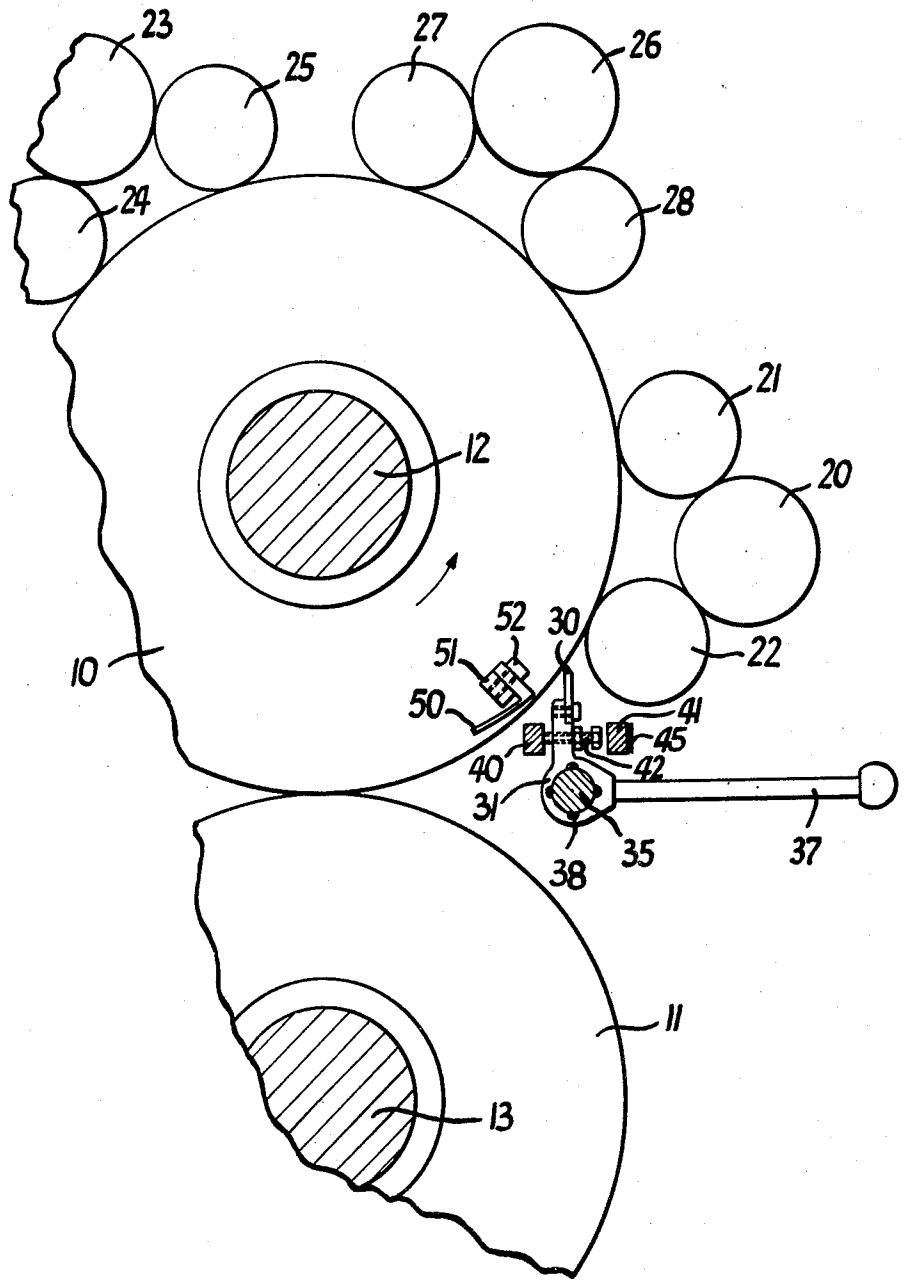
Aug. 18, 1964 W. B. LANG ETAL 3,144,826

DEVICE FOR REMOVING HICKIES FROM PRINTING PLATES

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FIG.1.



