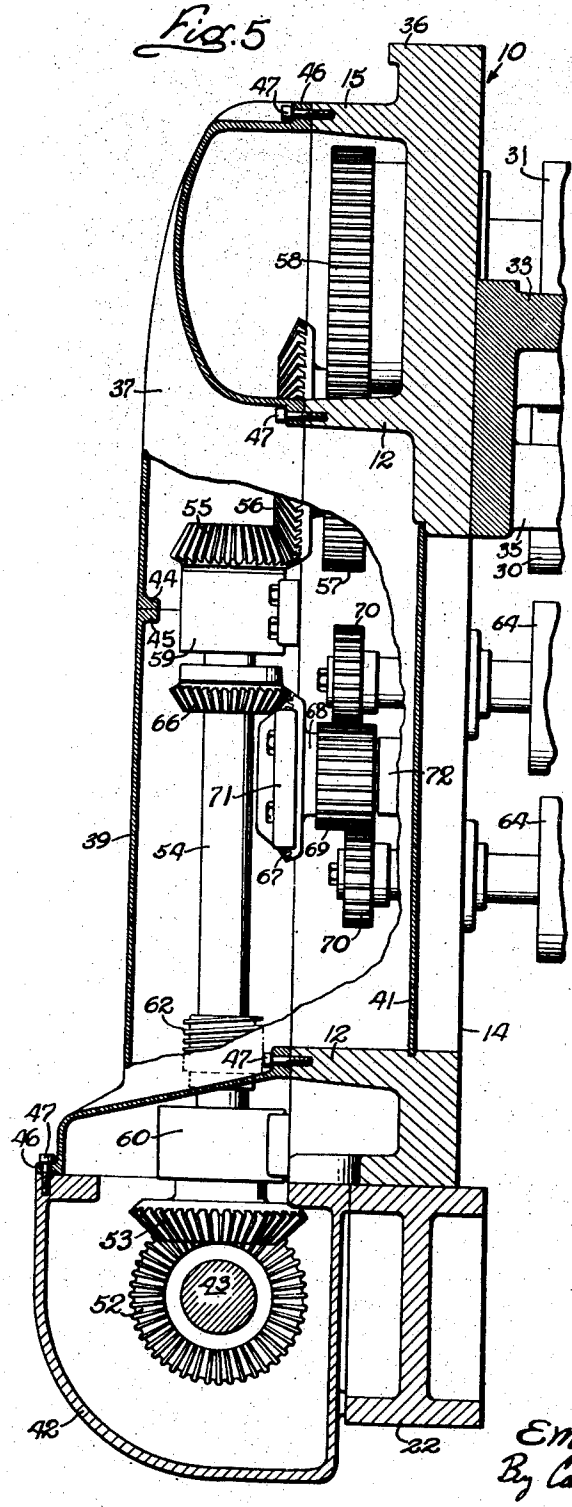
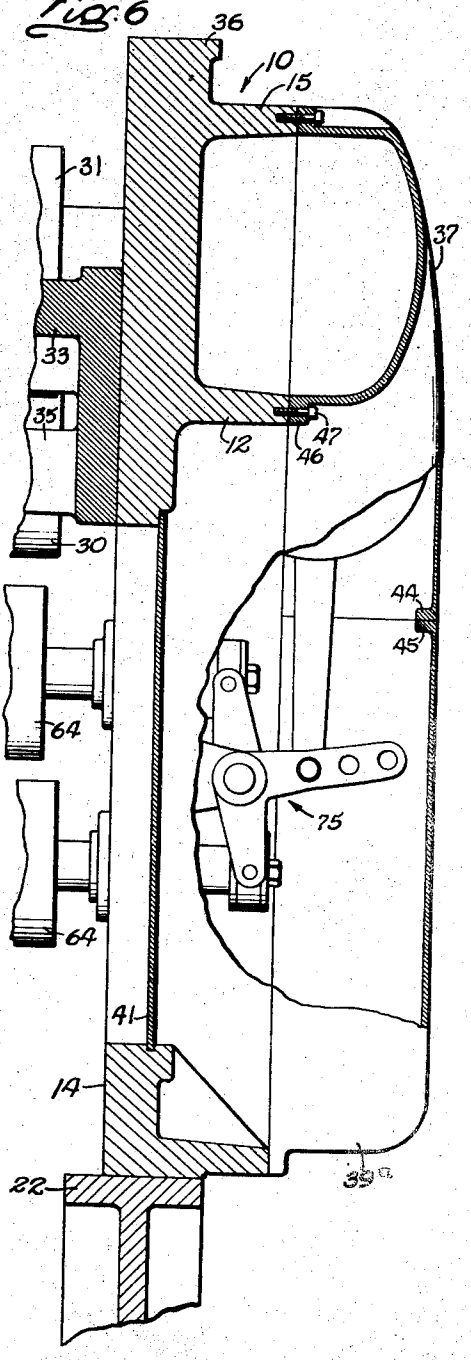


Fig. 6



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UNITED STATES PATENT OFFICE

2,447,887

PRINTING PRESS FRAME

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Application January 12, 1945, Serial No. 572,567

11 Claims. (Cl. 101—216)

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The present invention pertains to framing for printing presses.

Few machine structures have as exacting requirements with reference to strength and durability as do the frames of printing presses. For example, the frame of a rotary type printing press unit such as is used for newspaper or other continuous web printing must bear a series of cylinders and rollers weighing several tons and revolving at the tremendously high speeds requisite for printing of 50,000 to 60,000 newspapers per hour. The close tolerances demanded for spacing of the rotating elements, plus the necessity of minimizing vibration and weaving makes extreme rigidity imperative. Moreover, the structure must be such as to stand up under these punishing requirements day in and day out over long periods of time to afford the continuity of service demanded in the newspaper field.

The general aim of the present invention is to provide a novel and improved printing press frame which, with a minimum of machining or finishing for the rough castings used, affords a structure having not only maximum rigidity and strength in relation to its weight, but which also constitutes an effectual housing for the drive mechanism of the press. To put it another way, the purpose is to afford the necessary strength and rigidity while eliminating a large portion of the machining cost that has resulted from the heretofore common use of slab type frames with intricate sectionalized housings applied to enclose the drive mechanism and support outboard bearings and the like of the same.

More particularly, it is an object of the invention to provide a rotary printing press unit framing which has not only the characteristics noted above but which is also such as to afford an unobstructed tunnel or crawl space extending transversely through the unit from an opening in one or preferably both sides and by virtue of which free access may be had to the various cylinders and rollers comprised in the unit.

The invention also resides in a novel side frame for such rotary printing press units.

A further object is to provide a printing press frame recessed to receive the drive mechanism and equipped with a simple set of removable covers so constructed that machining to accomplish oiltight sealing of the covers to the frame is minimized through employment of finishes that all lie in a single plane, both on the frame and on each cover.

Still another object is to provide a printing press frame of the character indicated in the

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immediately preceding statement of object and in which the finish on the frame there alluded to also serves as a mounting surface for supporting brackets of the drive mechanism.

Further objects and advantages of the invention will become apparent as the following description proceeds, taken in connection with the accompanying drawings in which:

Figure 1 is a perspective view of one of the side frames of the framing for a rotary type printing press unit embodying the present invention.

Fig. 2 is a perspective view of a pair of side frames like that of Fig. 1 tied together and mounted in an appropriate manner to complete the framing of a press unit.

Fig. 3 is a front elevation of the side frame of Fig. 1 with the drive mechanism for the printing press unit installed therein, the covers for the frame and the lower drive housing being shown in vertical section.

Fig. 4 is an enlarged detail transverse sectional view taken substantially along the line 4—4 in Fig. 3 and showing in plan one of the drive shaft brackets and its asscociated mounting pad on the frame.

Fig. 4a is a view similar to Fig. 4 but showing a modified form of bracket and mounting pad therefor on the frame.

Fig. 5 is an enlarged vertical sectional view taken substantially along the line 5—5 in Fig. 3.

Fig. 6 is a vertical sectional view similar to Fig. 5 but taken through the side frame at the side of the unit opposite to that for Fig. 5.