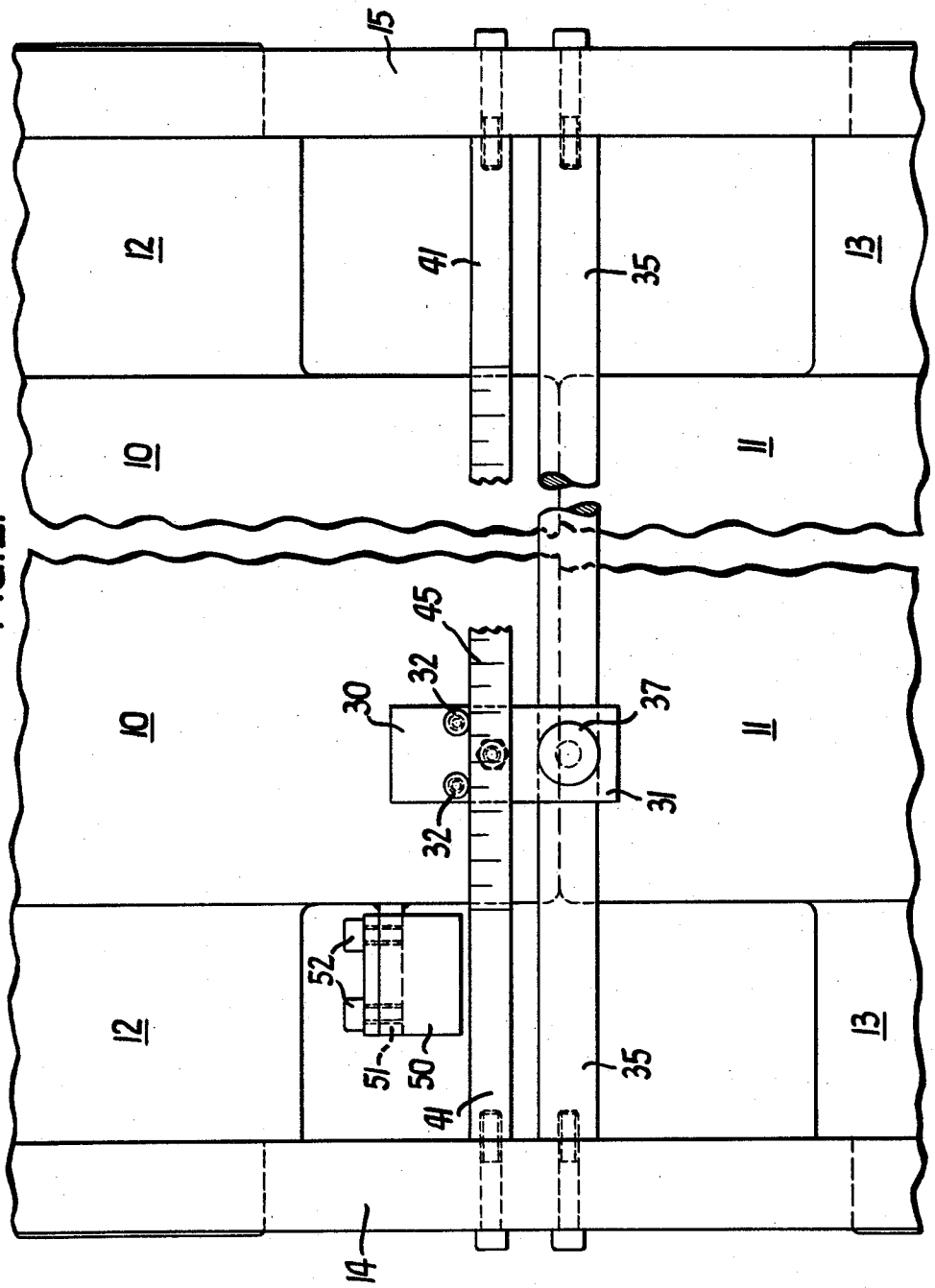
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FIG. 2.



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DEVICE FOR REMOVING HICKIES FROM PRINTING PLATES

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17 Claims. (Cl. 101—425)

This invention relates to apparatus and devices for removing particles of dirt or foreign matter (frequently called "hickies") adhering to the surface of printing plates and, more particularly, to such apparatus and devices for removing particles adhering to the surface of a printing plate while actually on the printing press and while the printing press is running.