Referring more particularly to the drawings, the invention has there been exemplified as embodied in the framing of a rotary type printing press unit of the general class employed in newspaper work. Such embodiment has been selected since the invention is, in some respects, peculiarly adapted to such units. Moreover, the problems which the present invention solves are particularly acute in such units. In some of its broader aspects, however, the present invention is applicable to other types of presses or press units. Accordingly, there is no intention to limit the invention, in all respects, to that particular use. On the contrary, the intention is to cover all adaptations, modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

In Fig. 1 is shown a press unit side frame, designated generally as 10, and which in large measure constitutes the key or basic element for the

framing illustrated. Two such side frames 10 (see Fig. 2) of substantially identical construction, arranged back to back in spaced relation, are employed in a rotary printing unit, the various rollers, cylinders, etc., being rotatably mounted at their opposite ends in these frames (see Figs. 3, 5 and 6).

The side frame 10 (Fig. 1) is of a form unique in printing presses and may be aptly termed as being of a "shell type" as will be evident from inspection of its general shape. It is comprised of two columnar portions C, C rising on either side of a central opening 11, joined at their lower ends by an integral transverse yoke portion Y, and at their upper ends by an integral arch portion A. The columnar and arch portions of the frame are of channel-shaped cross section, the center opening 11 being defined by a continuous inner flange or wall 12, the opening being of generally rectangular outline with rounded corners. The channel shape for the columns and arch is completed by a vertical and generally flat back wall 14 together with a marginal flange or wall 15 extending up the sides and over the top. The frame 10 is thus chambered or recessed to define outwardly facing pockets which are utilized for the reception of the drive mechanism, an exemplary form of which is indicated in Fig. 3. Thus pockets 16 are defined in the columnar portions C of the frame, merging at their upper ends with a pair of inwardly curved or slanted pockets 17 in the arch A. The latter pockets are separated by a web 18 bridging between the flanges 12, 15 along the vertical center line of the frame. A similar center line web 19 projects from the lower side of the inner flange 12. Additional webs indicated at 20 and 21 serve to reenforce the side walls of the columnar pockets 16, 16 as well as to support certain brackets, as will hereinafter appear.

The shell type side frame 10 thus being of generally channel-shaped cross section with internal reenforcing webbing, it is comprised throughout of rigidly joined and angularly related walls. In consequence it affords an extremely rigid structure of great stiffness as compared to its weight so that it is highly resistant to twisting, weaving or vibration. On the other hand, the more or less hollow or internally chambered structure which results from this shell type construction affords suitable pockets or chambers for enclosing a large bulk of gearing, shafting, etc., for the press drive.

When installed at the point of use the side frames 10 are anchored to so-called wall brackets or sills 22 (see Figs. 1 and 2) which are sectional beams of deep and massive section. Such wall brackets are ordinarily supported on the upper ends of Y-columns 23 between which the paper reels (not shown) are mounted. A plurality of downwardly facing ribs 24 (Fig. 1) projecting from the lower side of bottom shelf portions 15a of the frame rest on the wall brackets 22 as do edge flanges 25 on the frame and a flange 26 on the bottom edge of the lower center web 19. All of the flange and web surfaces of the frame which contact the wall bracket are milled or otherwise finished so as to lie in a common horizontal plane.

The frame 10 of Fig. 1 is preferably fashioned as a single massive casting with the various pockets and openings cored out of the same except that two portions constituting arch caps 27 are removable. The lines of juncture of such caps with the main portion of the side frame

are indicated at 28 and pass through the centers of openings 29 which receive the journals for the printing cylinders and impression cylinders. One printing cylinder 30 and one impression cylinder 31 (Figs. 5 and 6) are mounted on each side of the vertical center line of the unit so as to complete two duplicate printing couples for the unit, the printing cylinder being the lower one of the pair in each case. Bolts 32 removably secure the caps 27 in place.

The upper portions of the side frames 10 may be rigidly tied together in various ways as for example by the three transverse frame elements 33, 34 and 35, shown in Fig. 2 (see also Figs. 5 and 6). In this instance these three transverse frame elements are spaced apart to define slots therebetween for passage of the webs of paper (not shown) which are received in the printing couples. These three transverse frame elements are located at respective corners of a triangle, the upper member 33 being of inverted V-shape cross section with a rounded upper edge and the lower members 34, 35 being of inverted arcuate cross section.

Flat-topped integral feet 36 are provided on the upper portions of the side frames to carry the catwalks or other usual superstructure (not shown) of the press. It will be understood, incidentally, that a plurality of press units may at times be arranged one above the other with the side frames of each unit supported from those of the next unit below it.

In order that the various pockets in the face of the side frames may constitute oiltight housings for the drive mechanisms received in them, covers are applied. As indicated in Fig. 2, the covers for each side frame are preferably divided into two cover structures for the right and left-hand portions, respectively, of the frame, and each such structure is split transversely, about midway up the frame, into two separate sections, making a total of four sections. These covers may be made of some light material such as aluminum to facilitate their handling, since they do not bear any weight of outboard bearings or the like. By dividing the covers into four sections as shown, appropriate ones of the two upper sections 37, 38 may be removed to afford access to the ends of the corresponding printing couples, whereas removal of appropriate ones of the two lower covers 39, 40 exposes fully the driving mechanisms in the column pockets 16. If desired, removable panels 41 may also be placed in the central openings 11 of the side frames to prevent the emergence of ink mist.

The covers 37 to 40 are, as indicated in Fig. 2, all bellied outward, being of curved cross section as appears in Figs. 4 and 5. Such shape is utilized in order that ample clearance will be afforded for various drive mechanism elements which are secured to the same finish on the frame as the covers themselves. To simplify machining of the frame and covers, the outer face of the side frame itself is all machined flat so as to lie in a single substantially vertical plane. Necessity for gang milling of a multiplicity of surfaces in different parallel planes is thus avoided. Since all portions of the covers which abut against the frame contact the single-plane outer face finish on the latter, such portions of the covers may also be machined flat and in a single plane.

At the so-called "drive side" of the press unit, which is the side nearest the observer in Fig. 2, an elongated trough-shaped casing 42 is pro-

vided for a main horizontal drive shaft 43 of the press (see Fig. 3). This casing 42 has right-angularly related, accurately machined surfaces at its rear side and top which are abutted respectively against the outer side face of the wall bracket 22 and the overhanging portion of the side frame 10, being anchored to the same. On such drive side of the press the lower pair of covers 39, 40 is extended out over the open top of the casing 42 and is screwed to the top surface of this casing. At the opposite or so-called "operating side" of the press the lower pair of cover sections 39*a*, 40*a* is of slightly different shape (see Figs. 2 and 6), the lower edges being secured directly to a continuous marginal bottom flange on the side frame, there being no casing like 42 present. Otherwise the covers at the two ends of the machine are alike.

To be particularly noted is the arrangement utilized for eliminating any necessity for accurately dimensioning the spacing of opposite end surfaces with reference to each other on each of the several covers 37 to 40. It will be observed that if the covers were abutted end-to-end as a series of four more or less L-shaped parts to close the rectangular series of pockets on the outer faces of the side frames 10, a large amount of close tolerance fitting would be entailed. Such fitting or precise dimensioning would be requisite since the end surface on each cover would in each case have to be precisely located, both in distance and angularity, with reference to the opposite end surface on that same cover. To avoid such expensive fitting each of the covers 37 to 40 has, in the present instance, been arranged so that it has ony one end, not two, which abut against an adjacent cover end in the series. And the opposite end is in each case sealed to the frame face rather than to an adjacent cover.