As well understood in the printing art, there may frequently occur on the surface of printing plates adhering particles of dirt or agglomerated ink solids or paper fluff during the printing press run, which particles may be transferred to the surface of the plate from the inking mechanism or from the surface of the paper or other material being printed, etc. Once adhering to the printing surface, however, such particles are themselves covered with ink in the next inking operation and form a spot or other imperfection which is transferred to the next sheet of paper to be printed.

Additionally, since such particles are on the printing plate surface, and consequently raised therefrom, there may also be produced immediately surrounding the particle an uninked area, depending on the resiliency of the inking roll surfaces, with the result that the imperfection in the printed image caused by the particle may take the form of a black dot the size of the particle surrounded by a white or unprinted area, thus causing a substantial and undesired imperfection in the final printed result, especially when the particle lies on a portion of the image area of the printing plate instead of merely in an unprinted background area. As well understood in the printing trade, such particles adhering to the surface of the printing plate and/or the imperfections caused by them in the final printed result are frequently referred to as "hickies" or "doughnuts."

It is apparent, of course, that such particles may appear at different portions of the printing plate and at different times during the printing press run. Similarly, the appearance of such "hickies" or "doughnuts" is readily noticed as the printed sheets come off the press, so that, to keep the waste of imperfectly printed sheets to a minimum, it may be desired to remove such particles from the printing plate surface as soon as they are detected.

If it is attempted to remove such particles manually while the printing press is in operation, severe dangers to the operating personnel may result because of the inaccessibility of the surface of the printing plate except through other moving parts of the printing press. Even if it is attempted to remove such particles with a tool or other device during printing press operation, some further disruption of the ink film on the plate surface may occur, and especially with printing presses of a lithographic type where the establishing of inked and non-inked areas of the printing plate depends upon sequential and balanced application of aqueous fountain solution and greasy printing ink to the plate surface.

Thus, with many types or arrangements of lithographic presses, a point of accessibility to the plate cylinder surface occurs only after the printing plate has been moistened or inked, so that the actual removal of a particle or hickie may create additional printing imperfections on the plate surface causing additional waste of printed

sheets, as well as great danger of injury to the press operator by having to reach into the printing press for accessibility of the plate surface while the press is in operation. Also, especially with lithographic presses, it may not be advantageous or desirable to stop the printing press for the purpose of removing a particle from the plate surface because the finely balanced metering and application of ink films and water films to the printing plate surface must be reestablished anew each time the press is stopped and with additional wasting of printed sheets until the desired operating balance is reestablished.

According to this invention, by contrast, apparatus and devices are provided for the simple and easy removal of particles or hickies from the surface of printing plates and during the operation of the printing press, which apparatus and devices include a spatula mounted in convenient association with the printing plate cylinder and readily and safely operable from a remote position free of danger to the operator so as to move the spatula across the plate surface depending upon where a particle is to be removed and for contacting substantially no more of the plate surface than is required to remove the particle regardless of the continued rapid operation of the printing press. As a further feature of this invention, there are also provided means within the printing press or on the plate cylinder itself for cleaning the spatula after each use, and for positioning the apparatus at a position with respect to the direction of rotation of the plate cylinders so that particles are removed therefrom before the printing plate surface is contacted by inking and/or moistening rolls to minimize the number of printed sheets which must be wasted or rejected for printed image imperfections caused by either the particles on the plate surface or disruptions in the ink film on the plate caused by the removal of the particles.

With the foregoing and additional objects in mind, this invention will now be more particularly described, and other objects and advantages thereof will be apparent from the following description, the accompanying drawings, and the appended claims.

In the drawing:

FIG. 1 illustrates schematically or diagrammatically a portion of a printing press, particularly a lithographic offset press, having the invention applied to; and

FIG. 2 is an elevation view, looking from the right hand side of FIG. 1, of apparatus embodying and for practicing this invention as illustrated in FIG. 1 with some parts being omitted or broken away for clarity.

Referring to the drawings, in which like reference characters refer to like parts throughout the several views thereof, there is indicated somewhat diagrammatically an arrangement of apparatus in a lithographic offset press having a conventional plate cylinder **10** around the surface of which a lithographic plate is secured in known manner, and a rubber blanket offset cylinder **11** for receiving an inked image from plate cylinder **10** and transferring such image, in known manner, to paper or other material to be printed against a conventional impression cylinder (not shown).

Plate cylinder **10** and blanket cylinder **11** are illustrated as being rotatably mounted on, respectively, shafts **12** and **13** extending between main side frame members **14** and **15** of the printing press. Cooperating with the printing plate surface of plate cylinder **10**, in known and conventional manner with lithographic presses, are water fountain rolls **20–22**, and a plurality of conventional inking roller mechanisms indicated at **23–28** (all of which rolls are omitted for clarity from the showing of FIG. 2). As will be understood, during rotation of plate cylinder **10** in the direction indicated by the arrow, a lithographic printing plate on the surface thereof first contacts water fountain rolls **20–22** for the application

over the surface of the printing plate background areas thereof. The thus moistened plate subsequently contacts the various inking mechanisms **23–28** for the application of a film of printing ink to image areas of the plate, which film is subsequently transferred to blanket cylinder **11** as an ink image thereon, and thereafter transferred to the paper or other material to be printed against an impression cylinder (not shown).

A spatula **30**, preferably formed of a synthetic plastic such as methyl methacrylate, is mounted on a holder or a carrier **31** therefor, as by bolts **32**, and in a position such that the upper edge of spatula can be brought into contact with the surface of plate cylinder **10**. Holder **31** is, in turn, mounted on a rod **35** extending across the printing press and affixed to the side frames **14, 15** thereof, with holder **31** being slidably and rotatably carried by rod **35** so that spatula **30** may be moved to any of a variety of positions axially along cylinder **10** and also moved toward and away from the surface of cylinder **10**. Such movement of spatula **30** and holder **31** is preferably accomplished by an operating handle **37** affixed to holder **31** and extending through the printing press mechanism and away from the moving parts thereof to a point where an operator may easily and safely manipulate handle **37** without risk of danger from the moving parts of the printing press. As an aid in sliding holder **31** along rod **35** and in rotating or tilting holder **31** to position spatula **30** as desired with respect to the surface of plate cylinder **10**, ball bearings, generally indicated at **38**, may be provided within holder **31** for engaging rod **35** and facilitating the sliding and tilting movement of holder **31** with respect thereto.

Somewhat above rod **35** and generally adjacent to spatula **30** on holder **31**, there are provided rails **40** and **41** also extending across the printing press and carried by side frames **14** and **15** thereof, with rails **40** and **41** being spaced apart and positioned one on either side of spatula **30** as indicated in FIG. 1. On that portion of holder **31** extending between rails **40** and **41** is also provided an adjustable stud or stop member, illustrated as bolt **42**, for limiting or adjusting the extent of tilting or angular movement of holder **31** around rod **35** and between stationary rails **40** and **41**.

As will be apparent from the foregoing, holder **31** and spatula **30** thereon are readily moved to any axial position along the surface of plate cylinder **10**, and may also be tilted toward or away from the surface of plate cylinder **10** merely by manipulation of handle **37**. In this manner, when a particle or hickie is discovered to exist on the surface of plate cylinder **10**, spatula **30** is merely moved axially to a point in line with the hickie, and then handle **37** raised to the position shown in FIG. 1 to bring the upper edge of spatula **30** actually in contact with the surface of cylinder **10** at least long enough to scrape or remove the particle or hickie from the surface of the cylinder. Merely releasing handle **37**, then, allows the weight thereof to rotate holder **31** about rod **35** so that spatula **30** is no longer in contact with the surface of cylinder **10** and until the right hand end of bolt or stud **42** engages rail **41** to maintain spatula **30** in a position out of contact with any of the moving mechanism.