In the specific arrangement illustrated, the covers 37, 39 at one side of the frame have respective top and bottom flanges 44, 45 abutted together (see Fig. 5) and the covers 38, 40 at the opposite side have similar abutted flanges (not shown). The adjacent portions of the upper covers 37, 38, and lower covers 39, 40 do not actually abut together, however, even though they have somewhat that appearance at first glance. Instead, such ends of the covers are spaced apart slightly and provided with flat edge portions 46 (Figs. 2 and 5) which continue on and around the sides of each cover. These flat edges of the covers are abutted against the flat outer face of the side frame, being secured by screws 47 at suitably spaced intervals. To afford a frame surface for receiving the flat border portions at the ends of the covers, bridges 48, 49 are provided (Fig. 1) in the form of flanged forward edges on the upper and lower center line webs 18, 19. At the "drive side" of the press (see Figs. 1 and 2) a central bridge 50 in the top of the shaft housing 42 constitutes in effect a right angle extension of the bridge 49 and the adjacent lengths of the flat edge portions 46 on the lower covers 39, 40 are screwed flat against it.

From the foregoing it will be perceived that each of the covers 37 to 40 is individually removable without interference with any other. Any gang milling on either the frame or covers themselves is obviated insofar as provision of finishes for attachments of the covers is concerned. Close tolerance dimensioning of the covers or finishes on them is obviated. And despite such simplifications a highly effectual oiltight

seal is provided for the entire pocketed face of the frame.

Attention may now be given to the illustrated drive mechanism in order to make clear its correlation with the frame and the functions of the latter in reference to the drive mechanism. It should be understood that the particular drive mechanism shown is but one of many specifically different forms that may be advantageously employed with a frame embodying the present invention. And as a matter of fact the drive mechanism per se, which is here illustrated, constitutes the subject matter of the copending application Serial No. 572,568, filed January 12, 1945.

In the drive mechanism illustrated a main horizontal drive shaft, such as shaft 43, is utilized, the same being journaled in bearings 51 at opposite ends of the housing 42 (Fig. 3) and driven from a suitable electric motor or motors (not shown). This horizontal shaft is connected by pairs of bevel gears 52, 53 with corresponding ones of a pair of upright drive shafts 54 led up the faces of corresponding columnar portions of the adjacent side frame and connected at their upper ends by pairs of bevel gears 55, 56 directly with the shafts of the printing cylinders 30 for the corresponding couples (see also Fig. 5). The associated impression cylinder 31 of each couple is driven from its printing cylinder by spur gears 57, 58. By leading the drive connections for the two printing couples upward at opposite sides of the opening 11 the latter is left free and unobstructed.

The upright drive shafts 54 are journaled at their upper and lower ends respectively in bearings carried by the brackets 59, 60. The upper brackets 59 are secured to the end faces of the webs 21 whereas the lower brackets 60 are secured to the end faces of the ribs or webs 15, 24 (see Figs. 1, 3 and 4). It will thus be seen that these brackets 59, 60 are fixed to finishes on the frame which are coplanar with the finishes to which the covers are attached, thereby simplifying the machining of the frame.

An alternative mounting arrangement for the shafts 54 is shown in Fig. 4*a*. As there indicated the bracket 59 may be of such shape that the faces on its side wings which are bolted to the frame webs lie in a plane passing diametrically through the shaft, rather than behind it as in Fig. 4. Similarly shaped brackets are, in such case, used for the lower ends of the shaft. The net result is to set the shafts 54 further back into the face of the side frame so that the covers 39 may be somewhat shallower.

Drive connections for the inking mechanisms and fountains of the unit are, so to speak, tapped off the intermediate portions of the vertical shafts 54. Fountain rollers, indicated at 61 in Fig. 3, may be driven from worms 62 rigid with respective ones of the shafts 54 and meshing with worm wheels 63, which are connected through suitable gearing (not shown in detail) with corresponding ones of the fountain rollers. The inking mechanism for each end of the unit, which serves to convey ink from the fountain rollers to the associated printing cylinders, may include vibrating drums 64 (Figs. 3, 5 and 6), as well as rollers 65. Such drums are 64 rotatively driven from bevel gears 66, rigid with respective ones of the vertical shafts 54, and meshing with bevel gears 67. The latter, fixed to stub shafts 68 (Fig. 5), have rigid therewith pinions 69 meshing with pinions 70 on the respective drums 64. Brackets 71 bolted to the outer edges of webs 20 support

the outboard ends of the stub shafts 68. The fountain drive worm wheels 63 are, on the other hand, fixed to stub shafts (not shown) journaled in brackets 72 bolted into inner finished surfaces (Fig. 1) on the inner wall 14 of the side frame.