Bolt **42** is also adjustable so that, when spatula **30** is in particle-removing position as in FIG. 1, the upper edge thereof merely touches the surface of plate cylinder **10** to avoid bearing against it with such force as might scratch or mar the surface. Also, there may optionally although preferably be arranged on a visible surface of rail **41** or elsewhere a calibrated scale (indicated at **45**) as an aid to the operator in rapidly positioning holder **31** and spatula **30** at the particular axial point along plate cylinder **10** at which a particle or hickie has been found to exist by examination of the printed sheets coming off the press.

It is preferred that spatula **30** and the appertaining apparatus just described be mounted in a printing press in a position to contact the surface of cylinder **10** at a point in the rotation thereof prior to the application of either a moistening film from fountain rolls **20–22** or a printing ink film from inking mechanism **23–28** so that any streaks or other marks produced by spatula **30** in contacting the surface of cylinder **10** for the removal of a particle may be immediately eradicated or corrected by the fountain rolls and inking mechanism prior to the next subsequent printing impression in order to minimize as much as possible the number of printed sheets which must be wasted or rejected as having a printing imperfection therein. Particularly with lithographic presses where a perfectly inked image depends upon the careful application of both an aqueous fountain solution film and an ink film, the positioning shown in FIG. 1 with respect to the rotation of plate cylinder **10** and the orientation of the inking and moistening apparatus with respect thereto is preferred, and is readily accomplished in accordance herewith with most types or arrangements of printing presses in view of the remote operation by handle **37**, which can readily extend through the mechanism to a readily accessible and safe operating position. In any event, it is preferred that the spatula **30** be arranged to contact the surface of plate cylinder **10** at some point prior to the final application of a printing ink film on the printing plate even with printing plates of other than lithographic character.

In order to clean the scraping edge of spatula **30** after each use or as may be desired and without the necessity of reaching into the operating mechanism, there is preferably provided a scraper blade **50**, mounted in a holder **51** therefor as by bolts **52**, and positioned for rotation with the plate cylinder at some convenient location thereon. In the illustrated embodiment, blade **50** and holder **51** are illustrated as being mounted at one end of plate cylinder **10** and closely adjacent the periphery thereof, although blade **50** is also satisfactorily mounted within the conventional axial groove long plate cylinder utilized to accommodate the clamping mechanism for the opposite axial edges of printing plates mounted around the surface of the cylinder. In such manner, spatula **30** and holder **31** therefor are merely slid along rod **35** to a point aligned with blade **50** and beyond the edge of spatula **30**, as cylinder **10** rotates, to remove from spatula **30** ink or dirt or particles adhering thereto and having been scraped off the surface of plate cylinder **10** as described above.

Thus there is provided in accordance with this invention apparatus for quickly and easily removing particles or hickies from the surface of printing plates virtually immediately, as soon as the presence of the particle is discovered, and without either stopping the printing press or endangering the operator attempting to remove the particle. Additionally, the apparatus in accordance herewith is extremely simple and economical to construct and is readily applicable to a wide variety of printing press mechanisms and arrangements without requiring redesigning or alteration thereof. The arrangements hereof provide for removing a particle or hickie from the printing plate while contacting the blade only momentarily in an area restricted generally to the vicinity of the particle being removed and without disrupting inordinately the entire ink or water film across the whole printing plate surface. Although mechanism embodying and for practicing this invention may be mounted at a variety of different positions in the printing press, the entire mechanism is sufficiently compact that it is readily and preferably included at a point where the spatula contacts the plate cylinder surface prior to the application of a moistening film and/or ink to the printing plate so that, even with extremely high speed press runs, a particle or hickie may be removed quickly and in a way which minimizes the number of imperfectly printed sheets which are produced during or as a result of the particle removal operation.

While the forms of apparatus herein described constitute preferred embodiments of the invention, it is to be

understood that the invention is not limited to these precise forms of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. Apparatus for removing particles of foreign matter adhering to the surface of a printing plate mounted on a plate cylinder of a rotary printing press in which said plate cylinder has applied thereto repeatedly during the operation of said printing press a film of ink, said apparatus being adapted for removing said particles while said printing press is in operation and during continued rotation of said plate cylinder therein, which comprises in combination a transverse rod mounted across said printing press and adjacent the surface of said plate cylinder and said printing plate thereon, a spatula member having a scraping edge for contacting said printing plate on said plate cylinder in an area thereof where said particle is adhering for removing said particle, means for mounting said spatula member on said transverse rod for axial and angular movement with respect thereto, said transverse rod and said spatula member thereon being disposed in said printing press for contacting said printing plate at an angular position in the rotation of said plate cylinder prior to the application of said ink film thereto, and operating means for moving said spatula and said scraping edge thereof angularly into and out of contact with said printing plate and axially of said plate cylinder during rotation thereof for contacting said printing plate at any point on the surface thereof where said particle may be adhering.

2. Apparatus as recited in claim 1 in which said printing plate on said plate cylinder has applied thereto repeatedly during operation of said printing press films of both ink and fountain solution, and in which said transverse rod and said spatula member thereon are disposed in said printing press for contacting said printing plate at an angular position in the rotation of said plate cylinder prior to the application of both said ink and fountain solution films thereto.

3. Apparatus as recited in claim 1 which said operating means includes means for moving said spatula member axially of said transverse rod and angularly into and out of contact with said plate cylinder, said operating means extending from said spatula member through said printing press to a position which is readily and safely accessible during continued operation of said printing press.

4. Apparatus as recited in claim 3 in which said operating means also forms means for normally urging said spatula member out of contact with the surface of said printing plate on said plate cylinder.

5. Apparatus as recited in claim 1 which also includes ball bearing means for mounting said spatula member on said transverse rod for free and easy axial and angular movement thereon.

6. Apparatus as recited in claim 1 which also includes adjustable stop means for adjustably limiting said angular movement of said spatula member toward and away from said surface of said plate cylinder.

7. Apparatus as recited in claim 1 in which said operating means includes a handle for moving said spatula member axially of said plate cylinder and angularly into and out of contact with the surface thereof, said handle extending through said printing press to a readily and safely accessible position therein, and a calibrated axial scale disposed adjacent said handle for indicating the axial point on said plate cylinder at which said spatula member is located.

8. Apparatus as recited in claim 1 which also includes a moving blade for cleaning said scraping edge of said spatula member, and means for mounting said blade in said printing press and disposed therein at a point adjacent said spatula member and within the extent of movement thereof permitting selectively moving said scraping edge into contact with said cleaning blade.

9. Apparatus for removing particles of foreign matter adhering to the surface of a printing plate mounted on a plate cylinder of a rotary printing press, said apparatus being adapted for removing said particles while said printing press is in operation and during continued rotation of said plate cylinder therein, which comprises in combination a transverse rod mounted across said printing press and adjacent the surface of said plate cylinder and said printing plate thereon, a spatula member having a scraping edge for contacting said printing plate on said plate cylinder in an area thereof where said particles are adhering for removing said particles, means for mounting said spatula member on said transverse rod for axial and angular movement with respect thereto, operating means for moving said spatula member and said scraping edge thereof angularly into and out of contact with said printing plate and axially of said plate cylinder during rotation thereof for contacting said printing plate at any point on the surface thereof where said particles may be adhering, adjustable stop means for adjustably limiting said angular movement of said spatula member toward and away from said surface of said plate cylinder and including a stationary rail across said printing press and on each side of said spatula member, and an adjustable stop on said spatula member and disposed between said rails for abutting contact therewith of angular movement of said spatula member.

10. Apparatus for removing particles of foreign matter adhering to the surface of a printing plate mounted on a cylinder of a rotary printing press, said apparatus being adapted for removing said particles while said printing press is in operation and during continued rotation of said plate cylinder therein, which comprises in combination a transverse rod mounted across said printing press and adjacent the surface of said plate cylinder and said printing plate thereon, a spatula member having a scraping edge for contacting said printing plate on said plate cylinder in an area thereof where said particle is adhering for removing said particle, means for mounting said spatula member on said transverse rod for axial and angular movement with respect thereto, and operating means for moving said spatula member and said scraping edge thereof angularly into and out of contact with said printing plate and axially of said plate cylinder during rotation thereof for contacting said printing plate at any point on the surface thereof where said particle may be adhering, a moving blade for cleaning said scraping edge of said spatula member, said blade being mounted on said plate cylinder for rotation therewith but out of contact with said surface of said printing plate thereon, and means for mounting said blade in said printing press and disposed therein at a point adjacent said spatula member and within the extent of movement thereof permitting selectively moving said scraping edge into contact with said cleaning blade.