To expose a desired portion of the drive mechanism for servicing, the operator has only to remove the appropriate one or more of the covers 37 to 40 at the drive side of the press.

A reserve supply of lubricant is preferably maintained in the drive shaft housing 42, the oil covering the extensive bottom surface of this housing to a depth indicated approximately at 73 (Fig. 3) so that ample cooling of the oil is afforded. Oil from this reserve is supplied under pressure by a pump 74 to the various meshing gears, bearings, etc., through suitable connections (not shown) and cascades down over the various moving elements housed in the frame pockets 17, 18 returning to the housing 42 by gravity flow.

At the opposite or operating side of the press unit the side frame houses appropriate portions of the actuating mechanism for the unit, such, for example, as the fragmentarily illustrated rocker mechanism 75 (Fig. 6) which oscillates the drums 64 axially.

From the foregoing it will be perceived that a novel framing for printing presses has been provided which is extremely stiff and rigid in proportion to the weight of material employed, but which entails a minimum of machining in its construction. To recapitulate as to the latter, it will be observed that all portions of the outer faces of the side frames 10 are flat and lie in a single plane so that they may be machined in a single operation. Similarly, the finished surfaces on the bottom of each side frame also are flat and lie in but a single plane, in this instance at right angles to the side face, and may be machined in a single operation. The only other finish surfaces on the side frames, aside from those for the caps 27 and the bores for the several cylinder shafts, etc., are the inner vertical surfaces such as those for the brackets 72 and all lying in a single vertical plane. Machining of the covers 37 to 40 entails merely provision of flat surfaces on their edge portions 46, coplanar throughout, together with flat surfaces on the flanges 44, 45. Effectual oiltight housing of the drive mechanism is afforded with complete freedom of access whenever desired.

I claim as my invention:

1. A shell type side frame for a rotary printing press unit comprising spaced upright columnar portions of channel-shaped cross section joined at their lower ends by an integral transverse reenforcing yoke and at their tops by an integral arch, said channel-shaped columnar portions having walls, the outwardly presented edges of which lie substantially in the same plane for housing the drive mechanism for rotary printing press elements, means recessed between the walls of said channel-shaped portions for journaled mounting of said drive mechanism, and a removable cover structure adapted to engage said outwardly presented edges and sealingly close the open outer sides of said columnar portions to constitute the latter oiltight housings for said drive mechanisms.

2. The combination of a shell type side frame for a printing press unit having spaced upright columnar portions joined at their lower ends by an integrally transverse reinforcing yoke having a flat supporting surface thereon and joined at their tops by an integral arch, said columnar portions, yoke and arch having a common flat outer face lying in a generally vertical plane, said frame being recessed to define pockets open at said outer face for the reception of the drive mechanism of the unit, and means including a removable cover structure for said pockets adapted to seat against said flat face for coaction with said frame in defining an oiltight housing for a drive mechanism in said pockets.

3. A side frame for a rotary type printing press unit comprising an upright shell type structure including a back wall portion having an open center bordered by a substantially continuous reenforcing inner flange integral with said back wall portion, said wall also having integral therewith a reenforcing border flange generally paralleling said inner flange in spaced relation with the same and coacting with said inner flange to define at least one deep pocket opening outward and perpendicularly away from the back wall of the frame for the reception and enclosure of the drive mechanism for the press unit, the lower portion of said border flange providing an extensive flat mounting surface for said frame.

4. A shell type side frame for a rotary printing press unit, said frame being of inverted U-shape with an integral reenforcing yoke extending between the legs of the U, said U being of channel-shaped cross section substantially throughout its length for the housing of the drive mechanism therein, said frame having a pair of apertures therein on each side of a vertical median plane dividing the same for journaling the ends of the components of printing couples located with one couple on one side of said plane and the other couple on the other side, and said frame including structurally separable cap portions divided from the remainder of the frame along angularly related parting lines passing respectively through the centers of each pair of apertures.