11. Apparatus as recited in claim 10 in which said cleaning blade is mounted on said plate cylinder and at one end thereof axially beyond the area of said printing plate thereon.

12. Apparatus as recited in claim 11 in which said operating means includes means for moving said spatula member axially of said plate cylinder and angularly into and out of contact therewith and with said cleaning blade, said operating means extending through said printing press to a readily and safely accessible point therein.

13. Apparatus as recited in claim 10 in which said printing plate on said plate cylinder has applied thereto repeatedly during operation of said printing press films of both ink and fountain solution, and in which said transverse rod and said spatula member thereon are disposed in said printing press for contacting said printing plate in an angular position in the rotation of said plate cylinder prior to the application of both said ink and said fountain solution films thereto.

14. Apparatus as recited in claim 10 in which said

printing plate on said plate cylinder has applied thereto repeatedly during operation of said printing press films of ink, and in which said transverse rod and said spatula member thereon are disposed in said printing press for contacting said printing plate at an angular position in the rotation of said plate cylinder prior to the last application of said ink films thereto.

15. Apparatus as recited in claim 10 in which said printing plate on said plate cylinder has applied thereto repeatedly during the operation of said printing press films of fountain solution, and in which said transverse rod and said spatula member thereon are disposed in said printing press for contacting said printing plate at an angular position of rotation of said plate cylinder prior to the last application of said fountain solution film thereto.

16. Apparatus for removing particles of foreign matter adhering to the surface of a printing plate mounted on a plate cylinder of a rotary printing press in which said printing plate on said plate cylinder has applied thereto repeatedly during operation of said printing press a film of ink, said apparatus being adapted for removing said particles while said printing press is in operation and during continued rotation of said plate cylinder therein, which comprises in combination a transverse rod mounted across the printing press and adjacent the surface of said plate cylinder and said printing plate thereon, a spatula member having a scraping edge for contacting said printing plate on said plate cylinder in an area thereof where said particles are adhering for removing said particles, said transverse rod and said spatula member thereon being disposed in said printing press for contacting said printing plate at an angular position in the rotation of said plate cylinder prior to the application of said ink film thereto, means for mounting said spatula on said transverse rod for axial and angular movement with respect thereto, operating means for moving said spatula member and said scraping edge thereof angularly into and out of contact with said printing plate and axially of said plate cylinder during rotation thereof for contacting said printing plate at any point on the surface thereof where said particle may be adhering, a moving blade for cleaning said scraping edge of said spatula being mounted on said plate cylinder for rotation therewith, but out of contact with said surface of said printing plate thereon, and means for mounting said blade in said printing press and disposed therein at a point adjacent said spatula member and within the extent of movement thereof permitting selectively moving said scraping edge into contact with said cleaning blade.

17. Apparatus for removing particles of foreign matter adhering to the surface of a printing plate mounted on a plate cylinder of a rotary printing press, said apparatus being adapted for removing said particles while said printing press is in operation and during continued rotation of said plate cylinder therein, which comprises in combination a transverse rod mounted across said printing press and adjacent the surface of said plate cylinder and said printing plate thereon, a spatula member having a scraping edge for contacting said printing plate on said plate cylinder in an area thereof where said particle is adhering for removing said particle, means for mounting said spatula member on said transverse rod for axial and angular movement with respect thereto, operating means for moving said spatula member and said scraping edge thereof angularly into and out of contact with said printing plate and axially of said plate cylinder during rotation thereof for contacting said printing plate at any point on the surface thereof where said particle may be adhering, said operating means extending from said spatula member through said printing press to a position which is readily and safely accessible during continued operation of said press and forming means for normally urging said spatula member out of contact with said printing plate, and stop means including a stationary rail across said press and on each side of said spatula member for adjustably limiting angular movement of said spatula member about said transverse rod toward and away from the surface of said printing plate on said plate cylinder.

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