5. In a rotary type printing press unit, the combination of a pair of spaced side frames having tie means extending therebetween rigidly joining the same, means for journaling first and second printing couples between said frames on opposite sides of a vertical median plane therethrough, at least one of said frames including a pair of laterally spaced columns disposed on opposite sides of a central opening in such frame giving access between said couples, means for journaling a horizontal drive shaft in position to extend along the lower portion of said one frame, and said columns having a chamber therein enabling access to the journaling means for said couples and adapted for the housing of drive connections from said horizontal drive shaft to respective ones of said couples whereby said opening between said columns is left free and unobstructed by any drive connections to the couples.

6. In a rotary type printing press unit, the combination of a pair of spaced side frames having tie means extending therebetween rigidly joining the same, each of said side frames comprising a shell facing outwardly with respect to said tie means and having two upright columnar portions spaced apart transversely and joined at their tops and bottoms by integral portions of such side frames, a horizontally elongated housing fixed to the lower portion of one of said side frames and adapted to receive a horizontal drive shaft, said columnar portions of said one side frame being adapted to receive drive con-

nections extending upwardly from said shaft, said housing defining an oil reservoir therein and communicating at its upper side with the interiors of said columnar portions of said one side frame for drainage of lubricant from the interior of such columnar portions down into said reservoir.

7. In a rotary type printing unit for mounting on a massive beam type wall bracket or sill, the combination of an upright shell type side frame having a pair of upstanding columnar portions spaced apart transversely and of channel-shaped cross section to present pockets facing outwardly from the plane of said columnar portions and adapted to house a drive mechanism for the press, means for anchoring said side frame on said wall bracket and generally alined therewith with the outer portion of the frame overhanging the latter, a horizontally elongated housing dimensioned to fit in the angle between the outer face of said wall bracket and the overhanging portion of said frame, said housing being adapted to receive a horizontal drive shaft and having an open top projecting outward beyond the bottom of said side frame, and a plurality of removable covers adapted to close said pockets and the top of said housing.

8. In a rotary type printing unit, the combination of an upright shell type frame having an open center surrounded by a series of pockets facing outwardly with respect to the plane of said frame and adapted to house a drive mechanism for the unit, a horizontally elongated drive shaft housing having an open top, means for securing said housing to the lower portion of said frame with at least a portion of the top of said housing unobstructed by said frame and with the interior of said housing in free communication with said pockets for circulation of lubricating oil therebetween, said housing defining an oil reservoir therein, and a plurality of cover sections dimensioned to overlie and close said pockets, at least some of said covers having portions thereof dimensioned to overlie and close the top of said housing.

9. The combination of a printing press side frame presenting a generally vertical flat outer face recessed to define a pair of drive-housing pockets separated by a web partition which is transversely arranged with respect to said face, two pairs of removable covers, each pair being dimensioned to close a corresponding one of said pockets, the end of each cover adjacent the other cover in its pair having a flat transverse end face adapted to abut against such face on the other cover of the pair, said covers each having border portions extending about the margins thereof continuously except at the ends having said flat faces thereon and presenting flat faces

adapted to lie against said flat outer face of said frame, and said web having an enlarged outer edge constituting a portion of said side frame face and adapted to underlie the flat faced edge portions on the ends of said covers lying on opposite sides of said web.

10. The combination of a printing press side frame having a central opening and with the portions on each side thereof recessed to define a pocket, means for journaling a drive mechanism within said pocket, the portion of said frame bordering said pocket being flat, a cover structure removably fixed to said frame and having a border portion extending entirely thereabout shaped to lie flat against said frame and substantially surrounding said central opening, and said cover structure being split transversely into two structurally separate generally J-shaped sections with a flange on each section abutting flat against the face of a corresponding flange on the other section along the parting line between said sections.

11. The combination of a printing press side frame having a central opening for access therethrough, the side portions of said frame adjacent said opening being recessed to define an internally webbed pocket for the reception of a drive mechanism, the portion of said frame bordering said pocket and the outer ends of the webbing in the latter all being finished flat in a common plane, a cover structure having a marginal portion presenting a flat face adapted to seat against said bordering portion of said frame, and means including a bracket adapted to be fixed against said flat webbing ends for supporting a drive mechanism in said pocket.

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